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Designing Mobile Software to Prevent Child Marriage

Masteroppgave i Datateknologi
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Juni 2019

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Summary

Context   More than 20 million children under the age of 18 are married each year, despite a global effort to end this practice. Current trends calculate that even if the percentage of marriages involving children is going down, the total amount is likely to increase as a result of population growth. Child marriage has a negative impact on education levels, health, work opportunities and economic development both for the individuals involved and the communities around them. While mobile applications have been used for many programs in low-development areas, a very small amount of these have focused on child marriage.

Objective   The objective of this project is to provide an overview of the current state of the art around child marriage and the methods used to prevent it, Human Computer Interaction for Development, and designing mobile applications for low-literate users. To do this, we will design and prototype a mobile application that can be used to combat child marriage by helping those in afflicted areas access information and assistance. By introducing a set of different design methods to users in low-development areas, we explore what concerns and limitations must be taken into account when developing software in these conditions.

The following research questions will be answered:

1. RQ1: What is the current state of the art of using apps to combat child marriage?

2. RQ2: How do different design choices affect the effectiveness of conveying information about child marriage?

3. RQ3: What factors must be considered when conducting user studies in underdeveloped areas?

Method   The project consists of two phases. First, a preliminary phase with literature review of relevant subjects and structured interviews with experts in the field of child marriage provides a foundation to build on and initial feedback to the general ideas of the project. Following this is a set of two user studies where we interview 23 participants in different areas of Malawi to test seven design methods that were created after the initial research phase. This is done in cooperation with Plan International, who are already working in and have knowledge of the areas where the testing is conducted. We used a semi-structured interview process in the case studies to gather insight and ideas from the participants. In addition to feedback on the different design methods, we also find answers to relevant questions around how the participants learn and seek information, their views on child marriage, how they use mobile phones and the internet, and what information they would need from an app that is supposed to help them against child marriage.

Results   Throughout this thesis, we have found that using mobile phones as a way to spread information about child marriage is viable and desired by both NGOs and other stakeholders. We have identified three previous attempts at using this approach, and covered difficulties that arise when designing software for people in underdeveloped areas of the world. We have interviewed one person that was involved in one of these projects, as well as several other experts on child marriage and ICT, to gather inspiration, feedback, and tips for the project. With their assistance, we came up with seven different design methods that we eventually tested in the field in Malawi. The user studies we ran there involved 19 girls and 4 local authority figures. Of the 7 design methods we prototyped, 3 were found to need small modifications, 3 have received larger changes, and 1 was scrapped in favor of using already existing technologies. The interviews also covered more general questions around marriage and mobile phone and internet usage amongst people in Malawi. Based on our experiences from the user studies, we also present a set of guidelines for performing user tests in underdeveloped areas.

Conclusions and further work   With an increasing amount of people worldwide getting access to mobile phones and the internet, many opportunities arise that can accelerate the speed at which poor people around the world move up the the economic ladder. To accompany this, there needs to be an increased focus on designing software that is usable by those on the periphery of internet and mobile access. In this thesis, we take a comprehensive look at design challenges, opportunities, and notable differences that must be taken into account. By sharing our experiences from our user studies in Malawi, we hope to provide future projects with the knowledge they need to get the most out of their work.

Our partners in Plan International have expressed great interest in continuing the project, and are looking into developing and launching a version of it. Many more studies are needed to pinpoint the details of the project, and

further studies should be run outside of Malawi so that the project can also be launched there. The guidelines we have made for user studies in low-development areas are by no means an exhaustive list, and we hope that future projects will expand upon it with their own experiences. A work-in-progress paper of the project is accepted and will be published by the IDC conference in June 2019, which is found in appendix G. Other papers are also in the works for later conferences.

Sammendrag

Kontekst   Flere enn 20 millioner barn under 18 blir gift hvert år, til tross for globalt arbeid for å utrydde denne skikken. Nåværende trender tyder på at selv om prosentandelen ekteskap hvor barn er involvert går ned, vil den absolutte mengden barneekteskap gå opp som et resultat av befolkningsøkning. Barneekteskap har negative konsekvenser på utdannelsesnivåer, helse, arbeidsmuligheter, og økonomisk vekst både for individene som er involvert og samfunnet rundt dem. Mobilapplikasjoner har blitt brukt av mange utviklingsprogrammer i utviklingsområder, men svært få av disse har vært rettet mot barneekteskap.

Målsetninger   Målet med dette prosjektet er å utforske mulighetene for å bruke mobilapplikasjoner for å spre kunnskap om barneekteskap i rammede områder. For å gjøre dette vil vi gi en oversikt over dagens state-of-the-artrundt barneekteskap og metodene brukt for å forhindre det, menneske-maskin-interaksjon for utvikling, og hvordan man utvikler mobilapplikasjoner for brukere med lav eller ingen lese- og skrivekunnskaper. Vi designer og prototyper en mobilapplikasjon som kan bli brukt for å bekjempe barneekteskap ved å gi de som trenger det lettere tilgang med å få tilgang til informasjon og assistanse. Ved å introdusere et sett med ulike designmetoder til brukere i lavutviklingsområder avdekker vi hvilke bekymringer og begrensninger man må ta hensyn til når man utvikler software under slike forhold

De følgene forskningsspørsmålene vil bli besvart:

1. RQ1: Hva er dagens state-of-the-art rundt å bruke apper for å bekjempe barneekteskap?

2. RQ2: Hvordan påvirker ulike designvalg effektiviteten rundt å spre informasjon om barneekteskap?

3. RQ3: Hvilke faktorer må man ta hensyn til når man utfører brukerundersøkelser i underutviklede områder?

Metode   Dette prosjektet består av to faser. Først utfører vi en gjennomgang av litteraturen til relevante temaer, og utfører strukturerte intervjuer med eksperten innen barneekteskap. Dette gir et grunnlag å bygge på og gir oss tilbakemelding rundt de generelle ideene i prosjektet. Etter dette utfører vi to brukerstudier hvor vi intervjuer 23 deltakere i ulike deler av Malawi, for å teste 7 designmetoder som ble laget etter den første fasen. Dette ble gjort i samarbeid med Plan International, som allerede jobber i og har kunnskap om områdene hvor vi utførte studiene. Vi brukte semistrukturerte intervjuer for å samle tilbakemeldinger og ideer fra deltakerne. I tillegg til dette fant vi også svar på relevante spørsmål rundt hvordan deltakerne lærer og oppsøker informasjon, deres syn på barneekteskap, hvordan de bruker mobiltelefoner og internett, og hvilken informasjon de behøver fra en app som skal hjelpe dem mot barneekteskap

Resultater   Gjennom denne masteroppgaven har vi funnet at det å bruke mobiltelefoner til å spre informasjon om barneekteskap er gjennomførbart og ønsket av både hjelpeorganisasjoner og andre interessenter. Vi har identifisert 3 tidligere forsøk på å bruke denne metoden, og gått over problemer man kan støte på når man designer for brukere i underutviklede områder av verden. Vi intervjuet en person som har jobbet i et av disse prosjektene, i tillegg til flere andre eksperter på barneekteskap og ICT. Med deres hjelp kom vi opp med 7 ulike designmetoder som vi testet i felten i Malawi. Brukerundersøkelsene vi utførte der involverte 19 jenter og 4 lokale autoritetsfigurer. Av de 7 designmetodene var det 3 som ikke trengte mer enn små modifikasjoner, 3 som behøvde større endringer, og 1 som ble erstattet med allerede eksisterende teknologier. Intervjuene dekket også mer generelle spørsmål rundt ekteskap og bruk av mobiltelefoner og internett i Malawi. Basert på våre opplevelser presenterer vi også et sett med retningslinjer for å utføre brukertesting i underutviklede områder.

Konklusjon og videre arbeid   Stadig flere mennesker verden rundt får nå tilgang til mobiltelefoner og internett, og dette åpner mange muligheter for å hjelpe mennesker ut av fattigdom. For å støtte dette trengs det et større fokus på å designe software som også er brukbart av de på ytterkanten av internett- og mobiltilgang. I denne masteroppgaven ser vi på designutfordringene, mulighetene og viktige forskjeller man må ta hensyn til. Ved å dele våre erfaringer fra brukerundersøkelsene i Malawi håper vi å kunne hjelpe fremtidige prosjekter med informasjonen de trenger for å få mest mulig ut av arbeidet sitt.

Våre partnere i Plan International har uttrykt stor interesse i å fortsette prosjektet, og ser på mulighetene rundt å utvikle og utgi en versjon av det. Mange flere studier er nødvendige for å fastslå detaljene i prosjektet, spesielt dersom prosjektet skal lanseres utenfor Malawi. Retningslinjene vi har laget er ikke ment å være fullstendige, og vi håper fremtidige prosjekter vil utbedre disse med sine egne erfaringer. En work-in-progress-artikkel basert på

prosjektet har blitt akseptert av IDC 2019-konferansen, og vil bli utgitt der i juni 2019. Denne kan finnes i vedlegg G. Flere artikler er planlagt å bli tilsendt andre konferanser.

Acknowledgment

Preface

This thesis is submitted to the Norwegian University of Science and Technology (NTNU) as part of the course TDT4900 - Computer Science, Master's Thesis. The work has been performed at the Department of Computer Science, NTNU, Trondheim, under the supervision of Professor Letizia Jaccheri and with assistance from postdoc Juan Carlos Torrado Vidal.

Innhold

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Tabeller

Abbreviations

UNFPA	=	United Nations Population Fund
ICRW	=	International Center for Research on Women
ICT	=	Information Communications and Telecommunications
ICT4D	=	Information and Communication Technologies for Development
HCI4D	=	Human Computer Interaction for Development
NGO	=	Non-governmental Organization
NTNU	=	Norges Tekniske og Naturvitenskapelige Universitet
NSD	=	Norges Senter for Forskningsdata

Kapittel 1

Introduction

Child marriage is any marriage where one or both of the participants is under the age of 18. Today, more than 12 million such marriages happen every year (78). The eradication of child marriage is subgoal 5.3 of the UN's Sustainable Development Goals, but at the current rate this goal is far from reaching its 2030 deadline (79). Combating child marriage is a complex project which requires changing cultural, religious and ethical norms and traditions (32).

This master's thesis explores the design and use of digital tools for spreading information about the dangers of child marriage in low-development areas. Through a cooperative effort with Plan International, we conduct interviews with 19 young girls and 4 local authority figures in Malawi. Here we test 7 different design methods to identify design challenges and opportunities that arise when developing and designing for people who are on the fringes of internet and mobile device availability.

This chapter starts by introducing the motivation behind the project, then the research questions are presented in section 1.2. Finally, the objectives of the project are discussed in 1.3.

1.1 Motivation

Globally, 21% of women between 20 and 24 were married before they turned 18 (78). Child marriage leads to lower levels of education, physical and psychological problems, and depression, and The World Health Organization has found that complications from pregnancy and childbirth, of which 9 out of 10 happen within the bonds of marriage, is the leading cause of death among adolescents (54) (18) (84). Being subjected to early marriage has significant impact on the future of a child, as they are far more likely to stay illiterate, drop out of school, and experience poorer health (58). While there has been significant work done to stop child marriages worldwide, population increase means that certain parts of the world will see an increase in the absolute number of people subject to child marriage (79). In addition, whereas some countries have had great success with their programs, others have seen little or no decline in the rate of marriage. There are still eight countries in the world where more than half of all children are married off before the age of 18 (79).

While we often think of child marriage as something that only happens in less developed countries, this is not always the case. Even in countries with strong laws and safety checks against underage marriages, kids sometimes find themselves married away while visiting their family's home countries. The Norwegian Red Cross has had a child marriage helpline since 2008, which received more than 250 calls in its first four years of service (64). In 27 states in the USA, there is no lower limit to the age at which a person can get married as long as there is judicial and/or parental approval. Close to 60.000 children between 15-17 years old were married in all of the U.S., around 0.5% of all children in this age group (65).

Some efforts have been made to use mobile phones to prevent child marriage. One example is Bandhan Tod, an app made for the Indian state of Bihar by the UN Population Fund (UNFPA) and Gender Alliance Bihar (80). Bandhan Tod uses educational text and videos to spread information about the dangers of child marriage, and also provides an SOS button to contact the Gender Alliance if the user needs help. In its first three months on the market, the app had 3000 downloads and more than 240 distress calls, proving that using mobile applications against child marriage is working and is worth studying closer. Bandhan Tod is further discussed in chapter 2.5.

In total, we test 7 different design methods. These are based on Bandhan Tod and the set of interviews we conducted with experts on child marriage in 4.2. They are:

1. Presenting information through text and statistics.

2. Teaching arguments that can be used against child marriage.

3. Telling stories about the hardships of marrying early.

4. Using videos to show stories and facts about child marriage.

5. Displaying contact information to people and organizations that can help the user.

6. Organize links to already existing publications and fact sheets about child marriage.

7. Using social media as a platform where users can seek help and advice.

In addition, we look into how local differences can change how these design methods should be used. Child marriage is especially susceptible to such distinctions, as the reasons behind and solutions to it vary greatly from place to place. An app like Bandhan Tod, for example, is designed for a specific region of India, and would not work outside of that state. Language, norms and customs, available organizations, and the particular reasons for child marriage are all different and must be taken into account when designing (79). A closer look on local differences is done in chapter 2.8.

1.2 Research Questions

This thesis looks to answer questions related to the requirement elicitation and design of mobile applications in areas that often suffer from low literacy rates, reduced access to electricity, poverty and which lie on the periphery of internet access. While the focus of the project lies on the prevention of child marriage, these questions would be relevant for any project operating in these areas, especially if they aim to spread information. By creating prototypes using the design methods presented in 1.1 and doing user studies on them, this project not only gathers user feedback on the prototypes, but also explore questions about child marriage and phone and internet usage related to the design methods. In addition, it will determine which of these methods, or combinations of them, that are the most efficient at communicating information about child marriage specifically. The following research questions will be answered:

1. RQ1: What is the current state of the art of using apps to combat child marriage?

2. RQ2: How do different design choices effect the effectiveness of conveying information about child marriage?

3. RQ3: What factors must be considered when conducting user studies in underdeveloped areas?

The first research question is answered by a preliminary study of today's state of the art, as well as interviews with expert in the field of child marriage. The second question is answered by conducting user tests with young girls and local authority figures in two different areas of Malawi. For the third questions, we provide a set of guidelines that should be followed when conducting user studies in similar situations as ours.

Originally, only RQ1 and RQ2 were included in the study. RQ3 was added after the user studies were done, as we felt it prudent to give a larger focus to the many lessons we learned during the user studies.

1.3 Objectives

The literature review and expert interviews in this thesis is meant to provide an overview of all the different aspects of developing an app targeting child marriage. Since mobile development for this purpose is scarce, this requires combining information from many different disciplines and re-targeting them towards mobile development. In addition, this part will cover research on the effectiveness of mobile applications in low-development areas, and the additional issues faced under these conditions.

Based on the information uncovered in the first part, the project will conduct user testing with participants in Malawi living in areas where child marriage is prevalent. From this we will not only get feedback on the designs themselves, but also A new version will then be designed based on the feedback and results of this testing. The final goal of the project is to develop a system for creating localized apps worldwide, however this may be outside the scope of a master's thesis.

1.4   Thesis Outline

This thesis consists of 9 chapters. In chapter 1 we have introduced the motivation, background, and objectives of the project. Chapter 2 analyses the current state of the art around child marriage and mobile development in underdeveloped areas, as well as an introduction into the current attempts at combining these two subjects. In chapter 3 we explain the research methods used in the project, and explain why other methods were not chosen. Chapter 4 covers how we cooperated with international NGOs and other organizations throughout the project, and contains the expert interviews we conducted. Chapter 5 presents the design methods that we created and tested. Chapter 6 describes the case studies we conducted in Malawi, as well as an introduction to Malawi and child marriage there. In chapter 7 we outline the results we gathered from the case studies. Chapter 8 summarizes the lessons we learned about conducting user studies while in Malawi, presented in the form of a set of guidelines to assist similar, future projects. Finally, in chapter 9 we present our conclusions.

Kapittel 2

State of the Art

While there has been significant research done on the subject of child marriage, none to our knowledge has been done with a focus on designing a mobile application. A small number of applications that aim to combat child marriage do exist, and these are discussed in section 2.5. Since there is no previous research which directly covers the subject, it was decided that a systematic review was not applicable in this instance. Systematic reviews work better when comparing papers around the same subject. As this project instead tries to combine multiple, diverse subjects, this literature review will instead look at the state of the art within each of these subjects.

This chapter has three overarching parts: search methods in, child marriage, and Human-Computer Interaction for Development. Section 2.1 introduces the chapter by giving an overview of the search methods that were used for the data gathering. Figure 2.1 shows the connections between the remaining sections. We have already given an overview of child marriage in the Motivation section of this thesis, chapter 1.1. To build on this, the first sections will cover child marriage in more detail. The two most important parts to understand about child marriage for our project are the reasons why it happens, so that countermeasures can be found, and what prevention methods are available. We cover these in sections 2.2 and 2.3, where the latter is divided into subsections based on the prevention methods found in Roudi-Fahimi et al. (2013) (70). In section 2.4 we look closer at wedding buster groups, which are youth groups that fight child marriage in their communities, as they are an important stakeholder.

With an understanding of what drives child marriage and how it can be prevented, we spend the rest of the chapter looking at the challenges of creating mobile applications under such conditions. Firstly, 2.5 examines three projects that have used mobile phones to combat child marriage. In 2.6 we introduce the field of Human-Computer Interaction for Development, or HCI4D. Then, 2.7 looks at the extra difficulties caused by trying to design for a user group with many low-literate or illiterate people. Finally, we show in 2.8 that local differences are important to take into account when designing for low-development areas.

2.1 Search method

As much of the data gathering and work done on child marriage is by global NGOs, most of the information found here is from publications and policy briefs made available by organizations such as the UNFPA, the International Center for Research on Women, and Plan International. In addition, it will provide some select examples of projects that have tried different methods of preventing child marriage. The latter sections do not look at child marriage specifically, but rather the development and design of mobile solutions used in low-development areas and for people with low literacy skills. Here, aggregate sites for scholarly literature, in particular Google Scholar, IEEE, and ACM, were the primary sources for initial research. These were initially searched using broad search strings such as "child marriage", "ICT4D", and low-literate AND (software OR mobile)". The initial set of relevant articles was then explored for any relevant references, as well as forward snowballing by using Google Scholar's "cited byfeature. In addition, the initial set of papers were used to compile a set of relevant conferences. The most relevant of these conferences were then searched manually for relevant articles in order to get a complete overview of the current state of the art. These conferences were as follows: IST-Africa 2017, IST-Africa 2018, ACM Compass 2018, ICTD X, IDC 2017, and IDC 2018
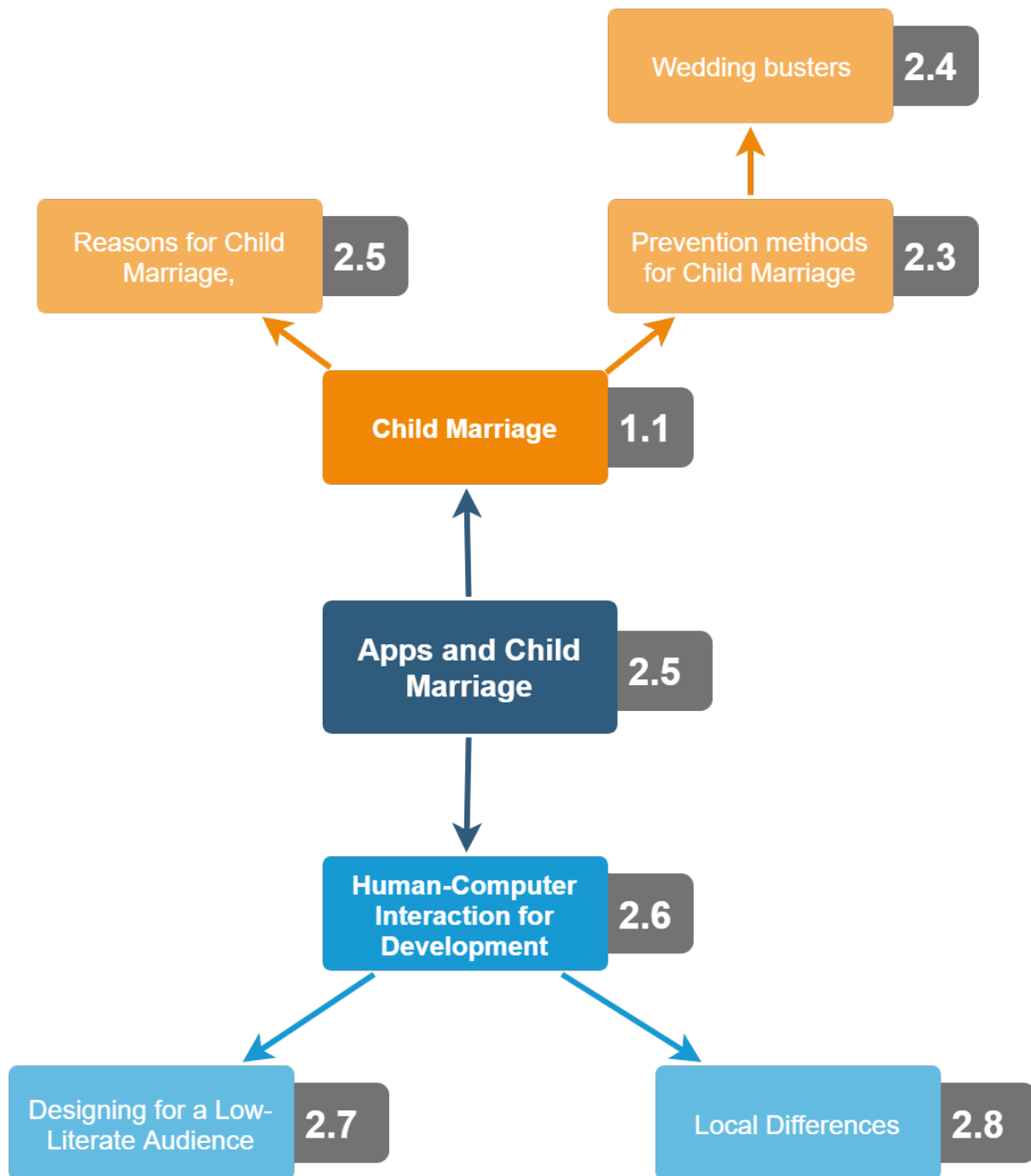
Figur 2.1: Overview of the sections in the State of the Art chapter

2.2 Reasons for Child Marriage

Reducing the rate of child marriage has been an important focal point of multiple projects and research efforts, with many different methods being tried (54) (3). Roudi-Fahimi and Ibrahim (70), looking at the Arab region, identify the following underlying reasons for child marriage:

1. **Poverty**
   There is a clear correlation between poverty rates and child marriage. Poverty is also linked to lower education, less access to police assistance, and fewer opportunities at finding employment.

2. **Family honor**

   Being married early reduces the chance of a girl being sexually assaulted, kidnapped or suffer from other humiliating acts. Because of this, many parents will marry off their daughter to someone they believe can protect them.

3. **Financial incentives**

   In some areas young girls are seen as having no value, which means they provide nothing but extra expenses for the family. In cultures that practice dowries, a younger bride is often worth more because there is a higher chance that she has no sexual experience, or is pure"in that sense (54).

4. **Low education**

   Schools do not only provide education which again means higher earning potential later in life, but are also a safe space where social bonds can be formed. Children who live isolated from others are more likely to be married away early.

5. **Patriarchal laws**

   Many Arab countries follow sharia laws which grant men increased control over the lives of women, ranging from men being the only ones allowed to initiate a divorce to women being banned from interacting with the state unless a male family member does it for her.

6. **Non-enforcement of laws**

   Even though many of the countries studied have laws which ban all marriage before the age of 18, these are sometimes not strong or enforced enough.

7. **Public awareness**

   When people are not educated on the dangers and other negative aspects of child marriage, it is difficult to end it. Other studies have shown that just informing girls of their opportunities outside of marriage has an impact on the rates of early marriage (21).

2.3 Prevention Methods for Child Marriage

In 2011, the International Center for Research on Women published Solutions to End Child Marriage - What the Evidence Shows"(32). This review looked at 23 programs which utilized five main strategies for delaying or preventing child marriage

1. Empowering girls with information, skills, and support networks.

2. Educating and mobilizing parents and community members.

3. Enhancing the accessibility and quality of formal schooling for girls.

4. Offering economic support and incentives for girls and their families.

5. Fostering an enabling legal and policy framework.

These methods are covered in the following subsections.

Most of the programs focused on the first two strategies, often in combination. Their results found that programs working on the macro level of society, strategy 5, saw the weakest results. The strongest performers were those focusing on long-term changes in social and cultural practices. The problem with these kinds of programs is that they require a great amount of work on a personal level with the participants, meaning they have issues scaling up. These issues are further exacerbated by local differences in how and why child marriage happens, a problem discussed more closely in section 2.8.

2.3.1 Empowering Girls with Information, Skills, and Support Networks

The first of these methods, and the most relevant for this project, is that of giving the girls who are at risk of child marriage introductory courses in information about child marriage, education and employment opportunities. An issue with these programs is that they have high cost in money and man hours, and as such few of them have seen large scale deployment.

One example of such a program worked with adolescent girls in Bangladesh, as noted by Amin et al. (2018) (3). It used three different approaches to educate more than 9000 participants on the dangers of child marriage: education in mathematics, finance, and English to make learning more attractive; gender-rights awareness training focusing on critical thinking around gender roles; and livelihoods-skills training where the girls were shown opportunities in locally available occupations (3). All three intervention arms saw a later decrease in child marriage of 25%-30%. The project was reliant on volunteering participants, meaning that those already at a lower risk of marriage might have been more likely to participate. The authors also note the possibility that the act of showing up and showing that the government is serious about ending child marriage is sufficient to put a dent in the underage marriage statistics. Other studies show that informing children that there are other options than early marriage available alone can have an impact on their approach to marriage and employment (21).

2.3.2   Educating and Mobilizing Parents and Community Members

This method is often deployed in combination with the previous method, and aims to provide the same information to the society as a whole. A focus point in many of these is to influence key societal members such as religious leaders, tribal elders and the Wedding Buster type groups covered in section 2.4. Since the parents are usually the ones who decide if a marriage is going to happen, convincing them that marrying off their child is a bad idea is most often enough to avoid any marriage proposition. Implementations of this approach range from one-on-one conversations with parents to large-scale public announcements across different media. Often, but not always, this approach is combined with the Empowering girls"method in 2.3.1.

2.3.3   Enhancing the Accessibility and Quality of Formal Schooling for Girls

There is a clear correlation between early marriage and early dropout of formal schooling (17). The connection works both ways; better access to education results in lower rates of child marriage in the region (4). At the same time, lower rates of child marriage lead to higher levels of education, as the girls are no longer required to drop out of school to work as housewives. Education on its own is still not enough to completely end early marriage practices, as shown by Amin et al. (2017) (4). They note that

> [...] investments in schooling, an important entry point, need also to be tied to income-generating skills and to the provision of improved security and safety in public spaces and workplaces. Safeguarding girls by empowering them with knowledge of their rights and access to remedies, [...], is also instrumental since concerns about safety can prevent girls from accessing opportunities and limits the potential returns on their education.

Higher education is a goal for many developmental programs, and these end up having an impact on child marriage tangentially to their own objectives. This is especially prevalent amongst programs providing education about sexual health and diseases (7).

2.3.4   Offering Economic Support and Incentives for Girls and Their Families

The use of conditional cash transfer (CCT) programs, in which participants are given a monetary reward if they or their family reach a specific goal, have proven successful in many areas such as child health and growth, education, and child labor (11). An example is parents being promised financial aid should their kids finish middle school, which means there is no longer a need for them to pull their child out of school to help at the farm. This approach has also been attempted in the fight against child marriage, however Amin et al. (2016) found that CCT programs are largely ineffective when applied to this problem (2). In their paper, they conclude that CCTs are not able to overcome the deep social and cultural norms that form the foundation of child marriage. In one case, the Apni Beti Apni Dhan ("Our Daughters, Our Wealth") program in India, the CCT program ended up having a negligible impact on the amount of children married before 18, as well as an increase in the rate of marriage as soon as the girls turned 18 (52). It turned out that more than half of the participants saw the money as a means to help them pay for their child's wedding, a traditionally expensive procedure. Only a third were planning to spend the money on further education for their daughter, which was the intended use case.

A systematic review by Lee-Rife et al. in 2012 found evidence to the contrary that multiple CCT programs had an impact on marriage rates in Malawi and Kenya, but these programs did not focus on child marriage directly (43). Instead, they were linked to continued education and free school uniforms. This would suggest that CCTs which focus primarily on child marriage prevention perform worse than those linked to other aspects of life which

in turn have a secondary impact on child marriage. This effect has also been found in educational programs linked to HIV awareness (7).

2.3.5 Fostering an enabling legal and policy framework

Most countries in the world have set the legal age of marriage to 18, although exceptions to these laws are not uncommon (32) (65). Despite this, 68% of all child marriages happen illegally. Local traditions and self-rule, lack of sanctions, and religious laws overriding national laws are some of the reasons (83). Another issue is that of informal unions, in which a child placed in a relationship that is all but legally a marriage. These informal unions then turn into official marriages as soon as the child reaches the required age.

In addition to outlawing child marriage itself, legislation can be used to ensure that other aspects of society are in place to foster an environment which discourages early marriage. Ensuring education, and especially proper education for young girls, is noted by Wodon et al. (2017) as one of the key focus areas where legislation can make a difference (83). As labor force participation and vocational opportunities also has a significant impact on child marriage rates, laws which enable easier entry into the labor force for young women are also important (82).

2.4 Wedding Busters

This section gives an introduction into Wedding Buster groups, which consist of young people that try to prevent child marriage in their communities (24). Wedding buster groups are highly relevant for any project that aims to curtail child marriage, as they consist of local youth who know both the people they need to talk to and the customs and norms of those areas. The term "Wedding Busters"originates from Bangladesh, but similar groups are common all over the world (62). We cover them here as these groups are one of the key stakeholders for a project like this, since they already work against child marriage. Wedding buster groups work by figuring out if a child in their area is in danger of being married away, and then going to the child's parents and telling them why child marriage is a bad idea. Many parents are unaware of the negative side effects of early marriage and pregnancy, and change their minds when informed about it. If the wedding buster groups are given access to additional information, especially if that information is from sources the parents know and trust, they can greatly increase their efficiency.

2.5 Apps and Child Marriage

The authors of this thesis have found three projects that use mobile applications to prevent and delay child marriage, which are presented in this section.

In 2015, Accenture and CINI (Child in Need Institute) produced GPower, which tackled multiple issues such as school drop-put, human trafficking and child marriage (8). It tracks data on position, education, and health, giving the projects a large amount of data points which could be used to spot abnormal behavior. It was deployed to over 6000 families in West Bengal, India, and claims to have succeeded in all aspects. It was awarded the Vodafone Foundation's Mobile for Good 2015 award.

Another project in the Indian state of Bihar called Bandhan Tod (Break your Shackles") gave young girls access to reach out to member organizations of the Gender Alliance in Bihar, if they or someone they knew were in danger of being married away (80). It got over 3000 downloads and received over 300 distress calls in its first three months after launch. After receiving an SOS, a member of one of the partner organizations would seek out the parents of the bride-to-be and try to convince them to cancel the plans. Should this fail, they would then contact the local police for assistance. In addition to calling for help, the app would also provide educational videos and other information necessary to prevent child marriage. To encourage use, several incentives were used to get people to download the app, including cheaper electricity. The "Informationaldesign method presented in section 5.1 is based on the design of Bandhan Tod.

Recently in early 2018, Plan International and the government of Bangladesh launched an app which helps marriage registrars verify the age of potential brides and grooms (61). Widespread document forgery has made it possible for parents to circumvent the legal age of marriage in the country, which has a child marriage rate of over 50%. The app has both an online and an offline version, as only 20% of Bangladesh's population has access to internet (35). It helped prevent over 3,700 marriages involving underage participants within 6 months of its release. We conducted an interview with one of the Plan employees that worked on this project, which is covered in chapter 4.2.2.

2.6 Human-Computer Interaction for Development

A part of the broader field of Information and Communication Technologies for Development (ICT4D), Human-Computer Interaction for Development (HCI4D) is an relatively new field within software development (56); the HCI4D featured community at the leading CHI conference was first introduced in 2013 (1). As a part of ICT4D, HCI4D focuses on the use of information technology to further socio-economic development on many topics such as developing countries, conflict zones, and ignored or disenfranchised groups (72). In particular, HCI4D looks at how software is designed so that it is understandable and usable by all users, especially those that are unfamiliar with mobile phones, computers, and the internet. Some problem areas one faces when designing for these audiences are low literacy rates, not being familiar with Western-centric icons and menu items, having to use different evaluation methods, communication, and understanding the context in which one is developing (16).

Despite being an increasingly more important field of research as mobile phones and internet access spreads to a larger and larger audience, HCI4D has received little scientific attention. As of December 2018, IEEE lists a single paper in its database with the keyword "HCI4D"(34). Google Scholar likewise finds 567 papers, a very modest amount for that site (27). The two main conferences around HCI4D are ICTD and ACM Compass (formerly known as ACM DEV) (41) (30), but the broader ICT4D conference is also highly relevant (33).

2.7 Designing for a Low-Literate Audience

Since the areas where child marriage is prevalent often overlap with areas of low education and income, the issue of low- and semi-literacy is one that must be considered (81). This has been one of the main issues for developers looking to produce applications for people who have recently gotten access to the internet and mobile technology. Applications stretching from banking to health and farming have all seen the need to make sure their software is usable even if the user has difficulties with reading (48) (37) (46).

A systematic review from Karageorgos et al. (2018) on the use of mobile technologies in health care (m-health) found that receiving calls instead of text messages is a more accepted method in poorer countries of reminding patients of medical appointments (37). In contrast, mobile users in the western world find communication by SMS to be a less stressful and invasive means of communication (44). One especially relevant part of their review looks at education of health care workers through mobile applications. This is similar to educating key personnel such as doctors, judges, police, and local leaders on the effects of child marriage, as mentioned in section 2.3.2. They found that SMS communication is not sufficient in these cases, as it did not carry enough information. Rather, they recommend sending links to sites with more information.

Another aspect that must be considered is that many people who are not used to interacting with technology might fear having to use it. One solution that has been attempted successfully is to first introduce the application to the users using Wizard-of-Oz prototyping on paper (9). Explaining how the app works using a familiar medium lets the users get to know it in a safer environment, making the subsequent introduction of the actual phone-based app simple. This approach will be used in our testing sessions.

2.8 Local Differences

An important aspect of development for people in low-income, low-literacy situations is to look at the differences between people groups and how they adopt mobile services. A early study on this with respect to mobile banking (m-banking) was done by Medhi, Ratan and Toyama (2009) (48). Their study looked at m-banking efforts in India, Kenya, the Philippines, and South Africa. Local conditions proved to have huge impacts on adoption rate and number of users, but many similarities were also found. For example, price of using the service was an important factor. M-banking was quickly adopted in countries where m-banking turned out to be cheaper than traditional banking methods, while those places with cheaper banking services saw less inclination to use m-banking. This shows the importance of assessing the pre-existing solutions in place in each area before re-using solutions that have worked in other places already.

Another relevant paper is Atre, Kudale and Howard's "Addressing family planning needs among low-literate population in peri-urban areas of Delhi, India: a qualitative inquiry"(2017) (6). Family planning has much in common with child marriage, as both relate to family, sexuality, and old norms and misinformation. They found significant differences in how information about menstruation was gathered by inhabitants of individual suburbs of New Delhi. In Dankaur, the women in the study reported talking to their husbands first, then doctors. In Loni, 50 kilometers away, they preferred talking to other female members of the family. Males in both areas reported

learning from their friends, looking to those who had been married before. While the sample size for this paper is small, it still illustrates local differences that one should keep in mind.

2.9   Conclusion

As can be seen from the previous sections, child marriage is a challenging and complex issue to target. One of the main difficulties is the limited access to and knowledge of internet and digital devices. In this regard, child marriage shares many of the same problems as other work within the Human Computer Interaction for Development research area. Even with the interest in HCI4D increasing, the problem is far larger than the research that has been done on it. In addition, child marriage is a subject with very ingrained cultural and social norms attached. Certain methods that have proven successful within other HCI4D programs, such as conditional cash-transfer programs, are thus less successful when applied here. Still, section 2.5 shows that the use of mobile applications can be successful, and that there are many ways in which apps can be used. It is therefore important to keep an open mind around which solutions one wants to implement and to be on constant lookout for new inspiration while doing research on this subject.

Choice of Research Method

In this chapter, we present the research methods that were used as part of the project, as well as a discussion around other methods that were not used. For the initial expert interviews we used structured, unstructured, and semi-structured interviews. When testing the prototypes we made in Malawi, we conducted user studies with semi-structured interviews. The methods described here are taken from Oates (2006) (55). The first section discusses why other methods were not chosen and how they possibly could have been used. Section 3.3 explains the data mapping procedure, section 3.4 talks about the difficulties of finding participants for a project like this, and section 3.5 discusses the scientific paradigm that this project falls under.

3.1 Employed Research Methods

1. **Interviews**
   Interviews consist of conversations between the researcher and the participant. They can take one of three form: structured, semi-structured, or unstructured. Structured interviews have a set list of questions to ask the participant, and does not deviate from them. Since every participant is asked the same questions, the answers are easily comparable and can be used to spot differences and similarities. Semi-structured and unstructured interviews allow for more deviation, and are thus more like normal conversations. This is useful when you expect subject that require further discussion to arise during the interview. Semi-structured interviews still employ a list of questions to steer the conversation in the desired direction, but will adapt the questions on the fly to accommodate the answers they get. In unstructured interviews the researcher has no prepared questions. As our project involved gathering reactions to and information around a new idea, interviews fit well. We used all three different forms of interviews. For the first two expert interviews we wanted to gather specific information about child marriage and the use of mobile phones in poorer areas, and so used structured interviews. For the other expert interviews with the ICT professionals, we wanted to hear about their experiences with using ICT for similar projects. As they would be doing most of the talking, we employed an unstructured format for these interviews. Finally, during the user studies in Malawi we used a semi-structured approach. We wanted to be able to compare results from each interview, but also expected the conversations to expand into subjects that we had not planned for. Using semi-structured interviews thus allowed us to add, remove, or alter the questions as necessary. The original set of questions can be found in Appendix D, while a version with the changes displayed is in Appendix E.

2. **Case study**
   A case study looks at how the situation is in the real world, trying to understand in depth the situation in one place and the underlying reasons. Since they focus on one area at a time, the results are usually only applicable for that area only. Local factors are important to understand when conducting these kinds of studies. For our project, case studies were perfect. A large part of the project centered on understand in depth why child marriage is happening and how it can be prevented. Since the final product would have to be created for each localization in turn, focusing on one single area in particular was a strength rather than a drawback. By doing multiple case studies in two different areas of Malawi, we had the opportunity to try to uncover differences between these areas.

3.2   Reasoning for Not Using Alternative Methods

Several research methods were considered for this project, but not used.

1. **Questionnaires**

   Questionnaires are based on sending a set of questions to participants to gather systematic information. Questions are often answered by selecting one or more answers from a set of options, which allows for easy comparison and data collection. Answers can also be given as written text where necessary. They usually involve a large amount of respondents, given their ease of replication. Since the questions are set and it is often not possible to get the reasoning behind why a participant chose what they did, it is important that the questions are well planned out and unambiguous. One of their issues is the low participation rate, which means that they often requires incentives for people to complete them (85). Questionnaires have been used to measure the effectiveness of child marriage prevention programs, for example by Freij (2010) (21). A problem for using questionnaires for the second part of our project was that they rely on the participants having knowledge about the subject they are asked about. Since we were developing software for people who have little experience with software design, this makes it difficult for them to fairly rate what they are asked about. It is also easy to see that an online survey would be difficult, as the overlap between areas with child marriage and poor internet access is quite broad (32).

2. **Design and Creation**

   The aim of a design and creation process is to provide a working artifact at prototype or higher level. This puts theory into practice, and makes it possible to see how a product works in a real-life environment. A design and creation project consists of five parts: Awareness (finding a problem to solve), suggestion (coming up with a possible solution), development (implementing the suggested solution), evaluation (measuring how well the solution worked), and conclusion (discussing the effectiveness of the solution). While too big of an undertaking for this thesis, if a real product is created based on the what has been done in this project the resulting research on the product's effectiveness will use this method.

3. **Experiments**

   Experiments aim to gather results from a controlled environment, where the impact of each decision can be measured. Experiments often take place in laboratories, where variables can be minimized as much as possible. They are well designed to establish cause-and-effect. If we wished to measure participants' knowledge about child marriage before and after using our app, experiments would have been a good way to do it. As the project at this point focused more on data collection rather than hypothesis confirmation, experiments were not used.

4. **Action Research**

   A relatively new field of research, action research aims to solve a real problem in the field (55). Since the aim of this project is to produce general results that can be used in multiple places, the narrow field of action research is not applicable. It is however very relevant to the development of any product which uses the data generated by this project, as such a product must be made to fit local laws, organizations, language and customs. Bandhan Tod, as described in 1.1, is an example of such a localized product (80).

5. **Ethnography**

   An ethnographic study would without doubt be helpful for the project, as it would help uncover many of the underlying reasons for why child marriage takes place. Several ethnographic studies on the causes and effects of child marriage have been done (5) (22). There are two reasons why it has not been chosen for this project. First off, an ethnographic study is a costly endeavour, both in time and resources (55). Secondly, while it is great for gathering deep knowledge in a single field, it is confined to that one area. Still, anyone looking to develop actual software for low-development areas should check if there are any ethnographic studies done in the area they are operating, as these may uncover unforeseen circumstances that must be accounted for.

3.3   Data Mapping

Preventing child marriage involves overcoming social and cultural norms, which requires a hands-on approach. It is also a problem where the effectiveness of a given project can be measured in two ways: number of marriages stopped directly (e.g. the number of times an SOS call was responded to and followed up on) and marriage rates in

the participatory group as opposed to a control group. The first of these measurements does not count any secondary effects such as girls being able to convince their own parents not to marry them away, only those instances where actual intervention is needed. The latter necessitates extensive follow-up and results are not clear until nearly a decade later.

As neither of these methods are a good fit for this project, it seems clear that up-front and user centric testing is needed. This was done in the form of two case studies in Malawi, with a total of 19 girls aged 14-22 and 4 traditional authority figures interviewed. Each case study explored how different design choices impacted the effectiveness by which the application can convey information about child marriage in that area. Through the interviews, we wanted to figure out not only what the participants thought about the different prototypes, but also information related to each design method to inform further development. The different design methods were named as follows: Informational, argumentative, story based, videos, contact, links, and social. They are covered in detail in chapter 5.

3.4 Finding Participants

Getting access to children in high-risk areas for child marriage is difficult, not only because it in most cases requires travelling far away, but also because convincing them to join the experiment is likely to be problematic. Language barriers, unfamiliarity with research projects, and distrust of strangers are all possible issues. It is also highly important to take ethical aspects into account, to make sure that both local and international standards and protocols are followed. Through the partnership we had with Plan International, we were able to make use of their extensive network and experience in Malawi to conduct our experiments. As Plan already have several projects aimed at tackling child marriage in Malawi, they were able to recruit participants from these. Both the girls and the traditional authority figures we interviewed were selected by Plan, according to our specifications as to how many and what type of participants we wanted.

3.5 Paradigm

As this project focuses on (semi-structured) interviews and aims to uncover unforeseen problems, it follows closely to the interpretivism paradigm. A stricter survey-type research from the positivist paradigm might be able to more accurately pinpoint differences in how the different designs were perceived by the participants. For example, it might find that on a scale from 1-10, people in Angola rated the "Story" design choice 8.5, while those tested in Indonesia gave it a 6.4 on average. This information is no doubt useful, but it would not be able to discern why such differences exists. A more informal survey might find that people in Indonesia are unfamiliar with stories told in text, and would prefer the story to be told audibly. As this information is more relevant for us, the interpretivist paradigm is a better fit for the project.

3.6 Ethics

Working with vulnerable children in poor areas makes it extra important to make sure that the work we do follow ethical standards. For the expert interviews, the participants were informed of the nature of the interview and their rights and opportunity to withdraw from the process. The consent form for the interviews can be found in appendix F. As the interviews were recorded for later transcription, we applied for and received approval from the Norwegian Centre for Research Data (NSD).

For the user studies in Malawi, we followed the ethical standards set by Plan Malawi and Plan International. At all times during the user studies there was at least one representative of Plan Malawi nearby to make sure we were following procedure. Plan International's Global Policy for Safeguarding Children and Young People"is available in appendix C. During the sessions, no pictures or names were recorded for use in this project. Each participant signed consent forms with Plan Malawi. We were also provided with Plan Malawi's security briefing, which can be found in appendix H.

Kapittel 4

Expert Interviews and Collaborative Efforts

As part of the research process, multiple organizations with experience working against child marriage were contacted. Both Norwegian and international organizations were included. The goal here was two-fold. Firstly, they were asked if they were willing to participate in an interview about child marriage and mobile development in the developing world. Secondly, they were given a cooperation proposal which included a description of the project as well as an offer to join in as a partner. Being a partner involves further assistance to the project by helping to plan and implement the testing and prototyping sessions, but also a larger role in the development of the project. The Cooperation Proposal can be found in Appendix A. Three organizations expressed wishes to be updated on the project, and three others were willing to help by offering interviews, information, or more. A close partnership was formed with Plan International, who organized and supported the interviews we conducted in Malawi.

The following section provides an overview of organizations which have expressed an interest in the project. Section 4.2 is a transcription of four expert interviews, that cover child marriage and the usage of mobile phones to fight it.

4.1 Stakeholders

The following organizations have expressed interest in the project and wish to be kept updated on its progress: The Norwegian Agency for Development Cooperation (NORAD), Red Cross Norway and Save the Children Norway. All of these bodies work with humanitarian projects, including against child marriage, that can benefit from the result we have gathered.

Three agencies offered to help the project with testing and other assistance: Plan Norway/Plan International, Leap Learning, and the International Center for Research on Women (ICRW). Leap Learning is a Norwegian company that develops educational technology for children in poor areas of the world (42). They have offered to help both develop and test an app based on our project. The International Center for Research on Women help women around the world with all sorts of problems. They are further covered in section 4.2. Plan International has been our closest partner, as they have helped us both with interviews and tips in advance of the case studies, and with organizing and implementing the testing sessions themselves. Future work on this project will be done either in cooperation with or under the direction of Plan International.

4.2 Expert Interviews

In order to assess the validity of the project, better understand child marriage, and get helpful comments and tips, we held a series of interviews with some of our partners during Fall of 2018 and early 2019. Two of the interviews were held with higher level officers in Plan International Norway and the ICRW to learn more about their organizations and how they have previously used mobile software to fight child marriage and other problems. It should be noted that there may be projects done by their organizations that they are unaware of, so no further conclusions about this should be made from this data. Their interviews are presented together in section 4.2.1, following a structured interview format. The question list can be found in appendix B. Following this, we interviewed two employees from Plan Bangladesh and Plan Malawi, respectively, who specialize in Information and Communications Technology (ICT). With them we focused on the actual implementation of mobile software in low-development areas and

the problems that accompany it. These interviews are found in 4.2.2 and 4.2.3. While taking inspiration from the questions in appendix B, these interviews were largely unstructured. Before the interviews, all participants were informed of the purpose of the interview and their rights to their personal data, in compliance with guidelines set forth by the Norwegian Center for Research Data (NSD). See chapter 3.6 for more information. Each interview was conducted over Skype. The summaries below has been edited for clarity and brevity.

4.2.1 Plan and ICRW

1. **What does your organization do?**
   Plan: Plan mostly works with children's rights and gender equality. This includes education, health, food and water, and relief programs.

   ICRW: ICRW focuses on women's wellbeing, which stretches from preventing domestic abuse to cardiovascular diseases. To do this they use a tripronged approach: they conduct research; do policy engagement and communication; and help governments, businesses, industries, and other NGOs with implementation of gender sensitive policies and programs.

2. **In what areas does your organization operate?**
   Plan: Over 70 countries in Africa, the Americas and Asia.

   ICRW: 70 countries, with offices in Kenya, Uganda, India, and USA in addition to a research office in Amsterdam.

3. **Have you (personally) been involved in similar projects before?**
   Plan: No, but I have heard of other projects which uses apps in a similar environment.

   ICRW: Not around child marriage, but I have used mobile devices to create support hotlines for self abortion. Another project I was part of used apps to support hand washing.

4. **How has your organization used mobile applications in areas like this?**
   Plan: For child marriage, Plan International has in cooperation with the Bangladeshi government developed an app which lets wedding registrars check if the birth certificates for possible newlyweds are legit. They also use apps for several other projects around the world.

   ICRW: ICRW has not done mobile development themselves, but have delivered research to projects that use mobile phones. One example is a project that promoted access to reproductive health services.

5. **Are there any methods of fighting child marriage that we might not have thought of?**
   Plan: Much like the wedding registrar app mentioned earlier, an option that digitization brings is making reporting easier. This is a huge help for creating emergency phone lines.

   ICRW: An important thing is to engage with community/religious leaders. If they can be convinces to preach a cause, they will often be able to convince their communities to follow them

6. **Do you know of any regional differences with regards to child marriage which would be of interest to the project?**
   Plan: No specifics, but localization is definitely important to do, What works one place might not work in others.

   ICRW: In India the pressure for marriage is usually from the girl's family, while Ethiopia has the opposite. Additionally, local conditions could also change. One example is that the rate of child marriage often rises when natural disasters like drought happens, as parents want to hand the safety of their children over to others.

7. **Is there a gap in digital competency between young and old in areas where child marriage happens?**
   Plan: Unsure.

   ICRW: Yes, as young people are usually more inquisitive and interested in gathering information.

8. **Do you have any tips for implementing the project?**
   Plan: There is definitely a need for a project like this, but the big thing is actually implementing it in a way that works on a local level.

   ICRW: As child marriage is contracted between families and not individuals, informing only the girls may not be enough. Often they don't have the power to cancel a marriage even if they want to. It is important to think about parents and community leaders, and involve them.

9. **Other comments**
Plan: None.

ICRW: The biggest issues are access to internet and electricity, and literacy levels. Videos can be used to help in areas with low literacy, but as people have limited credits to spend on downloading a whole video this might not work if people have to get the video on their own.

4.2.2 Interview with Representative from Plan Bangladesh

The first of the two ICT-focused interviews was held with a Plan representative from Bangladesh. He had been involved in the project between Plan and the Bangladeshi government where they developed a system for wedding registrars to certify the ages of prospective brides and grooms via SMS. As such, he had highly relevant experience for our project, having developed and tested a mobile phone system to combat child marriage. The following is a summary of the interview and the topics covered:

The project to provide wedding registrars in Bangladesh with an SMS service to help them verify the age of those that wished to be married was originally the brainchild of the a local government officer. Before this, there had been no good way for wedding registrars to validate the age of the applicants. Bangladesh has three means of registration: birth certificate, school certificate, and national ID. However these could easily be faked, and getting a verification from the government was difficult and time consuming. With this system the wedding registrars could retrieve information about the bride and groom from the government's data centers easily and quickly. The project has just started, but has been very successful so far. A country-wide roll out is planned for later this year. It was decided to use SMS instead of internet both because the cost is lower and access is easier, but also because many people do not have or are not used to smart phones.

One of the issues with this project is that people can still be unofficially married even if they are not approved by the government. In some cases, people get married by an imam or other religious figure without registering it with the government. Other times people in a village where there is high government control will travel to other villages to get married where there is less scrutiny. To combat this, strong laws and fines are in effect to penalize those that perform child marriages. A large focus was put on getting community leaders, of which wedding registrars are a part, on board with the project. The greatest challenge was convincing the wedding registrars that it is worth it for them economically. Since they get paid per officiating they do, each potential customer they turn away costs them money. Trying to convince people of the future benefits for them and the community is not easy.

The testing for the project was done with small pilots where they provided training for those involved over a couple of weeks. Their experience was that it went well, and people were both willing and able to adopt the new technology. Bangladesh has a large number of cell phone users, so introducing it was not too difficult.

4.2.3 Interview with Representative from Plan Malawi

The final interview was held with an employee of Plan Malawi who specializes in ICT for development. The interview centered around the work that Plan does in Malawi, with additional focus on how internet is used in the country. The following is a summary of the interview and the topics covered:

Plan Malawi works to help inform the people of Malawi about the dangers of child marriage and the importance of education, and helps those that have managed to get out of a child marriage get back into school. They work closely with youth groups all over the country to give youth a place they can meet, interact, learn, and share information about subjects such as sexual reproductive health. To facilitate information sharing, Plan Malawi has helped create channels to local health centers through WhatsApp and Facebook where the youth can ask questions. They had initially thought about using SMS, but decided to use WhatsApp when they learned that around 60% of the youth there had access to it.

Bandwidth in Malawi is generally very expensive, but there are separate bandwidth packs for only social media that are much cheaper. This means that access to social media is far higher than to the internet overall for most people. The government has recently made internet and mobile coverage a priority, so the amount of people with access to phones and the internet is growing quickly. Using

videos to inform people about child marriage is likely to be effective, but the bandwidth pricing does create difficulties.

Traditional authority figures are very powerful in Malawi, and can often operate as a government in the areas where the official government has little control. Using them to spread information about child marriage has been very successful, and is often not that difficult. Many will join the cause simply when they are told that it is illegal, and they create and enforce laws and fines to ensure child marriage does not happen on their own volition.

4.3   Discussion

From the interviews, it seems that while mobile phones are used for projects in low-development areas, this is still a relatively unexplored field. People are eager to use the new technology when they get the opportunity, but there are still large obstacles in the forms of mobile and internet availability, coverage, and cost. Taking these aspects into account is going to be important. Especially the fact that social media is cheaper and easier to use than the rest of the internet in Malawi is important to note. Evidence has been found that this is also the case in many other countries, especially in South-East Asia (15) (74).

A key takeaway is the focus on getting local authority figures on board, which was mentioned by three of the experts without any prior prompting. This is especially important for a project aimed at child marriage, which is largely driven by traditions and norms. We also saw some differences between Bangladesh and Malawi:

In general, the interviewees were positive to our project and seemed to agree with some of our assertions, such as local differences being important and cost bandwidth being an issue.

Kapittel 5

Design Alternatives

This chapter covers the design alternatives that were initially designed and tested in Malawi. An explanation for each design's strengths and weaknesses is given, as well as a simple mock-up design for how the design might look during the prototyping process. Each subsection covers a single design idea, in the following order: 5.1 uses information and facts, 5.2 uses arguments, 5.3 uses storytelling, 5.4 uses videos, 5.5 uses contact information for organizations which might be able to help, 5.6 uses links to other sources of information, 5.7 uses a social network, and finally 5.8 explores the possibilities of other designs which have not been thought of.

5.1   Informational

This design attempts to display and explain statistics, information and facts about child marriage. Showing information on how and why child marriage has declined around the world will show that the world does not demand nor approve of this practice, and that a life without it is better. The webpages of the United Nations Populations Fund and Girls Not Brides, a global partnership that is one of the key players in fighting child marriage, work in a similar fashion (25) (81). By testing this design we get insight into not only how the users would like the information to be presented in a way that is understandable to them, but also learn more about how they learn and what they would like to learn more about.

   The design shown in figure 5.1 is based on Bandhan Tod's (see chapter 2.5), with a similar tile setup for buttons which when clicked lead to more information. The SOS button has also been brought over, but is enlarged and more center stage. Changing the size of the SOS button is meant to make it more likely that the user will use it, however the effectiveness of such a design needs to be tested.
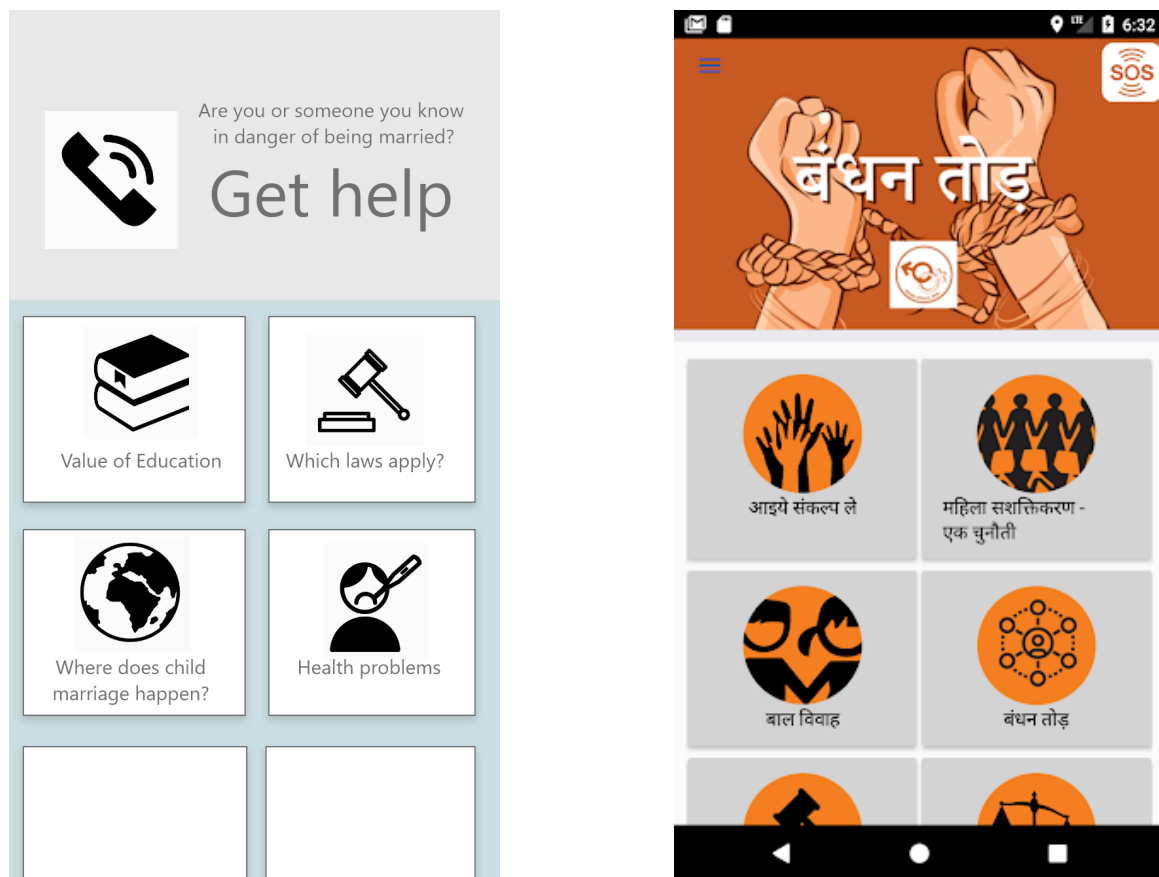
Figur 5.1: Design 1, which provides information and statistics. Prototype design on the left and Bandhan Tod on the right.

5.2 Argumentative

This design, while similar to the Informational approach as seen above, instead orders its information in the form of arguments against common misconceptions about child marriage. Some categories of arguments are shown in section 2.2. Groups of volunteers that try to convince people in their communities to avoid child marriages, like the Wedding Busters we discuss in section 2.4 already exist in many places (61). An app with this design could help teach them the facts they need to convince other people, and let them prepare for any arguments they might meet. Testing the design means figuring out how to structure the arguments in a good way, if these volunteer groups feel like they need it and would use it, and the impact it would have on people outside of these groups.

The design as shown in 5.2 is meant to easily provide access to the argument the user is looking for. It is organized on themes, as the conversation in question is likely to focus on one theme at a time. A search bar is prominently displayed, as searching provides an easier way to find exactly what the user is looking for.
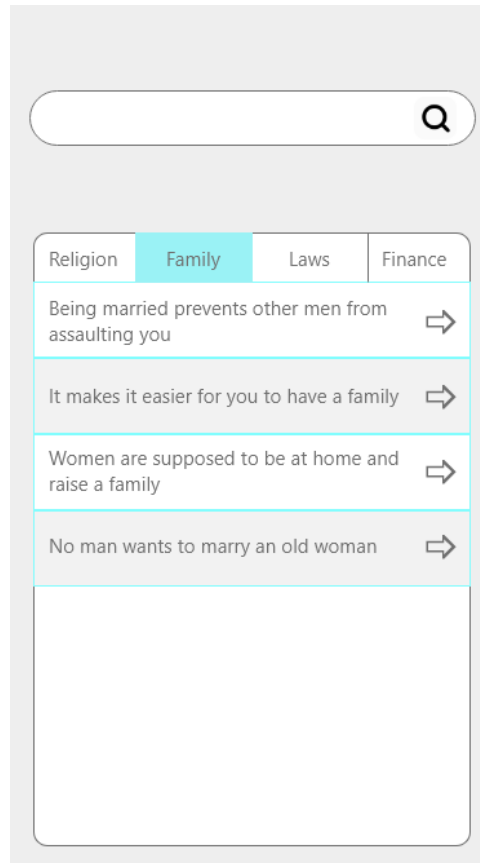
Figur 5.2: Design 2, based on arguments and talking points

5.3   Story based

This design is based on emotions and feelings, telling the story of how a child's life would differ if they are subject to early marriage or not. It has been shown by Freij (2010) that telling young girls stories about other women who have had successful lives by avoiding early marriage is an effective way of conveying information (21). From the same paper, we learn that while female educators in Yemen use stories, male educators prefer poetry. Cultural differences are an interesting point to look into for further development.

One thing to consider is whether or not to use images of real people or not. A real person may illicit a more empathetic response, but as shown by Chiao and Mathur (2010) the amount of empathy we subconsciously feel for others is often linked to the degree to which we feel a connection to them (13). For optimal results, one should then create separate stories for each area, illustrated by people who share the same characteristics as the end users. Instead of relying on facts and figures, this design tells a story about how a child's life can differ if they are subject to premature marriage or not.

The prototype design in figure 5.3 is meant to convey how the app functions, since it would work a bit differently than the other designs. Instead of menus where you select categories and receive information, here the focus is on creating a compelling story. In this iteration the story is told through text, but using voice acting is also something that should be considered.
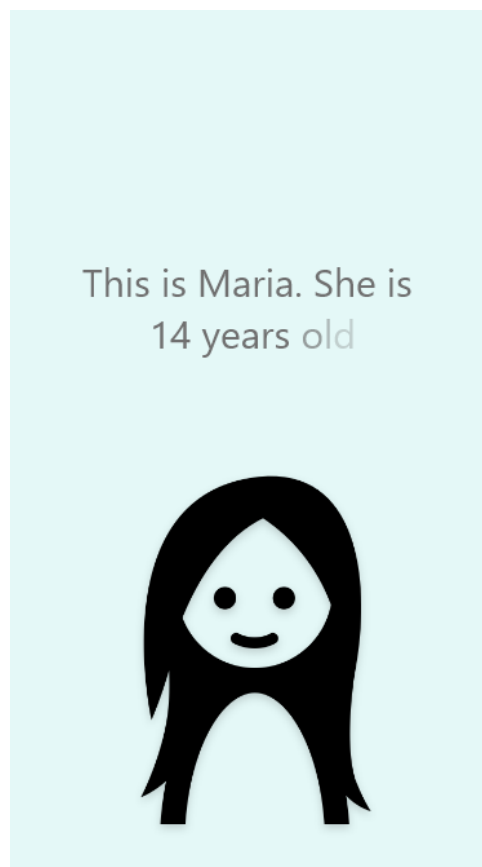
Figur 5.3: Design 3, a story-based approach

5.4   Videos

This design is not a separate method in and of itself, but rather an option that can be implemented into other designs. The use of videos lets people who are unable to read still make use of the application, increasing its usability. It is also an effective and often more interesting way of learning than text, as shown in Maredia et al. (2017). In their paper "Can mobile phone-based animated videos induce learning and technology adoption among low-literate farmers? A field experiment in Burkina Fasothey found that using animated videos is as effective as live demonstrations for learning and adoption among low-literate farmers (46). Other studies have shown similar results earlier, in several countries. (10) (23). Informational videos are also used in the Bandhan Tod application, as covered in section 2.5 (80).

Another aspect of videos is that they can prove memorable to those that watch them. A study in 2013 by Bentley et al. found that farmers in Benin who had been shown an informational video about rice farming four years earlier still remembered it (10). The video screenings had been very popular at the time, and sparked an increased interest in seeking out further information. For projects which aim to have personnel teach people about child marriage or other subject through short, informative sessions, it seems likely that videos are a good way to do this. This is especially true if the access to mobile equipment is poor in the areas, as the projects can bring their own equipment with the capabilities to play videos even if the locals lack it.

Based on this, it is clear that the inclusion of video lectures is desired. It should be considered as an alternative if the mobile devices and internet available to the local population is of high enough quality to support the disk space and/or bandwidth that video requires. Additionally, any projects where groups of educators spend only a small amount of time at each place should consider using videos for increased impact.

Figur 5.4: Design 4, using videos and text-to-speech

The design as shown in 5.4 is quite simple, with a video player, a header and a summary of the video in text format. Having text in addition to the video requires only a small amount of extra work, and lets users without the option of downloading entire videos still use the application. The text is also available in an audible version, to improve usability for non- or low-literate users. Videos across a wide range of subject matters will be made available.

5.5 Contact

This design is simply an overview of local and national agencies that can be contacted for information, legal assistance, police help or emergencies. It should, in addition to provide direct cellular and/or internet links give information on where the user can go to find the agency in person. The SOS functionality was one of the main foci of Bandhan Tod, which operated in cooperation with several local organizations (80). In order to be effective this approach must be highly localized to each area, and requires that the agencies displayed in the app are aware of the project and capable of handling any inquires they receive.
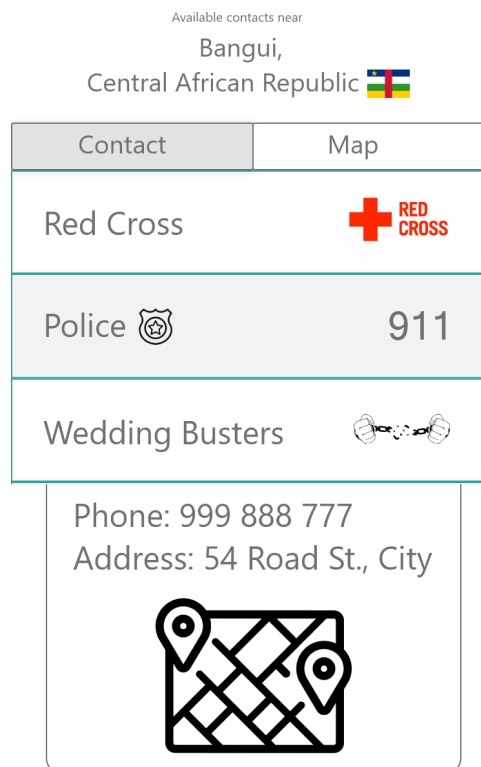
Figur 5.5: Design 5, displaying contact information of different local entities

Since this approach needs to be highly localized, a country/city selector is used to show the most relevant information. The selection process will differ depending on whether the application is launched on a global, countrywide or local scale, and only the relevant information will be displayed. The "Contacttab provides a list of local organizations. Logos for these entities are shown in the menu, as some people might only recognize logos and not the names. When clicked, a drop-down menu with more information shows how to contact the organization. Maps will be used when available, both to show the location of singular organizations and to provide an overview of all local opportunities in the "Maptab.

5.6 Links

This design aims to simplify the development process by not displaying any information or assistance in itself, instead linking to other web sites that already have this available. The use of external sources makes it easy to localize information and update it, as everything is based on adding and removing links. As mentioned in section 2.7, a systematic review by Karageorgos et al. (2018) recommends using links instead of SMS communication if the subject material is too complicated to cover in small bytes (37). With this in mind, a design which uses links seems to be more useful for educating those that are already convinced of the dangers of child marriage, and looks to get more informations. One of the main target groups for this approach should then be active community members such as Wedding Busters or local leaders.

One glaring problem with this design is that it requires a constant internet connection, as the user will have to load each link they want to visit. Since internet access is often sparse in areas where child marriage is prevalent, this could prove a serious obstacle in many places (35).
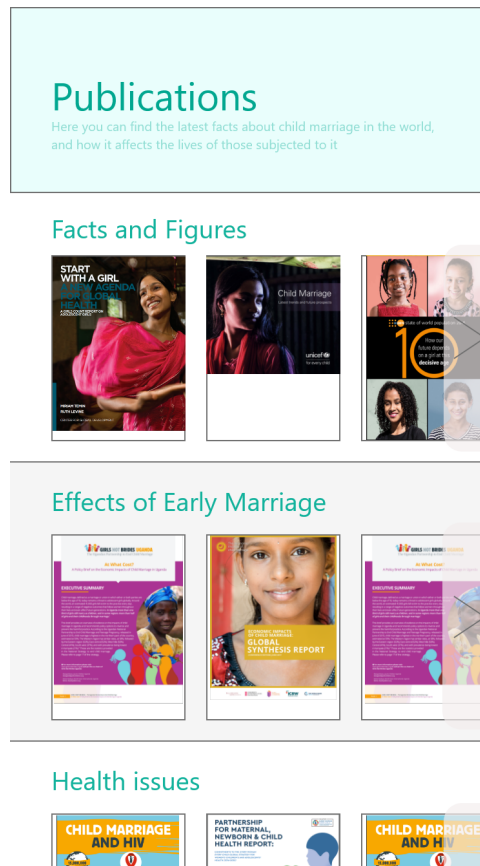
Figur 5.6: Design 6, with links to different publications about child marriage

In figure 5.6 we see one view of this design, displaying publications on different aspects of child marriage. Other possible views include brochures, informative videos, speeches, and instructional manuals for things like health complications. Organizations like the UN, Girls Not Brides, and ICRW have many publications available to the public, so this design aims to give an organized and clear overview over what is available. As mentioned above, this design is more high-level than many of the others, and can accordingly use a slightly more advanced design.

5.7   Social Media

This design is meant to act as a social platform in which people can get in contact with others in similar situations, either for advice, emotional support or if they are in need of urgent help. Renken and Heeks (2018) provide an overview of the use of social networks for ICT4D development, finding it highly relevant to the field. (66). Social networks are one of the main avenues of sharing information in disaster areas with internet access, used by both individuals and relief organizations (40). Having an easy and discrete way contact others helps alleviate any stigma and/or pressure from family and community members which might be present. Of course, a social network with no users is not very useful, so it might be necessary to populatethe application with volunteers or people working in relevant organizations.

Another solution is to leverage already existing social networks and platforms, which seems to be backed up by the expert interviews we conducted in 4.2.3. For many people, their internet usage is exclusive to social media platforms such as Facebook or WhatsApp (63). Introducing a new social network without the userbase, name recognition or cheaper bandwidth prices that exist for the big companies may be too difficult, and it would be better to instead establish such systems on already existing platforms.

The prototype shown in figure 5.7 is quite simple, consisting of a timeline showing the latest updates from other people, a tab for messages, and a tab where the user can join and check out different groups.
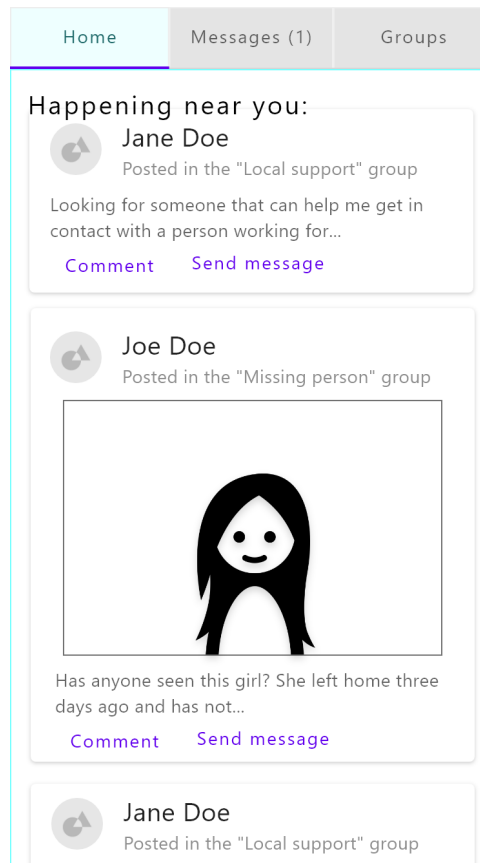
Figur 5.7: Design 7, a social network

5.8 Uncovered Methods

It is likely that some kind of design approach which the authors of this paper have not thought of will be found during the research. The designs presented in this chapter are mostly based around conveying information and explaining the issues around child marriage. This is quite different from Plan International's project in Bangladesh, as described in section 2.5, which uses mobile applications to check the credibility of birth certificates. As more information about the causes of child marriage is found, we expect there to be one or more possible designs discovered that are more in the vein of the Plan International project.

Kapittel 6

Case Studies in Malawi

In this chapter we will cover the case studies that we conducted in Spring 2019 in Malawi, where we interviewed 19 girls in the age range 14-22 as well as 4 traditional authority figures. We will first give an introduction into Malawi and its people in section 6.1, as well as taking a closer look at child marriage in the country. In 6.2 we cover 3 different Malawian tribes, one from each of the 3 main regions of the country, to act as background for any regional differences we might uncover. 6.3 provides information about the internet penetration and usage in Malawi, which is one of the lowest in the region. With the relevant background information about Malawi covered, the rest of the chapter covers the interviews we did. We start by looking at our process for finding the participants and the possible impact of the choices that were made in chapter 3.4. Section 6.5 covers all five interview sessions that we held, split between two villages in the Central and Southern regions of Malawi. We explain how the interviews were conducted, problems that arose and how we handled them, changes we made between interviews and other aspects of doing user testing in low-development areas. The results of the interviews are presented in chapter 7.

6.1 Malawi

Malawi is located in South-East Africa, landlocked between Mozambique, Zambia, and Tanzania. It has the fifth smallest GDP per capita in the world, and over 80% of the population work in agriculture (12). This corresponds to an urbanization rate at less than half of the average in Sub-Saharan Africa. English is used in official capacities, but local languages, especially Chichewa, is the most common for daily use. More than 85% of the population is Christian, the remainder being mostly Muslim. Malawi still has a high fertility rate, sitting at 5.5 as of 2016 (12). Still, the use of contraceptives is becoming more common, and great improvements have been made in maternal and child health (12). Amongst women aged 20-24 in Malawi, 47% were married before the age of 18, the 12th highest rate in the world. For men, the same number is 8%. As in most of the world, women in urban areas and/or with higher education marry later than the rest of the population (53).

The country is divided into three main regions; Northern, Central, and Southern. A map is shown below in figure 6.1 Significant differences in health, occupation, education, and tribal allegiance exist between these three regions (53). These regional differences are important to take into consideration when working in the area. One example is a study into HIV knowledge among people in Malawi which found that those in the Central and Southern regions of the country were less likely to endorse misconceptions about HIV than those in the Northern region (71). Three of the tribes, one from each of these regions, and some of their difference are covered in sections 6.2.1, 6.2.2, and 6.2.3.

Most tribes in Malawi, in contrast to the majority of other countries in Sub-Saharan Africa, are matrilinear, meaning that your kinship is traced through your female ancestors, and matrilocal, where a married couple will move to stay close to the wife's parents (59). In such societies, a father will not be significantly involved in the upbringing of his own children, but will have a big role in raising his sister's children. In addition, a husband will only have access to his wife's or her family's land and fields for farming. This means that many aspects of child marriage in Malawi may be different from those in patrilinear societies. Matrilinearity has some clear advantages to those girls who are subject to child marriage. In a patrilocal society, the girl would not only be married to an older man with more power and say in the relationship than her, she would also have to move away from her family after marriage. The matrilocal traditions seen in Malawi do mediate this power imbalance, allowing the girl to still live close to her family and familiar conditions. (59) quotes Henry Rowley, a British explorer to Malawi in the

early 1860s, as saying

> I was much struck with the regard which the men had for the women, whose position seemed to be in no way inferior to that of the men ... . Indeed, it was at times amusing to see the deference which the men sometimes paid the women by going to them and asking their opinion before concluding a bargain.

6.1.1 Child Marriage in Malawi

The organization Girls Not Brides lists the following reasons for child marriage in Malawi (26):

1. **Poverty**
   In Malawi, the dowry is paid by the groom's family to the bride's (31). For many families, a marriage can thus be a way out of poverty. Some parents also believe that their daughter will have a better life if she is living with a husband who has more money than they do.

2. **Limited awareness**
   Many girls do not know their rights or what the laws say about marriage, and only 8% of them are able to name three or more harmful effects of child marriage (39).

3. **Lack of opportunities**
   With no education or job opportunities, many see marriage as the only possible future for them.

4. **Boarding schools**
   At some schools with insufficient boarding facilities, girls will self-board in nearby houses. Sometimes, this arrangement turns into marriage in exchange for money.

5. **Pre-marital sex**
   Many early marriages happen because of pre-marital sex and early pregnancy (73). A study among Malawians found that 93% think that unmarried girls who get pregnant are naughty"(29). Many families will thus marry off their daughters to avoid dishonor.

6. **Traditional customs**
   There are many traditions connected to puberty and sex, and marriage is in many cases something that young girls are expected to do.

Education is an one of the key factors for when girls in Malawi get married. In some studies, the rate of underage marriage amongst those with no education is more than ten times higher than for those who have completed higher than secondary education (57). Like in other countries, the causality is two-way: more education leads to less child marriage, and lower rates of child marriage leads to higher levels of education. Malawi has long had issues with educating its populace, with enrollment for secondary education (age 14-18) at only 50% (68).

It is worth looking closer into the concept of child marriage being a social norm. In 2016, a study was done by the ICRW of 1492 decision-makers of girls aged 10-17 in Malawi (29). This study used the CARE organization's Social Norms Analysis Plot (SNAP)for understanding social norms. For a proper introduction to SNAP we recommend reading (73), but the key "Components of a norm"is shown in table 6.1. They found that while 89% of respondents agree that most girls in their communities marry before turning 18 (empirical expectations), only half said that "most people in this community expect girls to marry before the age of 18"(normative expectations). As for sanctions, only 36% agreed that not marrying off their daughters and/or nieces would lead to a family being disrespected in the community.

From this, we can infer that while most people think child marriage is common and expected, only a third feels like there are repercussions for not doing it. This discrepancy could be the result of people thinking "it's always been this way", rather than having a specific reason as for why marriage should happen before the age of 18. Convincing people with this mindset that child marriage is a bad practice is likely to be easier than if they had hard-set beliefs in favor of early marriage, religious, spiritual or otherwise.

6.2 Malawian tribes

Three possible areas for testing were explored for the testing phase of this project, of which two were later selected. These areas are outside the cities of Lilongwe in the Central Region, Blantyre in the Southern region, and Mzuzu
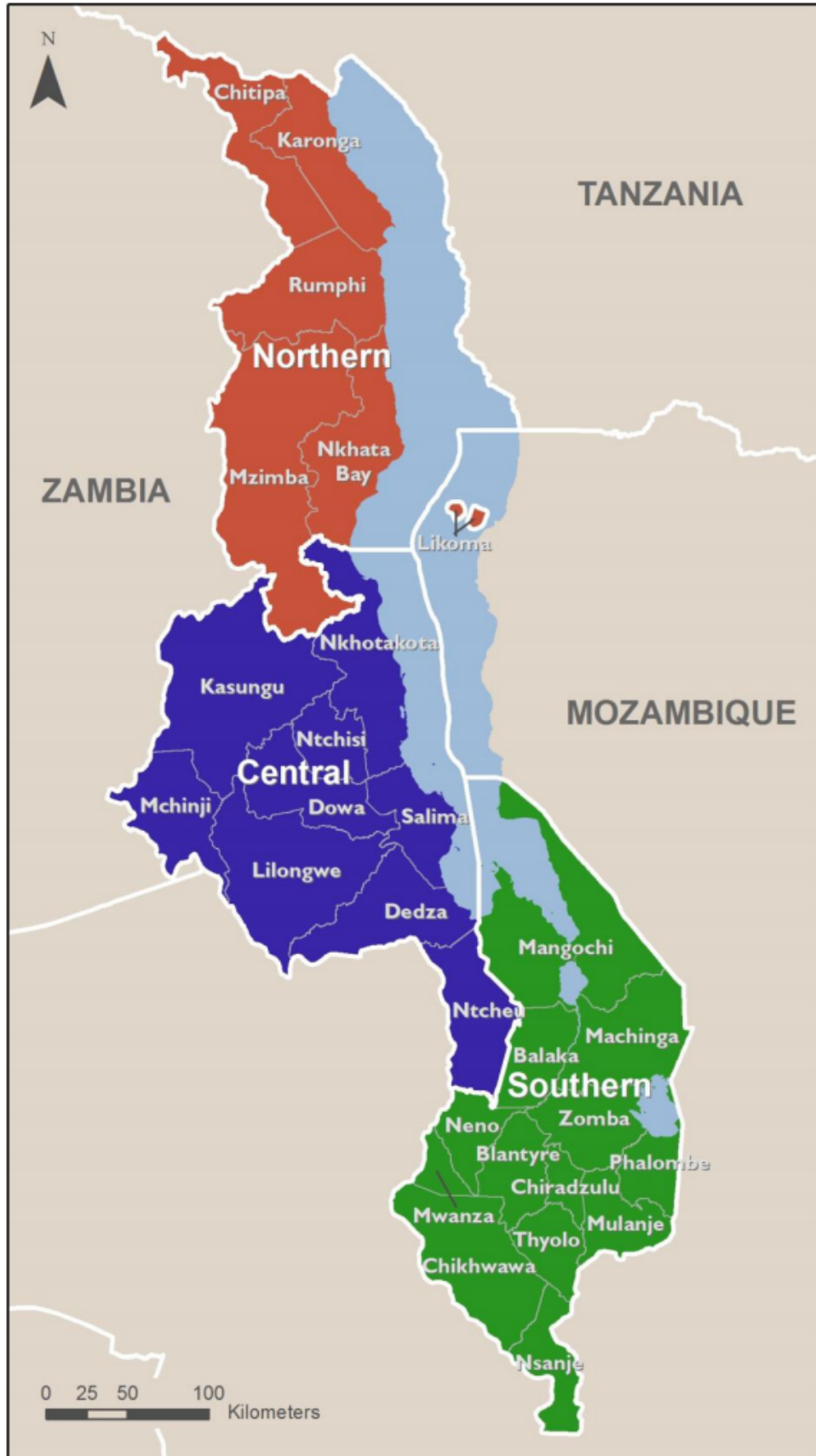
Figur 6.1: Map of Malawi's regions, taken from the Malawi Demographic and Health Survey 2015-2016 (National Statistics Office [Malawi] and ICF) (53)

Tabell 6.1: Social Norms Analysis Plot (SNAP) Framework

COMPONENTS OF A NORM	DEFINITION
Empirical Expectations (EE)	What I think others do
Normative Expectations (NE)	What I think others except me do (what I should do according to others)
Sanctions	Anticipated opinion or reaction of others (to the behavior) - specifically others whose opinions matter to me

in the Northern Region. As mentioned in 6.1, the differences between the regions and the tribes living there can in some cases be vast, so a preliminary study was done into the main tribes in the different areas. These were the Chewa near Lilongwe, Lomwe in Blantyre, and Tumbuka around Mzuzu.

6.2.1   Lomwe Tribe

The Lomwe, or Lomhwe, tribe mostly lives in the southeastern parts of Malawi and across the border to Mozambique, and are the second largest ethnic group in the country at 19% of the population. The Lomwe have been a marginalized people group for much of Malawi's history, often stereotyped as uneducated, retrogressive and even as cannibals (36). Since 2008 the tribe has seen a strong ethno-political mobilization (69). Traditionally, the Lomwe have been a matrilinear society led by village headmen and elders (36). Lomwe people have been described as being very talkative, and are known for their belief in the spirits of the dead, especially around the holy mountain of Mulanje. Some traditional Lomwe dances involve girls that are only wearing beads to cover their breasts.

6.2.2   Chewa

The Chewa are the large tribe in Malawi, compromising 35% of the Malawian population, mostly in the Central Region around Lilongwe. Like the Lomwe, they are a matrilinear society (50). As a result of this, a man is not allowed to bring his wife to the man's village unless he has received permission from the elders of his wife's matrilineage (59), a practice known as *chitengwa*. A study into male involvement in family planning among the Chewa had several relevant findings to our project, although it should be stressed that these are not necessarily exclusive to members of the Chewa tribe (19):

1. Many men felt ashamed when entering a family planning clinic, as there were only women present there.

2. Talking about family planning with friends and acquaintances is not common, as it is seen as too sensitive or private.

3. Older men are more comfortable talking about these issues.

4. Husbands decide which family planning methods a couple use, but do take advice from their wives. Still, it is the woman that is seen as responsible to avoid an unwanted pregnancy.

5. Only men educated in the subject will join their wives to family planning clinics.

6. Most male respondents felt like they already knew enough about the subject, and did not seek more knowledge about it.

Chewa society is famous for its many dances involving intricate masks with marking passed down over hundreds of years, called *Gule Wamkulu*.

6.2.3   Tumbuka

The Tumbuka make up 9% of the Malawi's population, and are the main tribe in the Northern region of Malawi. Unlike the Lomwe and Chewa, they are patrilinear (50). The Tumbuka are notable among the tribes in Malawi for

believing that their ancestors have an important role in their lives, able to cause misfortune and illnesses (51). As a result, maintaining traditions and customs is important, and many Tumbuka see medicines and medical treatment as unnecessary. An example cited in (51) is that "infertility in women is sometimes attributed to the ancestors' anger over the non-payment of bridewealth by the husband". While this paper does not cover any examples directly related to child marriage, it seems likely that the increased focus on traditions and fear of changing these could pose problems when it comes to ending the practice of child marriage.

(50) notes the intergenerational relationships in the Tumbuka clan, with children moving in with their grandmother soon after they stop weaning around the age of 2. Education during a child's upbringing with their grandparents is done through storytelling, which might be an indicator that the storytelling design method described in 5.3 can be successful with the Tumbuka.

6.3 Internet Usage in Malawi

Malawi has a very low level of internet penetration, with only 14% of the population having access to the web (35). In addition, the growth is far slower than that of its neighbors (20). For mobile phones the percentage is also comparably low, at 40% (35). Access to the internet is prohibited by prices far above what average Malawians can afford, at over US$20 per month for 10GB of data (20). However, as we uncovered in one of our expert interviews in chapter 4.2.3, there are cheaper bandwidth packages available for social media only. There are some positive developments, such as a new National Optic Fibre Backbone Project was completed in April 2018. Malawi's government has claimed that the project will increase internet access and speed, reduce costs, enhance government systems, and bring internet to areas where it was previously not readily available (45). ICT was identified as a priority development agenda by the government in 2018.

When it comes to internet usage, WhatsApp is the most common messaging app. It and other platforms are in common use for organizing demonstrations, conduct opinion polls, and digital activism (20). In 2018, the government in cooperation with UNICEF launched U-Report Malawi, which is meant as a participation tool for youths in the country (49). U-Report sends out regular opinion polls by SMS, anonymize and aggregate the results, which are then used to influence policy makers. It is completely free for the user, and all results are made available online. As of April 2019, the platform has 160.000 users, with nearly 90% of those under the age of 30 (75).

6.4 Finding Participants

All the participants were contacted and recruited by Plan Malawi, using their existing networks. These networks take many forms; in many villages, Plan recruits volunteers who act as contact points that the locals can talk to in order to get into contact with Plan. The volunteers also receive information and training in relevant fields for their work. Plan also organizes youth clubs, where youth can gather and learn life skills, socialize, get informed about health, sexuality, and marriage, as well as being a place they can meet others and feel safe. Many of the girls that were interviewed for this project were parts of youth clubs that focused on child marriage. Several of them had previously been subject to child marriage, and had sought refuge in Plan and these clubs to get away from the marriage.

6.4.1 Participant Biases

Because of their connection to Plan and the youth clubs, the girls interviewed were not a representative selection of the population when it comes to knowledge about the dangers of child marriage. They all had a negative view of the practice of child marriage and knew about many of the health risks it leads to. While this bias might seem like a negative for the legitimacy of the results, there are significant benefits to talking to these girls in particular. Firstly, they are still familiar with all the reasons and arguments around why child marriage is happening, as many of their families, friends and neighbors still practice it. Secondly, they themselves have experience in convincing others that child marriage should not happen through the work they have done in the youth group. Finally, and perhaps most importantly, any rollout of a final application based on this project would happen through these youth groups and other Plan-affiliated organizations. Getting their perspective on what they feel they need and would use is thus highly relevant to the project.

6.4.2 Tribal Leaders and Their Role

In Malawi, traditional authority figures still play an important role in society. Each village is headed by a village head(wo)man, who acts as the leader of the village. Above this sits a group village head(wo)man, who oversees a group of nearby villages. Further above this, heading increasingly larger areas and populations, are senior group head(wo)men, sub-traditional authorities, traditional authorities, senior chiefs, and finally paramount chiefs, of which there are about a dozen in the country. These roles are hereditary, and while they do not have any official political power they are important drivers of social, political, and economic change in the country. In many cases, bylaws and policies implemented by these leaders are later turned into official governmental policies after discussions between the leaders and the government.

Many of the experts that were interviewed in chapter 4.2 agreed that tribal and community leaders are important in order to change local customs and convince the people to change their ways. In our project, 4 community leaders, 2 village headmen, 1 group village headman and 1 group village headwoman, were interviewed. All of them have previously worked with Plan in order to combat child marriage, largely by spreading information given to them by Plan to their villagers, refusing to approve marriages with underage participants, and breaking up existing child marriages. A famous example of this is Senior Chief Theresa Kachindamoto, who received worldwide fame for her work against child marriage, including breaking up over 2600 child marriages (47) (28).

A PhD paper by Caitlin Richardson (67) found that the gatekeeperstrategy, in which focus is placed on convincing and working with key members of each local community to change norms and traditions, is highly effective. This sentiment echoes that of several of the experts we interviewed in section 4.2. However, it also stressed the need for the gatekeeper strategy to be used in conjunction with a girl-centric approach of educating women and girls of their opportunities and capacity. This girl-centric approach is similar to that covered in section 2.3.1. In addition, the gatekeeper's approach is found to only be successful if the strategy used takes the cultural, social, and the gatekeeper's personal factors into consideration. These findings support the underlying hypothesis in this paper that any final program or application aiming to spread information about child marriage must be made with a focus on understanding and adapting to the local circumstances.

6.5 Interviews

In total, 19 girls and 4 local leaders were interviewed across five sessions. This section will cover how these sessions went, as well as any lessons learned from each of them. Six girls and two of the leaders were from the area of Chitedze, 20km west of Lilongwe. They were all part of the Chewa tribe, which has been described in section 6.2.2. The remaining 13 girls and two leaders were from the area around Mulanje, a small city 70km south-east of Blantyre. They belonged to the Lomwe tribe, described in section 6.2.1. The location of Chitedze and Mulanje is shown in figure 6.2. The participants were all recruited by Plan Malawi, with most of them either working with Plan Malawi or part of one of the many youth groups that Plan organizes. All volunteered to be part of the study, and were given food and drinks after the interviews. Everything was done in accordance with Plan International's Global Policy for Safeguarding Children and Young People", which can be found in Appendix C.

6.5.1 First session - Chitedze

Participants: 3 girls
For the interviews in Chitedze we were originally told that we would be allowed to talk to around 15 girls, however only six were available. It was not completely clear what caused this discrepancy, but it seemed from our contact's comments that the rest were too busy to show up. The first three girls were interviewed on the first day, one by one. All were 18 years old and students at the school where we were located. One of the girls had been married while underage, but had managed to get away. Another one had a pregnancy that ended in a miscarriage. Both of them dropped out of school during these times, but had now re-enrolled to finish their education. The plan was originally to talk to all the girls on the same day, but as the interviews took longer than expected the second group was moved to the next day. One of the main reasons for the slower progress was the fact that the girls spoke very little English, necessitating the use of a translator. As we had previously been told by contacts in Plan that the girls would be fluent enough in English to not warrant a translator, this meant that each interview took far longer than expected. Additional difficulties presented themselves in the girls acting quite shy, resulting in short, non-descriptive answers to many questions. Follow-up questions to dig deeper into these short answers also contributed to increased time usage. Finally, the session had to conclude earlier than expected, as several of the participants lived far away from where we were located and had to get home before nightfall.

Figur 6.2: Location of Chitedze and Mulanje within Malawi, adapted from the Malawi Demographic and Health Survey 2015-2016 (National Statistics Office [Malawi] and ICF) (53)

6.5.2 Second session - Chitedze

Participants: 3 girls

A handful of changes in how the interviews were conducted on the second day were done in the hope of reducing wasted time and get better answers. Discussions with our local partners unveiled that the shyness the girls had shown is a common trait in many African countries, and is caused by the fact that girls who are too talkative with outsiders are seen as being promiscuous. According to them, this is mostly a problem the first time a girl meets someone new, and not usually the case upon subsequent encounters. This knowledge should be used for later projects, where a solution might be having an introductory meeting without doing any interviews a day or two before the actual testing would be beneficial (if time permits it). Several questions were changed, added or dropped from the original script, based on the conversations on the first day. The changes are shown (with additions in green and removals in red) in appendix E, but were in general caused by the following reasons:

1. Some questions were dropped as they did not provide relevant information, or if they were redundant.

2. Instead of asking directly what the participants thought about specific designs, they were asked who they thought would use that design, how they would use it, and what extra information they would like to see in the designs.

3. Extra questions were added to cover the youth clubs that many of the girls were part of, how they worked to prevent child marriage, and which methods they had found to be successful.

4. A final question about which design they found to be the best was added.

The girls interviewed in this session were not students, but rather members of one of the youth groups in the area Plan cooperates with. Aged 19, 20, and 22, they had all dropped out of school before year 10. Unlike the previous day, we decided to interview all three girls at once. This not only helped save time, but also led to better discussions as the girls were able to follow each other's answers. Since the girls, as opposed to the ones from the previous day, were all part of the youth group they had more knowledge of child marriage, and asking them about their experiences teaching others was a good way to get the conversation going. An earlier fear that the group setting would make the girls less likely to talk about personal subjects turned out not to be completely unwarranted. On the contrary, it seemed that not being the only one interviewed made them more comfortable.

6.5.3 Third session - Chitedze

Participants: 2 village headmen, school headmaster

Following the second session, we talked to two village headmen of nearby villages. Being the traditional leaders of 50 and 112 people, respectively, these men have both been fighting child marriage in their communities for some time. The questions used were mostly the same as for the girls, except that they focused on the villages instead of the participants themselves. Both were interviewed at the same time. Not surprisingly, the leaders were more talkative than the girls had been previously. In addition to the questions being more encompassing and the answers more in-depth, they added to it by telling several stories, mostly around child marriage but also other village matters. The Plan employees who attended the interview and acted as translators ended up having several spirited conversations with the headmen in Chichewa. In these cases, it worked well to let the conversation unfold by itself before receiving a summary from the Plan representative afterwards.

By this point the Plan employee who was with us had learned the descriptions for the different designs and the questions related to them by heart, so we were able to save time by not having to repeat everything in both English and Chichewa. We could have saved time on the earlier interviews by practicing this at an earlier stage, which we definitely should have done.

The school headmaster was not originally planned to be part of the interview process, but joined in at certain questions where he had input. Mostly, this revolved around the school's role in preventing child marriage. He could tell that they had a life skillssubject in school meant to teach sexual education when the students were around 10 years old. Previously this class had been much later on, around 8th grade, but was moved as the school saw that many students were getting, often incorrect, information about sexual health from friends and family instead. While the class did inform about contraceptives and how to use them, he said that they taught abstinence as the main method of avoiding STDs and pregnancies. In part, this was caused by a lack of access to contraceptives, leading to many opting not to use them.

The village headmen mostly worked against child marriage by having meetings in their villages where they informed the population about the dangers it presented. They would often go to village leader meetings where

organizations like Plan Malawi gave them the information that they then brought back to their communities. When they heard of early marriages taking place they would also try talking to the parents to convince them that they should cancel the wedding. A particularly interesting finding was that the village headmen were both sure that the people in their area knew what the legal age of marriage is, something we had found not to be the case in the earlier interviews. The believed legal ages are shown in figure 7.1. The same was true for the Linksdesign method presented in 5.6; while the headmen were sure that others would also choose the more information heavy publications over the summary one, all six of the girls we interviewed in Chitedze chose the summary. Furthermore, the village headmen at some point claimed that child marriages usually happen with both kids being underage. This is in stark contrast to data, which says child marriage happens to 47% of girls and only 8% of boys (53). There is of course a chance that this area is different from the rest of the country in this regard, but from their comments it seemed that they were talking in general terms. It does seem more likely that they were simply mistaken.

6.5.4 Fourth session - Mulanje

Participants: 1 group village headman, 1 group village headwoman
The next session was held in a village near Mulanje in the Southern Region of Malawi. In addition to the Plan representative that had been part of the earlier sessions in Chitedze, we were joined by a Plan employee from the local office in Mulanje. She had previously worked closely with the group village leaders, as well as the youth group from which the girls interviewed in session five were recruited. The two participants in this session had the title of group village headman/headwoman, putting them one rung higher on the ladder of authority than the village headmen interviewed the previous session. In total, they oversaw 2592 and 2812 villagers respectively. As in Chitedze these traditional leaders were quite talkative, often telling stories both relevant and not. This interview took about two hours.

When it comes to the fight against child marriage, these group village leaders had implemented more extensive measure than the village leaders. Together with other leaders in the area they had implemented bylaws stipulating the rules and punishments related to marriage, and how to enforce these. Talks with the government were underway at the time to try to make these bylaws official and enforced in more areas than just around Mulanje. Since the Lomwe tribe is matrilocal (as described in 6.1), when a man wishes to marry he has to present himself to the chief in the bride's village. This gives the chief a chance to enforce the laws and deny any marriage where the girl is underage. In addition, they also had programs meant to financially assist those that felt they were too poor to not marry their daughters away. The community and group meetings that were in place in Chitedze were also a thing here, as the main avenue of information flow between the leaders and the populace. As in Chitedze, we found that these leaders also overestimated the knowledge level about child marriage amongst young girls in their communities, as they too were sure that they all knew the legal age of marriage.

6.5.5 Fifth session - Mulanje

Participants: 13 girls
The fourth and fifth sessions were held on the same day, with the fifth taking place at a school a few kilometers away from where we had been for the fourth one. Since the session with the traditional leaders had taken more time than expected at more than two hours, we arrived at the school some time past noon, a bit later than planned. Further time was spent introducing ourselves to the school headmaster and staff, getting everything ready, and meeting and organizing the participants. A small surprise came in the form of the girls we were going to interview all lining up and performing a song, thanking us for visiting them and helping them fight child marriage. The Plan representatives later told us that this is quite common, so future researchers in this field should be prepared for similar situations.

A total of 19 girls had shown up to be interviewed, which we divided into three groups in the hope of being able to talk to everyone. With more time available we would have wanted smaller groups, but with only a few hours until sunset three was the maximum number of groups we could hope to get through. In the end, we only had time for two rounds of interviews, meaning the final group of six girls were not interviewed. We did attempt to shorten the interviews wherever possible, but were unable to get under the time limit. The final session ended about 45 minutes before the deadline, and as both of the interviews up until then had taken over an hour we decided to spend the remaining time having small-time conversations and interactions with the participants instead.

The girls were part of a group started by Plan Malawi in the area called *18+*, which in addition to being a place the girls can learn about the dangers of child marriage acts as a learning place for life skills and arts. We were told that Plan was in the process of pulling out of the daily running of the club, as it had moved on to being self-driven and no longer needed their help. Agewise they ranged from 14 to 18 years old.

Having a larger group size worked well. The girls were still willing to talk about personal subjects that could have been seen as embarrassing, but it is unclear if this would have been the case if they had not previously known each other. They also seemed to act quite independently, often disagreeing with the others in the group in situations where it would have been easy to just follow the leader". The Plan representative from the local office took on most of the role as translator here, which helped as she knew the girls well. Not only did her presence help the girls feel more comfortable and trusting, she was also able to bring up details that the girls had forgotten to talk about. As an example, in one case she could tell us that one of the girls had a smartphone, contrary to what the girl had answered earlier as she had misunderstood the question. Still, in our opinion the optimal group size would be 3-4 people. It is small enough for everyone to have their say while still allowing for conversations between the participants to arise. In our interviews there was usually one girl who stood out as the most talkative in the group, leading the conversation along, no matter the group size. So having a group size of 3 rather than 7 allows for twice as many of these leadersto show themselves. Of course, having smaller groups takes more time, so a balance has to be struck.

6.6 Discussion

Malawi is one of the poorest countries in the world, and has one of the highest rates of child marriage. The lack of internet and mobile phone coverage is a notable problem that must be taken into account if one is to develop mobile software for the country. Still, despite mobile phones being far from ubiquitous there is a significant amount of people with access to them, and from the interviews we have conducted there seems to be a great deal of interest and belief in using mobile applications to fight child marriage in the country. By interviewing both young girls and traditional authority figures we were able to get two different sides of the story. The village leaders knew much about child marriage and what was being done about it, while the girls gave us insight into how they experienced the situation on a personal level. This also allowed us to catch inconsistencies between the two groups, as the village leaders had a tendency to overestimate not only the effectiveness of the lessons they taught the villagers, but also how well they knew what the girls would want and need in an app aimed at fighting child marriage. From this, it seems fair to conclude that the village headmen overestimate both the general knowledge about child marriage amongst themselves and in their communities, and how well they know what their villagers would want in an app.

We did face several problems during the testing, mostly related to time management and having fewer and less English proficient participants than we thought we would have. By changing how we performed the interviews and cutting wasted time we were able to alleviate most of these by the time we were done. Using group interviews instead of personal ones was one of the keys to achieve this, as it helped both with the shyness that is common amongst African girls when meeting strangers, and by speeding up the interviewing process significantly. From our experience, it seemed that having 3-4 people in each group was the perfect amount, but having more than this posed no significant problems. Based on our experiences, we have compiled a set of guidelines for conducting user studies in low-development areas, presented in chapter 8.

One of the main reasons for working in two different cities was to try and uncover local differences that could impact the development and/or content of apps for these areas. From the interviews we held, we could not reach any such conclusions. While there were differences in the answers between the areas, there were no instances where we were able to attribute it specifically to local or tribal conditions. One possible explanation for this could be that the questions we asked were too broad, so that the subtle differences we were looking for could not shine through. It may be that the local differences become clearer when discussing specifics, e.g. what superstitions people believe in.

Kapittel 7

Results

This chapter will discuss the results gathered during the interview sessions described in chapter 6.5. In total, we talked to 19 girls and 4 traditional leaders. Chapter 7.1 covers the first part of the interviews, related to general information about the participants. In the case of the traditional leaders, the information is related to the villages they oversee. 7.1 also contains a summary of the participants' access to mobile phones and internet, and their relationship with them. Finally, it takes a look at their thoughts about marriage, both what they think about it personally and how it works in their communities. 7.2 recaps the input we received on the different design methods covered in 5. For each design method, we first asked a set of questions relevant to that method, to get related background information. The entire set of questions can be found in the appendix, but table 7.1 gives an overview of the areas covered by the questions for each design method. After the initial questions we presented and explained the prototype for that design to the participants, and discussed it with them. Each sub-chapter covers the relevant questions for each design method, and then presents any comments, critique and suggestions we received. Finally, we present a set of suggested changes based on the feedback.

Design method	Chapter	Areas covered by questions
Informational	7.2.1	What subjects they wish to learn more about and where they find information
Argumentative	7.2.2	What arguments people have to defend child marriage
Story based	7.2.3	How stories are used in education
Videos	7.2.4	How common videos are, and what effect they have
Contact	7.2.5	Where they go if they have questions related to marriage, sex, or health
Links	7.2.6	Which entities are trusted to give correct information about child marriage
Social Media	7.2.7	How comfortable they are asking strangers online potentially embarrassing question

Tabell 7.1: Questions covered by the subchapter of each design method

7.1 General information

This section covers the parts of the interviews that were not directly related to the design methods. The participants were first asked a couple of questions about themselves, both so we could get to know them and to have an easy start to the interviews. Tables 7.2 and 7.3 show a summary of these questions, with age, desired profession, access to phones and the internet, their personal experience with child marriage, and what age they personally would like to get married.

We did not interview any girls who were currently married. The ones we talked to were in school and/or part of one of Plan's youth groups, two groups with little to no overlap with underage girls who are currently married. As we have covered in 6.1.1, education and marriage are usually mutually exclusive in these parts of Malawi. Similarly, since Plan's youth groups are meant to inform and assist against child marriage, if a married, underage

girl were to join she would receive the help she needs to abolish her marriage quickly. However, the girls still had high knowledge about child marriage, with either personal knowledge or through friends who had been either married or gotten pregnant at an early age.

Age	Desired profession	Phone access	Internet usage	Experience with child marriage	Preferred age to marry
18	Teacher	Parents	Never used	Married while underage, ran away	After finishing school
18	Nursing Teacher	Parents	None	Not married, but has a child	After finishing school
18	Police	Personal	Whatsapp	Not married, has had a miscarriage	24
22	Agricultural	Personal and parents	Facebook	-	25
19	Grocer	Through family	None	-	25
20	-	-	-	-	24

Tabell 7.2: General information about the girls in Chitedze, from the first and second sessions

As can be seen from tables 7.2 and 7.3, the participants ranged from 14 to 22 years old. Five out of the 19 have some experience with child marriage or underage pregnancy. We have also included what age they would like to get married at, which ranges from 21 to 30. Most attributed their choice to wanting to finish their education first.

Age	Desired profession	Phone access	Internet usage	Experience with child marriage	Preferred age to marry
16	Nurse	Parents	None	-	25
18	Nurse	None	None	Pregnant at 16, not officially married	30
14	Teacher	Parents	None	-	26
18	Teacher	Parents	None	Pregnant at 16, not officially married	27
18	Nurse	None	None	-	25
15	Bank Manager	Parents	None	-	24
14	Soldier	Parents (smart)	Parents	-	21
14	Nurse	Parents (smart)	Parents	-	24
17	Nurse	Parents	None	-	29
15	Teacher	Parents (smart)	Parents	-	25
14	Doctor	Parents	None	-	29
15	Nurse	Parents (smart)	Parents	-	23
16	Lawyer	Personal (smart)	Facebook	-	24

Tabell 7.3: General information about the girls interviewed in Mulanje, from the fifth session

Table 7.4 shows an overview of the village leaders and their villages. The number of people in each village/village group are correct, but the percentages given are guesswork by the interviewees.

Title	People under authority	Owns a normal phone	Owns a smart phone	Normal age of marriage
Village Headman	50	18%	0%	14-17
Village Headman	112	13%	4.5%	15-17
Group Village Headwoman	2592	50%	10%	15 and up
Group Village Headman	2812	30%	10%	15 and up

Tabell 7.4: Information about the local authorities we interviewed, and their villages

7.1.1 Mobile phones

Table 7.5 shows a summary of the interviewed girls' access to mobile phones. Few of them had their own phones, but most had access to phones through their parents. The phones were mostly used for communicating, mostly through calling. Smartphone users also focused most on communication, with WhatsApp and Facebook being the only apps that were mentioned by name. Although some specified that they used their phones to relay news to friends and family, this was mostly news they had learned about through WhatsApp/Facebook, not something they

had learned from e.g. online newspapers. In addition to asking what those with personal phones used theirs for, we also asked those without phones what they would use it for if they had their own. Their answers mostly mirrored the usage of those with phones, with only a single answer, Find answers to health questions", that did not have anything to do with communication.

The local authorities we talked to agreed in large part with what the girls had said, naming WhatsApp and Facebook as the only apps they knew people used.

Access through	Number
Own phone	3
Family member's phone	14
No access to phone	2
Total	19

Tabell 7.5: Participants' access to phones

7.1.2   Internet

Only 7 of the girls had access to the internet, with 3 having personal smartphones. Table 7.6 shows the numbers with personal, parental, or no access to the internet. None that we talked to had any other method to access the internet than smartphones, and only through cellular data. The ones that had their own phone used it mostly for communicating through WhatsApp and Facebook, and while they sometimes looked up news they did not use the internet much to search for info. They did however often receive information and news through WhatsApp/Facebook, so while they may not actively seek out news their access to the internet still provided them with extra information they would not have otherwise.

Access through	Number
Personal smartphone	3
Parent's smartphone	4
No access to the internet	12
Total	19

Tabell 7.6: Participants' access to the internet

We also asked those that did not have access to the internet what they would like to use it for if they had the chance. Some did not know what they could do on the internet, and so had no answer. Most of the other answers revolved around communication, but they also touched on education, news, political issues, current affairs, and health as subjects they would use the internet to learn more about. Google was mentioned by name at one point.

Table 7.4 shows the rate of smartphone ownership in the areas overseen by the local authorities we talked to. Only one of them had personal access to the internet. He said he would use it for checking news and figuring out how others around the world are solving problems his area was facing. In Chitedze they told us that people used the internet to buy and sell crops and livestock, in addition to communication and looking up information. In contrast, the group village leaders in Mulanje said that few, maybe only 1 percent, did business through the internet. It is interesting that this discrepancy shows itself despite the fact that the villages in Mulanje had proportionally twice as many smartphone owners as the ones in Chitedze, but we did not receive good answers as to why this might be the case. A simple solution could be that doing business over the internet had simply not caught on yet in Mulanje.

7.1.3   Marriage

We started the questions about marriage by asking the participants to describe in their own words what marriage is. Most answered that marriage is an "agreement between a man and a woman to stay together", often adding "and have children". We found it striking that the word *love* was never used, as that is seen as the key facet of marriage in the Western world (14). Instead, marriage is seen as a necessity to be able to have sex without shame, and to have children. We cover this further in 7.2.2, where we discuss how sex and marriage is often seen in Malawian culture.

The absence of love was also clear in the answers to the next question, where we asked why people got married. Two answers were by far the most common; peer pressure from friends who were already married, and poverty. In
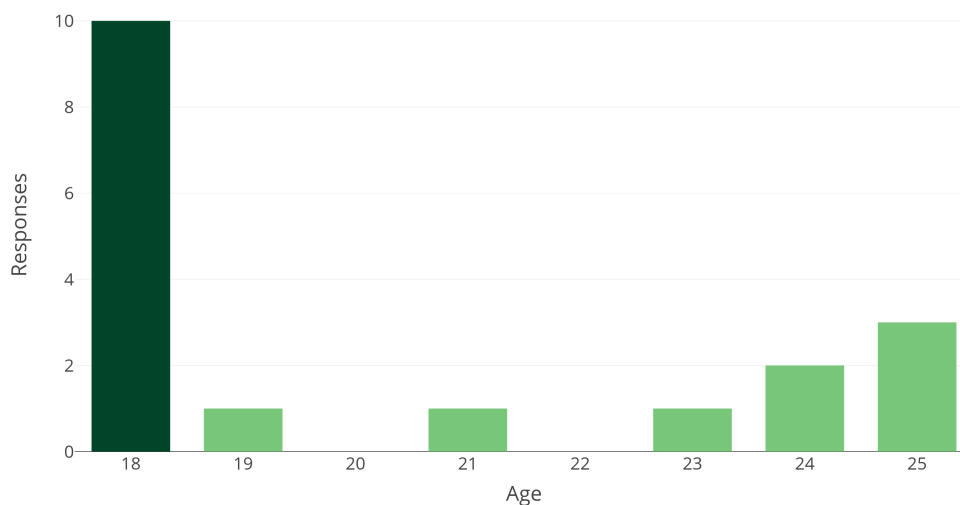
Figur 7.1: At what ages the participants believed marriage to be legal, with 18 being correct

addition, many of the other answers follow the same theme, namely marriage being an escape from a difficult life. E.g. if someone is orphaned, or is abused by their parents. Tradition was also mentioned as an important factor for peer pressure being so high.

Many also talked about underage girls who themselves wanted to be married, be it from peer pressure, love, being tired of school, or from looking for a better life, and ran away from their homes. Some of the village leaders said that this is a new development, something that has begun after Malawi became democratic in 1994 and the people were introduced to the notion of human rights and personal freedom. However, they said that most of these ventures ended in bad marriages and deep regret from the escapee. This does still present a new focus area for this project, as we had not previously thought about the underage girls being the ones to initiate marriage as a large problem.

We also asked the girls if they knew what the legal age of marriage is in Malawi. Their responses are shown in figure 7.1. Interestingly, we find that only around half of the participants knew the correct answer. The correct answers came from the group of three girls interviewed together in Chitedze and the second group of seven girls in Mulanje. The fact that so few of the girls knew the answer was surprising, as this had been part of the lessons given to them in the youth groups about child marriage. The Plan Malawi representatives that were present had no good answers as to what may have caused this.

7.2 Feedback on Designs

7.2.1 Informative

The questions for the informative design method were centered around figuring out where the girls go to get answers to their questions, especially around subjects related to child marriage, such as health, marriage, puberty, and sex. The most common answer was to ask a teacher or the school headmaster. Parents and youth groups were also mentioned multiple times, with police, Plan and other organizations, and groups of parents in their village responsible for child protection also seen as reliable sources of information. In general, the girls seemed to trust authority and governmental figures, and did not feel afraid or embarrassed to ask them questions.

As for what subjects they would like to learn more about, education and human rights scored high. The traditional authorities wanted HIV and agriculture to be covered. While not directly related to child marriage, it is clear that these are important subjects that would provide helpful information. Taking this design method in a more general approach, where topics like these are covered, would not only increase the usefulness of the app, it would likely help convince people to download it. As an example, if a girl can tell a father that this app will give him information that helps him increase his agricultural output, he would be more susceptible to download it than if she said it would only inform him about the dangers of child marriage. As shown by the Bandhan Tod app discussed in 2.5, economic incentives are important, and information that helps people's businesses can act as an indirect

version of this. One group also mentioned a section for "questions they can't ask their parents". As one of them said:

> "I have never asked my mom where the baby actually comes out, if I did she would probably slap me"

These kind of questions probably differ quite a bit from place to place and between cultures, so do require a fair amount of groundwork to implement. But as questions like these are the ones most likely to be the catalyst for misinformation and rumours, it seems to be worthwhile to add.
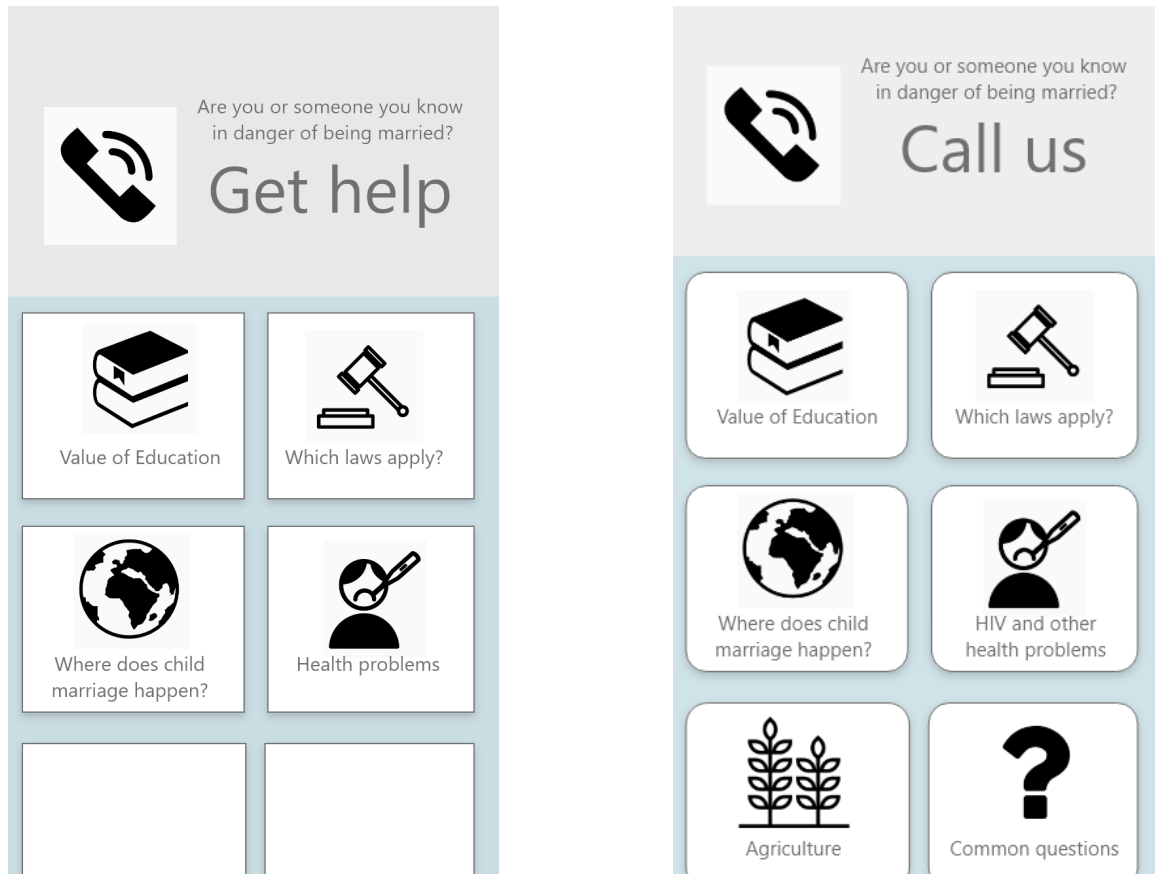
Figur 7.2: Proposed changes to the Informational design method, old version on the left and new on the right

The design received praise for being easy to use and similar to apps the participants had used earlier. As everyone needs information, it was seen as being useful for any kind of user. One of the village leaders pointed out the use of icons as a good thing, since that would help analphabets use the app too. Since Malawi only has a literacy rate of 62% as of 2015, taking this into consideration is especially important (12). With icons and audio versions even illiterate people can use it, and this approach should definitely be looked further into. Based on the positive feedback the only proposed changes, as shown in figure 7.2, are adding a few more categories.

7.2.2 Argumentative

For this design method, the questions centered around figuring out which arguments were being used to defend and promote child marriage. By far the most common reason given was poverty; parents who didn't feel they could afford to feed their kids would try to marry them off, either to have one less mouth to feed or to bring in another set of hands to help at the farm. As discussed in 6.1, Malawi is matrilocal, so if a daughter is married that means her new husband would move to her village and work there. In cases where parents are unable to afford education for their daughter, marriage is seen as the only other alternative to progress in life. The second most mentioned reason was peer pressure. What follows is a list of other arguments given, many of which are based on superstition.

- Men and women are meant to have sex.

- When you hit puberty, you are old enough to have a baby.

- Not having sex is "wasting an erection".

- A story where a boy had told a girl he was using male birth control pills, so it was safe to have sex. The girl ended up pregnant.

- Not letting your parents have grandchildren is unappreciative towards them.

- If you don't have sex after your coming-of-age ceremony, your skin will turn red.

- Sex is better with younger girls.

- Younger girls have warmer vaginas.

- Instead of genitalia, boys have snakes and girls have fire.

The village leaders could tell us that many of these superstitions and falsehoods are less prevalent now than before, both as a result of increased education and governmental intervention. In Mulanje, the local traditional authorities have set up assistance systems to help families which otherwise would marry off their daughters. They also organize community meetings where they spread facts, stories and testimonies about child marriage. Many people are receptive to what they are told by the village headmen, and according to the ones we spoke to around half of parents will cancel their child's wedding when told that a getting pregnant at e.g. 15 will put their daughter in grave danger of birth complications and possibly death. All participants agreed that information presented in this manner would be trustworthy and would help convincing others that child marriage is a bad practice. One particular example we were told was that kids and teenagers arguing for the importance of education often were met with "How can you tell me that education is worth it if you're only in seventh grade?". In such situations they would benefit greatly from being backed up by facts from credible organizations like Plan Malawi.

Another item of interest we learned was the absence of any kind of romantic relationship outside of marriage in these areas. This plays into the notion that sex outside of marriage is highly sinful, so many end up getting married so that they can have sex without hiding it. It is easy to see how having a societal mindset that you should have sex as soon as possible, and also that you can only have sex while married, leads to child marriages being common. Further study into what people in rural Malawi think about adopting the boyfriend/girlfriend dynamic found in other cultures would be of great value.

There were few comments about the design itself, but based on the feedback given to the informational design method above we learned that adding descriptive icons to the subjects is a good idea. Using tabs and multiple screens did turn out to be somewhat confusing for the users, so we suggest using a scrolling page with all related arguments shown together instead. Not using tabs also allows for more subjects being added to the list. We uncovered three new subjects that should be added: prevention methods, rumors and superstition, and education. The proposed change shown in figure 7.3 show the scrolling page with all the arguments rather than the home page with all the different categories that was designed earlier. Rather than acting as its own design method, we think the argumentative design method will be better served as a category under the Informational design method discussed in the previous section. The new design proposed in 7.3 could either be used for a single category, e.g. "Common questions"or Superstition", or singular cards can be used alongside the informative text in any category.
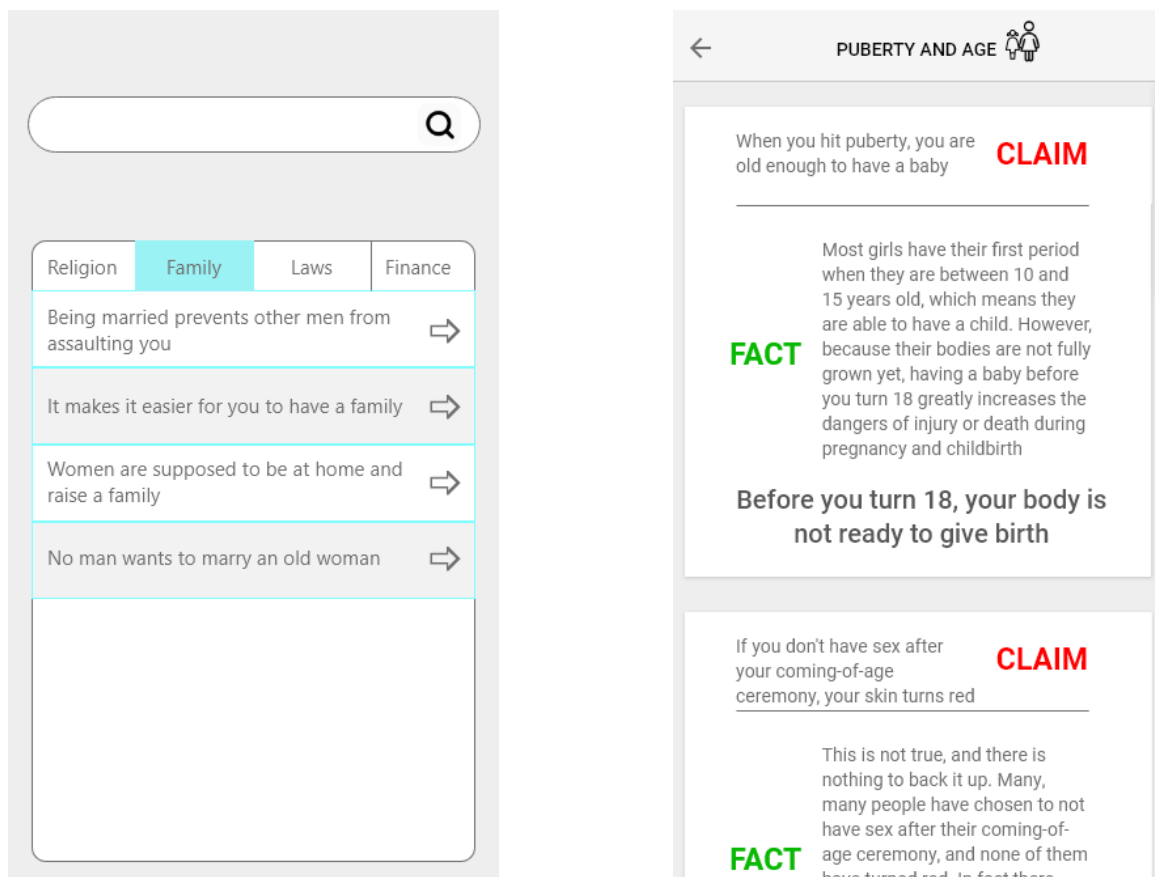
Figur 7.3: Proposed changes to the Argumentative design method, old version on the left and new on the right

7.2.3 Story Based

Stories are a common educational tool in these areas, and all participants mentioned them being used in school for various subjects. The youth clubs and community meetings held by the village leaders all use drama and poems to talk about child marriage. From the experiences with these dramatizations, they all felt that stories told by those who had been subjected to child marriage were the most effective. It was claimed that many people do not really understand the ramifications of marriage, and as discussed in 7.2.2 the view that it can lead to a better life is prevalent. In general the stories they used took the form of a girl getting married, discovering that it is not a better life, running away or being rescued before finally returning to school and getting a better life that way. In Mulanje, they also mentioned some other themes they talked about:

- The rights and responsibilities you have as a child, a student, and as a wife.

- How to avoid peer pressure.

- What to do when a boy asks you out.

- How to avoid getting pregnant.

It was also mentioned that positive stories, i.e. stories that focus on the importance and advantages of education without mentioning child marriage, are often undermined by the fact that many people who get an education still end up living the same life as before. This makes it easy for people to argue that education is not really the escape from poverty that it is often hailed as. This contradicts the findings by Freij (2010) in (21), where they find that positive stories are effective in Yemen. This could be caused by local differences, for example that Yemen has a higher correlation between education and getting a good job. So while positive stories might have a place in our application, a larger focus should be put on actually educating the user about the dangers of child marriage.

Based on the feedback, it seems that the prototype design is a good one. However, it should be changed from the third person originally used to a first person story. Like with previous designs, allowing illiterate users to still use the app using illustrations or voice-overs should be strongly considered. The only change we have made to the design as shown in figure 7.4 is to switch from a third-person story to a first-person one. We base this change on multiple comments we received that it is always better if the story is told by the person who experienced it themselves. Another alternative could be to provide scripts for plays that the youth groups could then perform. We did not establish if this is something the youth groups actually felt they needed, so further insight is needed before something like that is created.
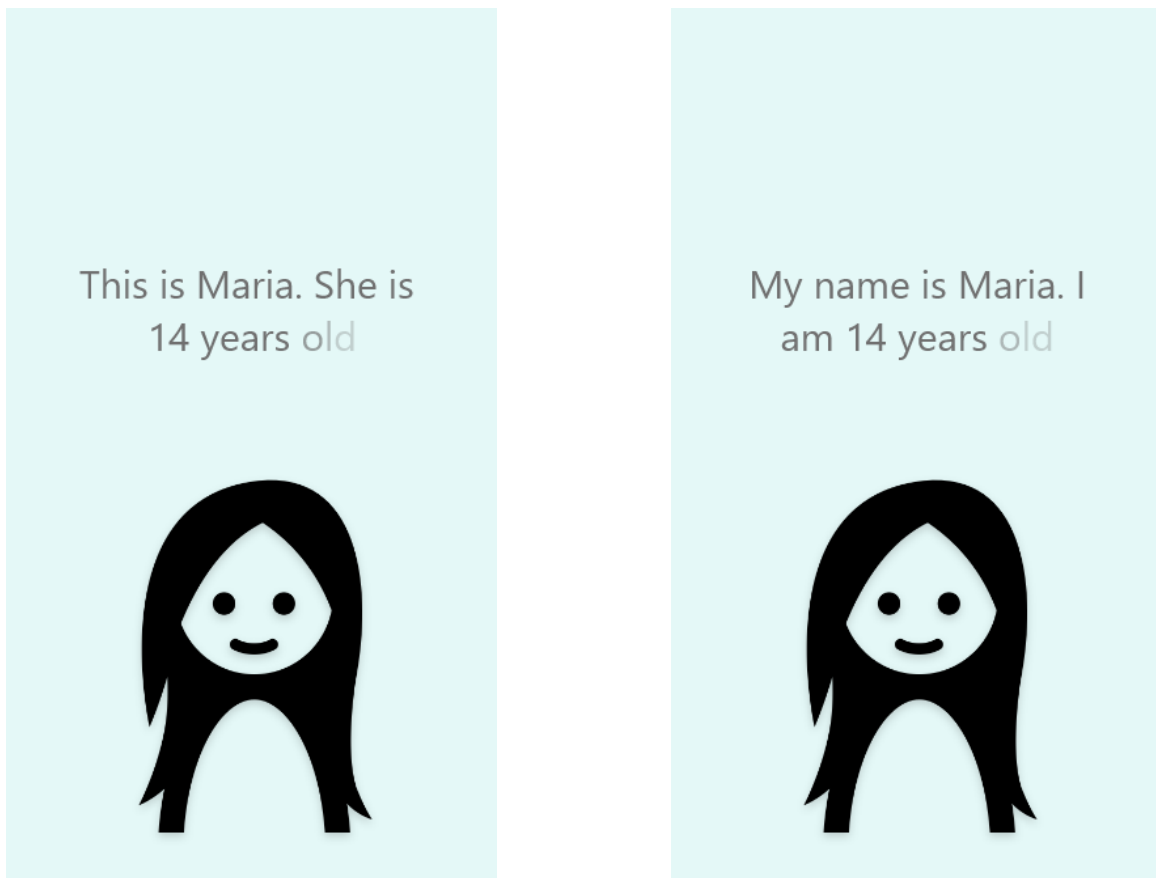
Figur 7.4: Proposed changes to the Story Based design method, old version on the left and new on the right

7.2.4 Video

For the testing with the videos, two versions were shown. Both were made by UNICEF in 2014 to promote the fight against child marriage. The first one, Let's end child marriage in Africa", features famous singer and Goodwill Ambassador Angélique Kidjo talking about the scope and dangers of child marriage (76). The second, They tried to marry a 10-year old girl", combines facts about child marriage with a story about a Ghanaian girl named Gloria, who was set to marry at the age of 10 (77). Gloria is the only one to speak in the video. The videos were chosen to represent two different approaches; the first one using a famous spokesperson and focusing on the larger picture, and the second one telling a personal story.

The videos were a popular choice, with several participants saying that they had never seen anything like it. Despite the fact that the videos being in English made it somewhat difficult for them to understand, they were still able to follow the stories. They unanimously agreed that the second video with Gloria's personal story was the best. The reasoning was the same as for the story design discussed above. Interestingly, this was the opposite of the response we had received earlier when talking about child marriage with friends and acquaintances back in Norway. There, people were more shocked when presented with facts about the scope of child marriage around the world, rather than its effects on a personal level. We can likely attribute this to the fact that people in Norway are generally well educated on human rights, marriage, and the effects and dangers of pregnancies. However, since they have never experienced it themselves, they likely underestimate how common child marriage actually is in other countries. In contrast, the girls we interviewed are well aware that child marriage is a thing that happens, but have not received sufficient information about why it is a bad practice. With this in mind, it seems fair to hypothesize that the using fact-based videos is more effective in richer/more socially liberal places with less exposure to child marriage, and story-based videos are more effective in areas where child marriage happens. We do stress that we have not studied this thoroughly, and so have no results with which to confirm this hypothesis.

The participants also said that it would be better if the videos featured stories from Malawi, as that would be more relevant to them. Of course, one should always try to present videos dubbed in the local language. The changes presented in figure 7.5 are similar to those for the story based design method in figure 7.4, changing the story told to be more personal. As we talked about in 5.4, the video design method is not meant to be a separate thing, but rather a tool that can be implemented into other designs, perhaps most easily into Informational.

Health Issues

Parents believe that marrying their daughters early protects them from HIV/AIDS. Research has shown the opposite: marriage by the age of 20 years is a risk factor for HIV infection in girls.7 In Kenya, married girls are 50% more likely than unmarried girls to become infected with HIV. In Zambia, the risk is even higher (59%). And in Uganda, the HIV

Gloria's Story

Gloria was only 10 when her family -- struggling in poverty -- wanted her to marry. "I was just crying," she says. "I was just thinking that my life has ended." Local authorities eventually intervened, mediating with her family and facilitating her return to school, but others are not so lucky. "My agemates, some are married ... and you

Figur 7.5: Proposed changes to the Video design method, old version on the left and new on the right

7.2.5 Contact

For the Contact design method, we tried to figure out how well informed the participants were about organizations and institutions they could contact, where they go to get answers to questions, and in which situations they felt this information would be used.

When asked about which organizations they knew about that worked to prevent child marriage, the police and Plan Malawi were universal answers. In Mulanje they also all mentioned Youth Network and Counseling (YONECO), a Malawian organization working to empower the youth, women and children (86). Some girls in both areas mentioned mother groups, a common body in a community for discussions, and the youth groups.

As for whom they would ask for help if they needed it, all the answers involved people either in the village or connected to it. Parents, teachers, the school headmaster, and mother groups were the most common. Some also mentioned Plan volunteers, which are local villagers working closely with Plan, and women in the community working specifically with child protection.

This was generally seen as a really good way to get access to information, not just for child marriage but for all kinds of issues. It was seen as especially good when a child needs to contact someone without anyone knowing about it, e.g. in the case of rape from a family member. Also mentioned was the use by youth groups, in cases where they are unable to convince parents to not marry away their child and have to get into contact with someone who can help them. Being able to find your own way to health centers or other institutions means that you can help with embarrassing problems you previously would have had to ask someone else to help you with.

This design method was very well received. Some preferred using the phone number, as that was the easiest and most accessible, while others thought the map/address was the most useful as going somewhere in person made it easier to get more information. Both alternatives were seen as being helpful and should be used in the future. None of the girls were afraid of speaking to a stranger about their questions. Based on their importance in the community and role as a contact point for those fleeing marriage, we were told that we should add the contact information for village leaders and other local, traditional authorities. As for the Informational design method, the changes presented in figure 7.6 are minor. We added the Group Village Headman as a contact, as they are an important person in the community and good choice as a first point of contact.
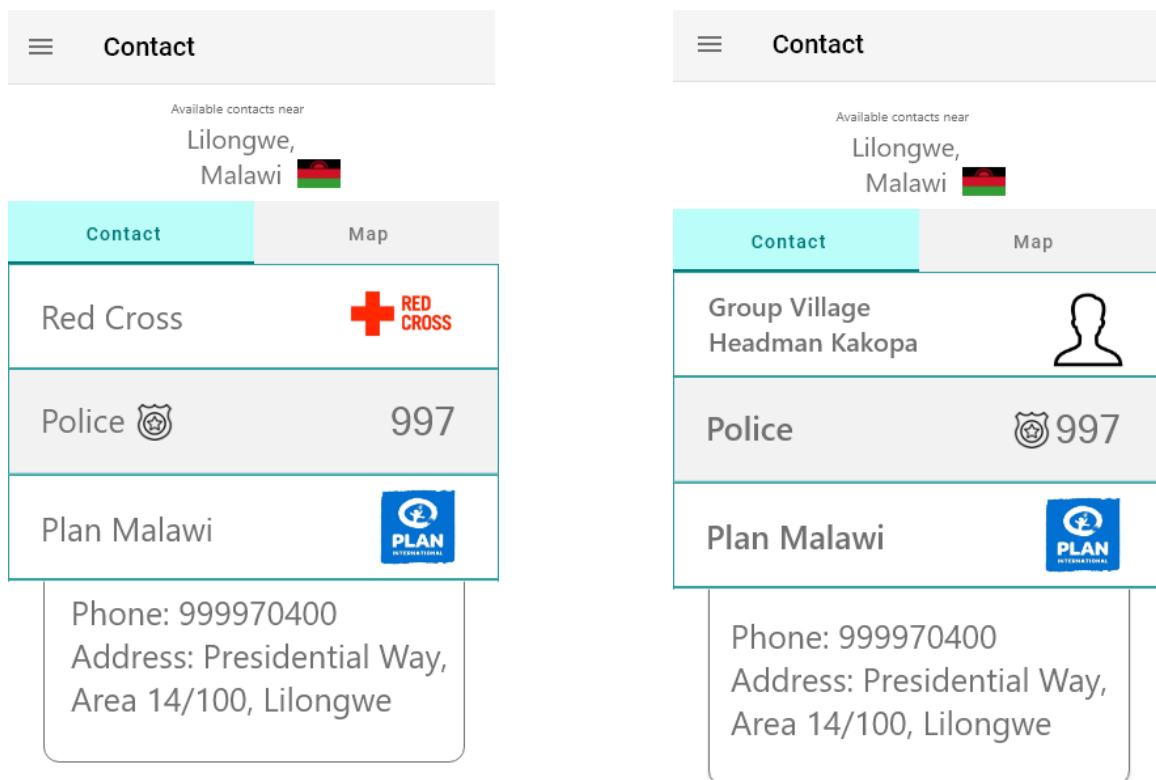
Figur 7.6: Proposed changes to the Contacts design method, old version on the left and new on the right

7.2.6 Links

When presented with the Linksdesign method, we also brought along two publications. The first one, UNICEF's "Child Marriage: Latest trends and future prospects", is an 8 page long publication that gives a global overview of the regional trends of child marriage (79). It features mostly factual text and statistics, with some pictures and graphs added. The second brief is a 1 page infographic about the connection between child marriage and HIV, made by the Girls Not Brides organization (25). Both publications are shown in figure 7.7. We wanted to see if the users preferred a more complex publication like the first one, or a simple overview that is easier to read in the second.
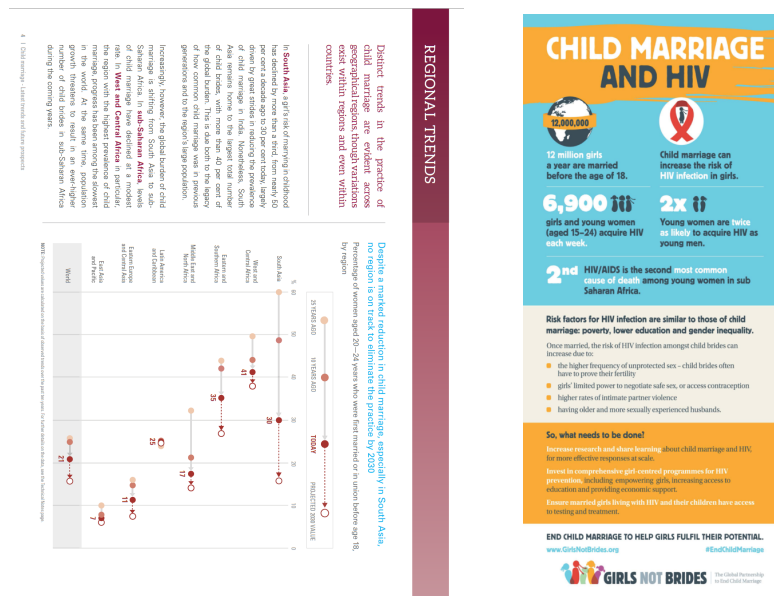
Figur 7.7: A sample page of UNICEF's publication and Girl Not Brides' infographic used in the testing of the Links design method

The questions for this design method relate to who the participants trust to give them information about laws and about child marriage. We chose those subjects as they are quite information and statistics heavy, and therefore fit well to be presented in both publication and infographic formats. As in earlier cases about where the participants got their information, local school headmasters, the police, and Plan Malawi and other NGOs were the main avenues used. All the local authorities preferred the full publication since it gave them more information, which is to be expected as they all work to inform others about child marriage. We expected the opposite to be true for the girls, but here we met one of the major differences between the two areas we visited. In Chitedze, all the girls chose the summarized version, whereas everyone in Mulanje chose the full publication. One possible explanation is that the girls in Mulanje felt that they knew more about child marriage than those in Chitedze, and so felt more comfortable choosing the more difficult version. Another point could be how well the two groups could read, as lower literacy skills likely leads to preferring a more simple alternative. We did not have access to the participants' education level, so it is difficult to draw a conclusion on these hypotheses. Thirdly, as the groups we had in Mulanje were quite large, it is possible that we got more unanimous answers there than we would have with personal interviews.

When asked what they thought the girls would prefer, all the village leaders were sure that the full publication would win. While this did turn out to be true in Mulanje, it was completely wrong in Chitedze. Again, this shows the importance of not relying solely on one source of information. The village leaders also commented that while they preferred the full publication, the best alternative is if every report also included a summary. Implementing this wish does require extra work, but it seems like a worthwhile investment if it allows those that either can not or will not read an entire paper, access to the information within.

This design was quite popular, with many participants expressing great interest in it. Based on the feedback, it does not seem like many changes need to be made. Both the long and short versions were seen as useful and should be kept, and, if possible, each long publication should also come with a summary. We propose adding summaries next to every publication where this is possible, as shown in figure 7.8. This allows for easy access to both versions.

There is an option to add more relevant information about each publication to the front page, such as number of pages, author, or a short summary. A further analysis of the possibilities around this option is needed.
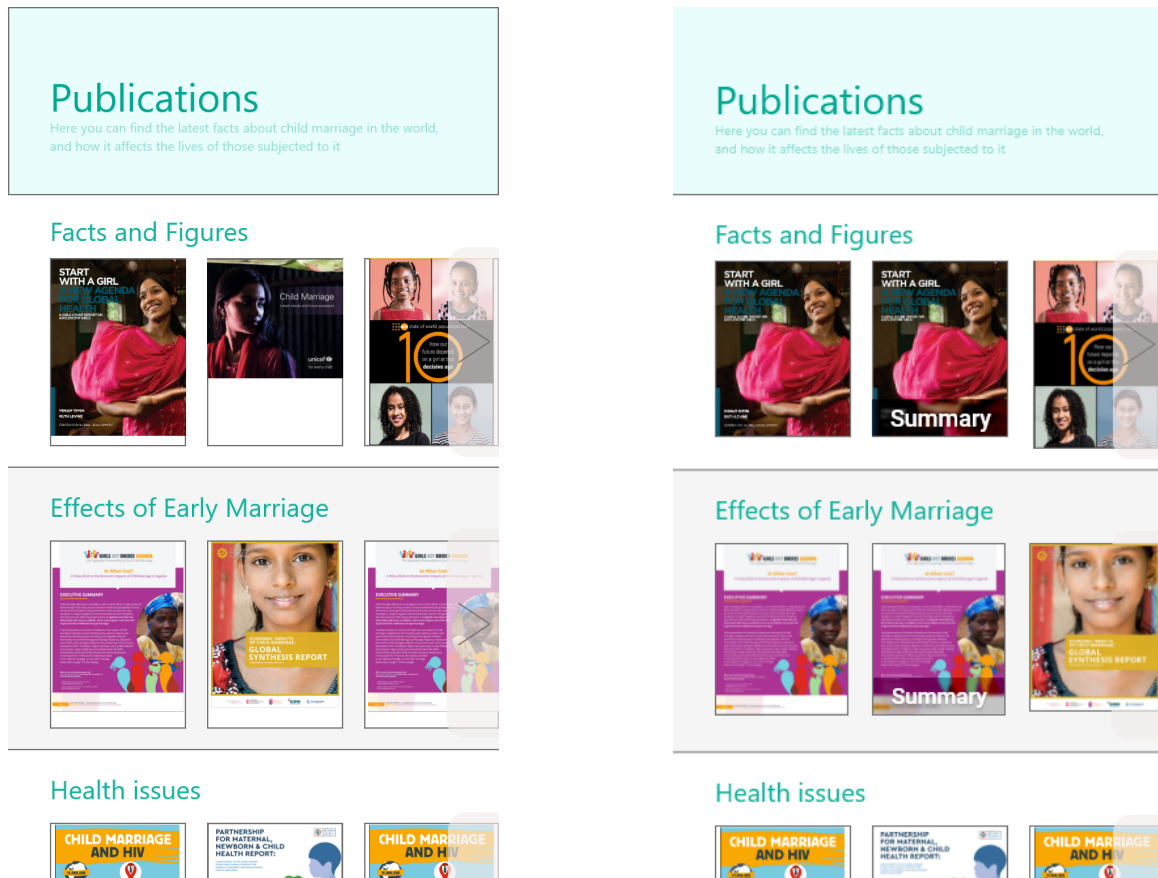
Figur 7.8: Proposed changes to the Links design method, old version on the left and new on the right

7.2.7   Social Media

When asked about social media, most of the participants had little or no experience with it. Those that had used it were familiar with Facebook and/or WhatsApp, but not much else. Based on this, it seems clear that building an entirely new social network would be far more work than it is worth. Instead, we should use the social media that the users are already familiar with. We were told by some of the village leaders that similar services exist for religious and business purposes. Presented with the idea of such a service, most participants said it would be the easiest way of all those presented to get access to information. They liked how quickly it allowed them to get direct answers to specific questions. Like for the other designs, they did not feel that any questions were too embarrassing to ask. On the contrary, one girl came up with a question on the spot, "What are the effects of early marriage and pregnancy on the body", that she had never asked anyone but would like to ask someone through WhatsApp.

Despite being quite comfortable talking to strangers, one of the groups in Mulanje did say that it would prefer talking to someone they knew. They pointed to the local Plan employee who accompanied us, whom the girls knew well, as someone they would like to talk to. This should be kept in mind by organizations wishing to establish a service like this, especially if they intend to hire new people as managers for the service. Further research is needed to figure out if the preference for talking to someone the users already know is universal or subject to local variations.

From the feedback we got, there does not seem to be much reason to design a completely new social medium centered around child marriage. As shown in figure 7.9, we instead suggest establishing helplines on already existing communication platforms. It would give the locals access to someone they can ask the questions they do not wish to ask if their friends or family are present. A good amount of work is likely needed to make sure that the populace are aware of this option and how to use it, but it should absolutely be looked into.
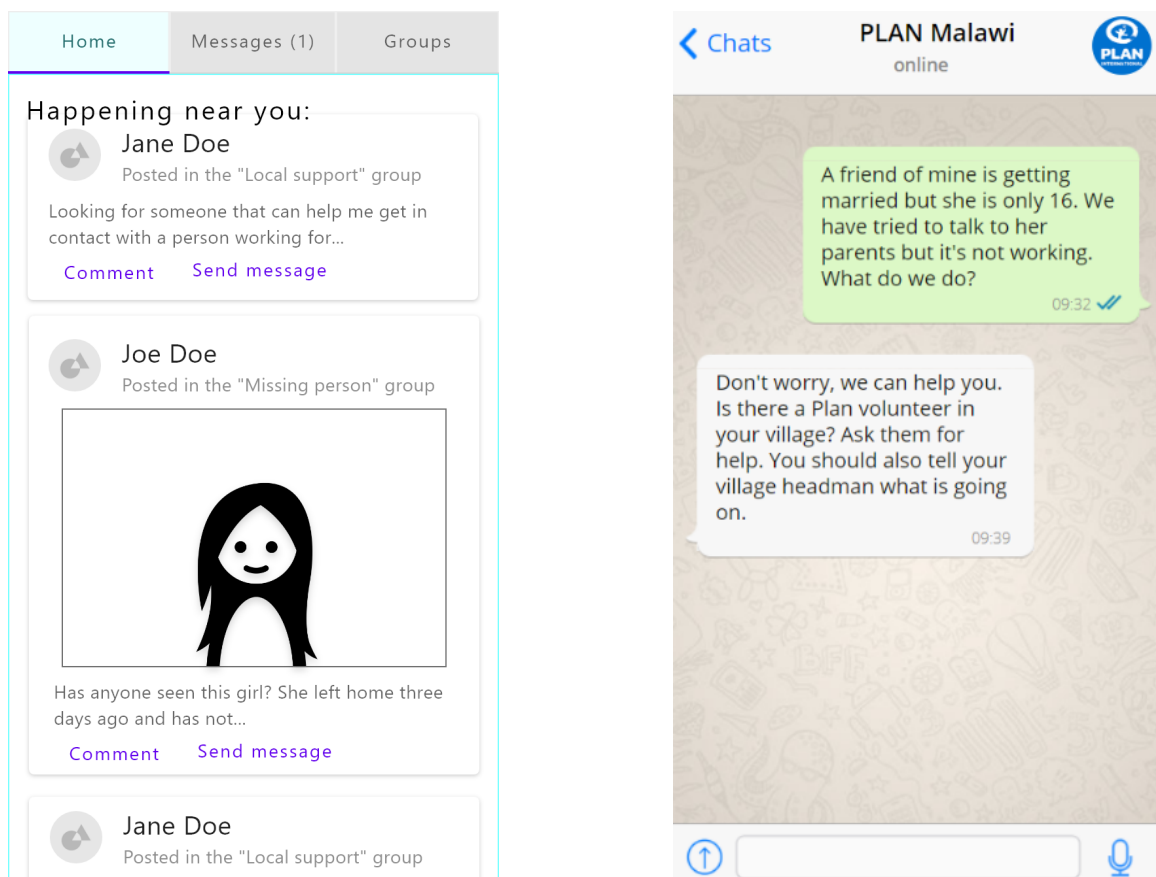
Figur 7.9: Proposed changes to the Social design method, old version on the left and new on the right

7.2.8 Favorite Design

After the three first interviews on the first day, we started asking the participants which of the seven design methods we had presented was their favorite. Before voting, all design methods were shown together and summarized in a random order, so as to avoid primacy and recency biases (60). The two village headmen interviewed in Chitedze answered that they preferred if all could be implemented, and as such are not included in the results. The results are presented in table 7.7.

DESIGN METHOD	FAVORITES
Video	13
Informational	2
Contact	2
Links	1
Argumentative	0
Story	0
Social Media	0

Tabell 7.7: Votes for each design method

As can be seen, the video design method was by far the favorite. The informational, contact, and links methods also received votes, while the argumentative, story, and social methods got no votes. There is a slight worry around the results from the second group of girls in Mulanje, as all seven of them voted for the video design method. It is not unlikely that some of them simply echoed what the first person answered, however the video design method was already the clear favorite. None of the other groups showed any indication of group thinking, as they had quite varied answers.

It is not very surprising that video turned out to be the most popular method, as we have previously discussed the effectiveness of using educational videos in underdeveloped areas in 5.4. Many of the participants said that they had never seen anything like it before, and the novelty effect was quite clear. This reinforces the importance of trying to implement videos in projects like this one. Videos carry a heavy cost as they either have to be streamed to the device, which requires a good internet connection and may be expensive for the user, or demand a lot of storage space on the device. Still, their effect is undeniable.

7.3 Uncovered Methods

We also set out with the hope of uncovering new methods that we had not thought of earlier. The following sub-chapters will cover three such methods: radio, youth groups, and local cinemas. The youth groups were mentioned multiple times during the interviews, while the two others came from singular comments we picked up on during the interview process. There are likely many additional methods we would have uncovered if we had more interviews, so this is still not meant to be an exhaustive list.

7.3.1 Radio

Radio was mentioned by one of the traditional authority figures as an expansion to the story design method, as it reaches more people than a story or a play by a youth group would. Plan Malawi employees claimed that radio listenership across Malawi is at 95%. Plan Malawi already uses radio as a way to spread information in March 2019, but we did not have access to data on how successful this has been. Many people in Malawi use radio programs as a way to learn more about agricultural practices (38). While not directly related to creating a mobile application, radio can still be used to complement an app, or to tell people about the app. As one of the main obstacles for an app is to make people aware of it and want to use it, radio could be a good way to get the word out. Another idea is to provide an overview of useful radio programs in the app, perhaps based on the users interests. This could act as another "carrotto get people who are not particularly interested in learning about child marriage to download the app.

7.3.2 Youth Groups

Plan has already established and supported many youth groups that fight child marriage. They act as a place to learn about both child marriage and life skills, and act as a safe place for youth to get together and socialize. In addition,

they spread the message they learn from Plan to the rest of their communities through meetings, plays, and by acting as "wedding busters"where they seek out parents who are marrying away their child and try to convince them to not do it.

As youth groups are already involved in the fight against child marriage, they are a great way to get any application out into widespread use. Any further testing should also use these youth groups actively as they have invaluable knowledge about the villages they live in and how child marriage can best be fought there.

7.3.3 Local Cinemas

We learned from the user studies that the communities in Mulanje have access to small, local cinemas that sometimes show movies for all to watch. If these could be used to show videos about child marriage it would be a great way to spread information to the people there. This could solve many of the issues faced by using videos in the app (as discussed in 7.2.4). While utilizing local cinemas may not be an option everywhere, it is something that should be looked into wherever it is available. Plan does not currently use cinemas to educate, but have donated modern television sets to health centers that let young visitors learn about health.

7.4 Conclusion

In this chapter, we have presented the results and feedback for each of the design methods. All of them were well received, and all the participants agreed that using mobile applications is a good approach and something that should be implemented. The clear favorite amongst the methods was using videos. This shows that even though it is difficult to implement, the effect of using videos is unparalleled and should be strongly considered. We have used the feedback to propose changes to each of the prototypes we presented in chapter 5. Four designs, Informative, Story Based, Contacts, and Videos, have received small changes, mostly in the details around which subjects were covered and how they were presented. For the Links design method we found a need for additional summaries to complement the publications, as the interviewees were split in what they preferred between the long-form publications and the summary. The Argumentative design method received a drastic overhaul, and is now far simpler than before. It has also been remade in a way that makes it easier to include in other designs. Finally, the Social Media design method was found to be unnecessary, and has been replaced with a suggestion that local organizations establish themselves on social media so that people can send them questions there.

We also found that local authority figures have a tendency to overestimate both how much the general population in their areas know about child marriage, how effective the meetings they hold are at conveying information, and how well they could predict what the girls we interviewed would prefer. This information should be kept in mind for any future projects that interview local authority figures.

Kapittel 8

Guidelines for User Testing in Underdeveloped Areas

This chapter contains a set of guidelines and tips for performing user testing in underdeveloped areas. We have chosen to present them separately from the results chapter as they are not unique to our project and our results. Since The guidelines are based on our experiences conducting the user studies as described earlier in this paper. Chapter 6 in particular provides much of the background and discussion behind the points given here. While they cover multiple aspects of the testing procedure under these circumstances, it is by no means exhaustive and therefore could and should be expanded upon by other researchers.

8.1 Guidelines

8.1.1 Time Management

- Translating takes time, and unless the researcher is fluent in the local language they should expect that a translator might be necessary (even if they are told that the participants are English proficient).

- If you have a translator, go through the questions with them in advance. Even in semi-structured interviews there are questions and explanations that are the same every time, and in these cases the translator can do the talking alone.

- Take into account that participants might have to leave before you are done, and be especially conscious around the fact that many might have to leave in order to get home before nightfall.

8.1.2 Bringing Locals

- Teaming up with locals is an important step to get good results. Not only can they act as translators where necessary, they are also able to ask questions that an outsider would not think about. In addition, those interviewed might be better able to discuss certain subjects with someone that knows the local customs, trends, and subjects of interest.

8.1.3 Getting Good Answers

- Young girls in Africa's rural areas are often shy when meeting strangers for the first time. If possible, try arranging a meet-up prior to the actual testing/interviews. Bringing along adults that they trust and can act as intermediaries helps loosen the mood.

- Shyness can also be caused by fear of their thoughts being spread in their communities. Personal and embarrassing topics like sex, marriage, and puberty are particularly sensitive. Be clear that you will not be using their names, and that what they say is between you and them only.

- As most people in these areas are unfamiliar with mobile applications, asking questions like "What do you think about this design"often lead to short, non-descriptive answers. They are unlikely to be critical of the designs, as they have little to compare them to. Try asking questions that work around this, like "Who do you think would use this, and why?".

- The best answers you get will rarely be the ones that directly answer your questions, but rather information about neighboring issues. Set up your questions so that they touch on as many subjects and aspects of life as possible, so that the participants have more opportunities to be reminded of relevant stories and talking points.

8.1.4 Group Sessions

- Group sessions help both in alleviating shyness and getting better answers. Participants will often build upon what the others are saying, and there is often one in the group who will lead the conversation and drag the others along. From our experience, a group size of 3-4 seems to be the best.

8.1.5 Local Authority Figures

- Getting in contact with local authority figures is helpful, as they can give a good overview of the situation in an entire area. They are especially important if the project involves changing local customs, as these leaders have a lot of influence.

- Be aware that local authority figures might overestimate how much they actually know about what their populace thinks. We found multiple cases where the village leaders were sure they knew facts or what their villagers thought, but turned out to be wrong.

Kapittel 9

Conclusion

In this paper we have presented a project aiming to combat child marriage on a global scale using mobile applications. Child marriage is a problem that, while slowly declining, is still prevalent and far from being eradicated (79). Population growth means that even with the current decline, the total number of child marriages might rise in the future. It is therefore important that the global community continues to fight child marriage.

There is a large amount of research done on the causes and effects of child marriage, as well as case studies on the different methods to prevent it (21)(54)(2). A key finding here is that the reasons as for why child marriage happens are wide and varied, and often differ greatly based on the country and region. It has been found that one of the most efficient methods is to convey information to children who are in danger of being married off early, as well as their parents and communities (32). As spreading information is the key objective of this research, these findings are very positive and show the relevancy of the project. We have also presented an overview of the field of Human-Computer Interaction for Development (HCI4D), which specializes in developing software to further socio-economic progress in underdeveloped areas. We also covered two common problems within the field: designing for a low-literate audience, and local differences in how applications are perceived.

We were able to identify three different projects that have previously used mobile phones to fight child marriage: Bandhan Tod, GPower, and Bangladesh's age verification system via SMS for wedding registrars. We were able to interview one of the people that worked on the latter as part of our expert interviews, where we learned how their experience with testing and deploying the system had been.

Based on the knowledge gained from the initial research, it was decided that the project would use case studies with semi-structured interviews to conduct the user studies. An overview of other methods, why they were not chosen and how they could be used for similar projects is given in section 3.2. The problem of finding participants, which is often difficult in areas where the researchers have little to no experience or contacts, was solved by collaborating with organizations that are already established in areas relevant to the project.

We interviewed 4 experts in the field of child marriage and ICT4D as part of the data gathering, this is transcribed in section 4.2. They all found the idea of the project useful and relevant. From the research into ICT4D development and the expert interviews, we identified and created prototypes of 7 different design methods.

A close cooperative effort was initiated with Plan International, who in addition to providing us with several interviews helped us organize and carry out a set of interview sessions in two different areas of Malawi. Here we interviewed a total of 19 girls and 4 traditional authority figures about internet and mobile phone usage, child marriage, and received feedback on the design methods we had prototyped. As a consequence of the connection with Plan International that was established through this project, NTNU and Plan International are now in talks of possible future projects where they can work together.

In addition to the results we gathered for this project we were able to identify several problems that can arise when doing user testing in low-development areas. To help others who might face the same issues in their work, we have created the Guidelines for User Testing in Underdeveloped Areas". This set of guidelines is by no means an exhaustive list, but can hopefully help others and act as something they can build upon.

The following sections answer the research questions we posed in the beginning of the thesis

9.1 RQ1: What is the Current Status of Using Apps to Combat Child Marriage?

During this research phase, we were able to find three programs that have used mobile applications to fight child marriage. These are covered more in depth in 2.5, with additional insight for the third project from the interview with one of its creators in section 4.2.2.

1. **Bandhan Tod**
   Bandhan Tod was the main inspiration for this project, and focuses on spreading knowledge about child marriage in rural populations. It also allows the user to contact organizations that can help them during crises (80).

2. **GPower**
   GPower uses positional and other personal data to discover abnormalities which might mean that the user is in some sort of trouble. Although not fully concentrated on child marriage, it had great results on both this and other fronts (8).

3. **Bangladesh/Plan International**
   This application lets marriage registrars check the credibility of birth certificates, which makes it easier to spot and deny marriage proposals that lie about the age of the participants to get around local laws (61).

Applications have been used in several other projects that take place in low-development areas, as shown in chapter 2.6 about HCI4D. While their findings are relevant, there are certain aspects of child marriage, especially socio-cultural norms (see section 2.8), which sets it apart from many other problems out there. There has been a universally positive response to the project, both from the experts we interviewed and everyone involved in the case studies in Malawi. Using mobile applications to fight child marriage seems to be highly viable, and there is a lot of potential that can be exploited.

9.2 RQ2: How do Different Design Choices Affect the Effectiveness of Conveying Information About Child Marriage?

Through research and interviews, we identified and prototyped 7 different design methods for use in an app that conveys information about child marriage. After testing these in a set of case studies in Malawi, we were able to make the following conclusions:

1. **Informational**
   This design was very popular, and got praise for its design. The only changes made were in which subjects the app covered.

2. **Argumentative**
   Here we saw larger changes, as the design was found to be somewhat difficult to use. The new version presents more information on the same screen in a better way. We also found additional subjects that should be covered.

3. **Story based**
   The biggest thing we learned for this design was to keep the stories as personal as possible. People are more likely to believe someone if they are telling their own story and not someone else's.

4. **Video**
   We can conclude that as for the story telling, personal videos are preferable. This was the most popular design method, but it remains the most difficult to implement as it requires a lot of data.

5. **Contact**
   Also popular, there seems to be no reason to not include this in any app looking to spread information in low-development areas. It is simple, but something that many of the participants really wanted to have access to.

6. **Links**

   This design method was quite popular, and has only received minor changes. We established that there is a want and need for both full publications and summaries, with both types being preferred by different people.

7. **Social Media**

   While the idea of using social media is good, designing a separate platform is unnecessary and unlikely to work. Instead, one should use existing platforms like Facebook or WhatsApp.

All the design methods were seen as good ways to convey information by the case study participants, and, with the exception of creating a separate social media platform, should all be considered for further use. The most popular design methods were Video, Informational, Contact, and Links.

9.3   RQ3: What factors must be considered when conducting user studies in underdeveloped areas?

This research question has been answered in chapter 8, with the background for each point explained in chapter 6. We do not claim to have covered every single factor by far, and invite others to build upon the work we have done here in future projects. Still, the information we gathered should be highly useful to anyone wishing to do similar projects to the one that we have done.

9.4   Further work

The main goal of the project remains to create an actual application and getting it tested and deployed. With the results we have gathered so far there is a solid foundation in place for this. A pilot project in Malawi is likely the best alternative, as Plan Malawi is already heavily invested in the project and many of their employees are eager to see it come to life. Much of the information we have gathered is also mostly relevant to Malawi.

In addition to the work-in-progress paper that was published at IDC 2019, several other papers are planned based on the work done in this thesis. The exact specifications for these papers and which conferences they will be applied to remains to be decided.

There is much that remains to be uncovered about local differences in child marriage, and getting a solid overview of this issue would be highly relevant for the project. We were unable to find significant differences in the work that we did for this thesis, so it appears like future attempts at this need to have a clearer focus on what they are looking for and how they are going to find it.

The Guidelines for User Testing in Underdeveloped Areas"is meant to be built upon by future research projects, as there are many more problems that we did not face during our case studies that others could experience.

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Bibliografi

[1] ACM SIGCHI, 2013. HCI4D Featured Community.
URL http://chi2013.acm.org/communities/hci4d/

[2] Amin, et al., 2016. Can conditional transfers eradicate child marriage? IZA Policy Paper No. 118.

[3] Amin, et al., 2018. Skills-Building Programs to Reduce Child Marriage in Bangladesh: A Randomized Controlled Trial. Journal of Adolescent Health 63 (2), 293–300.

[4] Amin, S., Asadullah, M. N., Hossain, S., Wahhaj, Z., 2017. Eradicating child marriage in the Commonwealth: is investment in girls' education sufficient? The Round Table 106 (2), 221–223.

[5] Archambault, C. S., 2011. Ethnographic empathy and the social context of rights:"Rescuing" Maasai girls from early marriage. American Anthropologist 113 (4), 632–643.

[6] Atre, S. R., Kudale, A. M., Howard, H. M., 2017. Addressing family planning needs among low-literate population in peri-urban areas of Delhi, India: a qualitative inquiry. International Journal of Reproduction, Contraception, Obstetrics and Gynecology 6 (10), 4500–4507.

[7] Baird, S. J., Garfein, R. S., McIntosh, C. T., Özler, B., 2012. Effect of a cash transfer programme for schooling on prevalence of HIV and herpes simplex type 2 in Malawi: a cluster randomised trial. The Lancet 379 (9823), 1320–1329.

[8] Balasubramanian, K., 2016. Accenture and CINI's Digital Solution 'GPower' Receives Vodafone Foundation's Mobile for Good 2015 Award for Women Empowerment and Inclusive Development.
URL https://newsroom.accenture.com/news/accenture-and-cinis-digital-solution-gpower-receives-vodafone-foundations-mobile-for-good-2015-award-for-women-empowerment-and-inclusive-development.htm

[9] Batool, A., Asghar, A., Tariq, T., Badar, M., Shahzad, I., Anwar, U., Naseem, M., 2016. Design Methods to Reduce Technology Fear and Solicit Feedback from Lady Health Workers (LHWs) in Pakistan. In: Proceedings of the 7th Annual Symposium on Computing for Development. ACM, p. 37.

[10] Bentley, J., Van Mele, P., Okry, F., Zossou, E., 2014. Videos that speak for themselves: When non-extensionists show agricultural videos to large audiences. Development in Practice 24 (7), 921–929.

[11] Cahyadi, N., Hanna, R., Olken, B. A., Prima, R. A., Satriawan, E., Syamsulhakim, E., 2018. Cumulative Impacts of Conditional Cash Transfer Programs: Experimental Evidence from Indonesia. Tech. rep., National Bureau of Economic Research.

[12] Central Intelligence Agency, 2016. The World Factbook 2016-17, Malawi.
URL https://www.cia.gov/library/publications/the-world-factbook/geos/mi.html

[13] Chiao, J. Y., Mathur, V. A., 2010. Intergroup empathy: How does race affect empathic neural responses? Current Biology 20 (11), R478 – R480.
URL http://www.sciencedirect.com/science/article/pii/S0960982210004306

[14] Coontz, S., 2006. Marriage, a history: How love conquered marriage. Penguin.

[15] Curtis, S., 2015. Is facebook becoming the internet?
URL https://www.telegraph.co.uk/technology/facebook/11402343/Is-Facebook-becoming-the-internet.html

[16] Dearden, A., Light, A., Dray, S., Thomas, J., Best, M., Buckhalter, C., Greenblatt, D., Krishnan, G., Sambasivan, N., 2007. User centered design and international development. In: CHI'07 Extended Abstracts on Human Factors in Computing Systems. ACM, pp. 2825–2828.

[17] Delprato, M., Akyeampong, K., 2017. The Effect of Early Marriage Timing on Women's and Children's Health in Sub-Saharan Africa and Southwest Asia. Annals of global health 83 (3-4), 557–567.

[18] Diaz, M., Engelman, R., Klugman, J., Luchsinger, G., Shaw, E., 2017. State of world population 2017. worlds apart: Reproductive health and rights in an age of inequality.

[19] Dral, A. A., Tolani, M. R., Smet, E., van Luijn, A., 2018. Factors influencing male involvement in family planning in Ntchisi district, Malawi–a qualitative study. African journal of reproductive health 22 (4), 35–43.

[20] Freedom House, 2018. Freedom on the Net - Malawi.
URL https://freedomhouse.org/report/freedom-net/2018/malawi

[21] Freij, L., 2010. Safe Age of Marriage in Yemen: Fostering Change in Social Norms
. Brochure for USAID.

[22] Fuller, Chris J and Narasimhan, Haripriya, 2008. Companionate marriage in India: the changing marriage system in a middle-class Brahman subcaste. Journal of the Royal Anthropological Institute 14 (4), 736–754.

[23] Gandhi, R., Veeraraghavan, R., Toyama, K., Ramprasad, V., 2007. Digital green: Participatory video for agricultural extension. In: Information and Communication Technologies and Development, 2007. ICTD 2007. International Conference on. IEEE, pp. 1–10.

[24] Girls Not Brides, 2013. Meet the Wedding Busters: Stopping Child Marriage in Bangladesh.
URL https://www.girlsnotbrides.org/meet-the-wedding-busters-stopping-child-marriage-in-bangladesh/

[25] Girls Not Brides, 2019. Girls Not Brides homepage.
URL https://www.girlsnotbrides.org/

[26] Girls Not Brides, 2019. Girls Not Brides Malawi.
URL https://www.girlsnotbrides.org/where-does-it-happen/atlas/#/malawi

[27] Google Inc., 2018. Google Scholar homepage.
URL https://scholar.google.no/

[28] Haworth, A., 2018. Hail to the chief.
URL https://www.marieclaire.com/politics/a19473174/theresa-kachindamoto-child-marriage-malawi/

[29] Hinson, L., Steinhaus, M., 2017. Enabling girls to advance gender equity.
URL https://www.icrw.org/wp-content/uploads/2018/02/WGCD-ENGAGE-Inisghts-to-Action-ppt.pdf

[30] Hossain, M. M., Sharmin, M., Ahmed, S., 2018. Bangladesh emergency services: A mobile application to provide 911-like service in bangladesh. In: Proceedings of the 1st ACM SIGCAS Conference on Computing and Sustainable Societies. ACM, p. 1.

[31] Human Rights Watch, 2014. "I've Never Experienced Happiness"Child Marriage in Malawi.
URL https://www.hrw.org/report/2014/03/06/ive-never-experienced-happiness/child-marriage-malawi

[32] ICRW, 2011. Solutions to end child marriage - what the evidence shows.
URL https://www.icrw.org/wp-content/uploads/2016/10/Solutions-to-End-Child-Marriage.pdf

[33] ICT4D Conference, 2018. ICT4D Conference homepage.
URL https://www.ict4dconference.org/

[34] IEEE, 2018. IEEE homepage.
URL https://ieeexplore.ieee.org/

[35] International Telecommunication Union, 2017. ICT facts and figures 2017.

[36] Kamwendo, G. H., 2002. Linguistic and ethnic identity among the Lomwe of Malawi. Ethnicity in an age of globalization, 113À127.

[37] Karageorgos, G., Andreadis, I., Psychas, K., Mourkousis, G., Kiourti, A., Lazzi, G., Nikita, K. S., 2018. The Promise of Mobile Technologies for the Health Care System in the Developing World: A Systematic Review. IEEE reviews in biomedical engineering.

[38] Kaufa, M., 2016. Malawi: Radio programs help fish farmers survive drought.
URL http://wire.farmradio.fm/en/farmer-stories/2016/06/malawi-radio-programs-help-fish-farmers-survive-drought-14517

[39] Kelly, C. A. e. a., 2017. More Than Brides Alliance: Baseline Report, Malawi.

[40] Kim, J., Hastak, M., 2018. Social network analysis: Characteristics of online social networks after a disaster. International Journal of Information Management 38 (1), 86–96.

[41] Kumar, N., Wong-Villacres, M., Karusala, N., Vishwanath, A., Kumar, A., Ismail, A., 2019. Aspirations-based design. In: Proceedings of the Tenth International Conference on Information and Communication Technologies and Development. ACM, p. 2.

[42] Leap Learning, 2019. Leap learning homepage.
URL https://leaplearning.no/

[43] Lee-Rife, S., Malhotra, A., Warner, A., Glinski, A. M., 2012. What works to prevent child marriage: a review of the evidence. Studies in family planning 43 (4), 287–303.

[44] Ling, R., 2017. The reconstruction of space and time: Mobile communication practices. Routledge.

[45] Malawi Voice, 2018. Chinese-Funded "National Fibre Backbone Project" Hailed For Transforming Malawi.
URL https://theworldnews.net/mw-news/chinese-funded-national-fibre-backbone-project-hailed-for-transforming-malawi

[46] Maredia, M. K., Reyes, B., Ba, M. N., Dabire, C. L., Pittendrigh, B., Bello-Bravo, J., 2018. Can mobile phone-based animated videos induce learning and technology adoption among low-literate farmers? A field experiment in Burkina Faso. Information Technology for Development 24 (3), 429–460.

[47] McNeish, H., 2016. Malawi's fearsome chief, terminator of child marriages.
URL https://www.aljazeera.com/indepth/features/2016/03/malawi-fearsome-chief-terminator-child-marriages-160316081809603.html

[48] Medhi, I., Ratan, A., Toyama, K., 2009. Mobile-banking adoption and usage by low-literate, low-income users in the developing world. In: International conference on internationalization, design and global development. Springer, pp. 485–494.

[49] Mkandawire, F. f. M., 2018. Minister advises youth to use social media positively.
URL https://www.mbc.mw/index.php/news/sports/item/6033-minister-advises-youth-to-use-social-media-positively

[50] Mphande, L., 2004. Terms for Intergenerational relations among the Tumbuka of Northern Malawi. Journal of Intergenerational Relationships 2 (3-4), 147–170.

[51] Munthali, A. C., 2006. Health problems that require no"medication": The case of ancestor-related illnesses among the Tumbuka of Northern Malawi. Nordic Journal of African Studies 15 (3).

[52] Nanda, et al., 2016. Making change with cash? ICRW publication, Impact on Marriage: Program Assessment of Conditional Cash Transfers.

[53] National Statistical Office - NSO/Malawi and ICF, 2017. Malawi Demographic and Health Survey.

[54] Nour, N. M., 2009. Child marriage: a silent health and human rights issue. Reviews in obstetrics and gynecology 2 (1), 51.

[55] Oates, B. J., 2006. Researching Information Systems and Computing. SAGE Publications Ltd.

[56] Pal, J., 2017. CHI4Good or Good4CHI. In: Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems. ACM, pp. 709–721.

[57] Palamuleni, M. E., 2011. Socioeconomic determinants of age at marriage in Malawi. International Journal of Sociology and Anthropology 3 (7), 224–235.

[58] Parsons, J., Edmeades, J., Kes, A., Petroni, S., Sexton, M., Wodon, Q., 2015. Economic impacts of child marriage: a review of the literature. The Review of Faith & International Affairs 13 (3), 12–22.

[59] Peters, P. E., 2010. "Our daughters inherit our land, but our sons use their wives' fields": matrilineal-matrilocal land tenure and the New Land Policy in Malawi. Journal of Eastern African Studies 4 (1), 179–199.

[60] Pinsker, R., 2011. Primacy or recency? a study of order effects when nonprofessional investors are provided a long series of disclosures. Behavioral Research in Accounting 23 (1), 161–183.

[61] Plan International, 2018. Mobile app stops 3,700 child marriages.
URL https://plan-international.org/news/2018-05-07-mobile-app-stops-3700-child-marriages

[62] PLAN Norge, 2017. Lillesøster ble gift som 11-åring.
URL https://www.plan-norge.no/weddingbusters/malawi-bangladesh

[63] Poushter, J., Bishop, C., Chwe, H., 2018. Social media use continues to rise in developing countries but plateaus across developed ones. Pew Research Center 22.

[64] Red Cross Norway, 2019. Roede kors telefonen for tvangsekteskap og kjønnslemlestelse.
URL https://www.rodekors.no/tvangsekteskap

[65] Reiss, F., 2017. Why can 12-year-olds still get married in the United States? The Washington Post.
URL https://www.washingtonpost.com/posteverything/wp/2017/02/10/why-does-the-united-states-still-let-12-year-old-girls-get-married/

[66] Renken, J., Heeks, R., 2018. Social network analysis and ict4d research: Principles, relevance, and practice. The Electronic Journal of Information Systems in Developing Countries 84 (4).

[67] Richardson, C., 2017. Ending Child Marriage in Malawi: A Gatekeepers Approach to Changing Norms. Ph.D. thesis, Columbia University.

[68] Robertson, S., Cassity, E., Kunkwenzu, E., 2017. Girls' primary and secondary education in malawi: Sector review.

[69] Robinson, A. L., 2017. The Political Logic of Cultural Revival: Ethnic Visibility and Electoral Politics in Malawi.

[70] Roudi-Fahimi, F., Ibrahim, S., 2013. Ending child marriage in the Arab region. Population Reference Bureau 1 (8).

[71] Sano, Y., Antabe, R., Atuoye, K. N., Hussey, L. K., Bayne, J., Galaa, S. Z., Mkandawire, P., Luginaah, I., 2016. Persistent misconceptions about HIV transmission among males and females in Malawi. BMC international health and human rights 16 (1), 16.

[72] SIGCHI, 2018. SIGCHI Communities.
URL https://sigchi.org/communities/

[73] Stefanik, L., Hwang, T., 2017. Applying theory to practice: CARE's journey piloting social norms measures for gender programming.

[74] Stork, C., Calandro, E., Gillwald, A., 2013. Internet going mobile: internet access and use in 11 African countries. info 15 (5), 34–51.

[75] U-Report Malawi, 2019. U-Report Homepage.
URL http://www.ureport.mw/

[76] UNICEF, 2014. Let's end child marriage in Africa.
URL https://www.youtube.com/watch?v=IVzvoU219F4

[77] UNICEF, 2014. They tried to marry a 10-year-old girl – Ghana | UNICEF.
URL https://www.youtube.com/watch?v=mvo2PRNaJyo

[78] UNICEF, 2018. 25 million child marriages prevented in last decade due to accelerated progress, according to new UNICEF estimates. Press release.
URL https://www.unicef.org/press-releases/25-million-child-marriages-prevented-last-decade-due-accelerated-progress-according

[79] UNICEF, 2018. Child Marriage: Latest trends and future prospects. Brochure.
URL https://data.unicef.org/wp-content/uploads/2018/07/Child-Marriage-Data-Brief.pdf

[80] United Nations Populations Fund, 2017. Crashing a wedding, saving a child bride: App helps girl avoid child marriage.
URL https://www.unfpa.org/news/crashing-wedding-saving-child-bride-app-helps-girl-avoid-child-marriage

[81] United Nations Populations Fund, 2018. Child Marriage.
URL https://www.unfpa.org/child-marriage

[82] Wodon, Q., Male, C., Nayihouba, A., Onagoruwa, A., Savadogo, A., Yedan, A., Edmeades, J., Kes, A., John, N., Murithi, L., et al., 2017. Economic impacts of child marriage: global synthesis report.

[83] Wodon, Q., Tavares, P., Fiala, O., Le Nestour, A., Wise, L., 2017. Ending child marriage: child marriage laws and their limitations.

[84] World Health Organization, 2018. Adolescents: health risks and solutions. Fact sheet.
URL https://www.who.int/en/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions

[85] Wright, K. B., 2005. Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. Journal of computer-mediated communication 10 (3), JCMC1034.

[86] Youth Network and Counseling, 2019. YONECO homepage.
URL https://yoneco.org/

Appendix

1. Appendix A: Cooperation Proposal

2. Appendix B: Interview Questions for expert interviews

3. Appendix C: Plan International's Global Policy for Safeguarding Children and Young People

4. Appendix D: Interview questions for Malawi tests

5. Appendix E: Interview questions for Malawi tests with changes made during testing

6. Appendix F: Consent form for interviews

7. Appendix G: Work-in-progress paper for IDC 2019

8. Appendix H: Plan International Malawi security briefing

Cooperation proposal {ORGANIZATION} – Jostein Brevik

In short

I am writing my master's thesis on the development of software in poorer, more rural areas globally. The goal is to produce extended knowledge on how to design, as well as the development of, an **app/website that helps prevent child marriage** by informing the girls and society around them about the dangers of this practice.

I'm sending this in hopes that you and/or {ORGANIZATION} would be interested in cooperating with me or know someone who would.

Who am I?

My name is **Jostein Brevik** (22), a Computer Science student specializing in Interaction Design at NTNU in Trondheim, Norway. My supervisor is [Letizia Jaccheri](#), professor at NTNU.

What is the project?

The thesis is based around the idea of creating a digital intensive experience that helps combat child marriage. It is inspired by a 2017 UNFPA project in the state of Bihar in India called [Bandhan Tod](#). Forwarding more than 200 distress calls in the app's first few months on the market, this project has shown that mobile apps are an effective way of preventing child marriage.

My idea is to take the concept from only covering a single Indian state, to a worldwide arena. **Going global** means dealing with challenges such as different languages, local customs and laws, reasons for why child marriage is happening and the most efficient ways of conveying information. While many current attempts at combating child marriage focus on a single area or country, the goal of this project is to create a product that is adaptable and modular enough to be implemented in new areas easily. The research will therefore be focused on different ways of spreading information and how the results differs from country to country. Not only will this be valuable knowledge for the anti-child marriage project, but it will also be available for use by other developers looking to create software on a truly global scale.

I will spend the fall conducting a literature review of scientific papers in the relevant areas to the project, gathering information from stakeholders such as you, and writing a report on this. After Christmas I'll start developing a prototype of the application and run tests and surveys on this to gather data. This data will then be the basis for my master's thesis and any related papers.

Why am I contacting you?

1) My hope is that we can get a close cooperation going, to the point where this project becomes something you would want to have **your name** on.
2) In the hope that you can put me in **contact** with other projects who have done similar work previously
3) Global research is impossible without **people on the ground** who know the area, people and customs there. Since you are already established in many areas of the world, going through channels that have already been established with the local communities is far easier than building them up from the ground.

What do I want?

I hope that you see the value in not just my project, but also how the research I plan to conduct will be useful for later projects. In short, I'm looking for answers to the following questions:

1) Would it be possible for me to share my prototypes with your teams on the ground around the world, and have them gather data on the success of these prototypes?
2) Do you have experience with similar projects looking at not just the development of digital experiences in these areas, but in the different design approaches available?

What do you get?

1) Any and all research I do and publish will be freely available, meaning that any other projects looking to develop similar software can do so more easily. I do not mean to overstate my own importance here, but I think that putting a **scientific spotlight** on the development of "making the world a better place" apps can be of great benefit to solving many of humanity's current problems. Of course, this research will hopefully be of use to you as well
2) For the app itself, I am not averse to either **letting you publish it** in your name or using what I have accomplished as the basis for your own project. However, as I'm contacting multiple organizations with the same offer, I can not say how this will play out at the moment.
3) A master's student willing to spend a year trying to find part of a solution to a problem that affects millions of people worldwide, **for free**

How to contact me

jostein.brevik@gmail.com   +47 988 60 574

LinkedIn   Facebook

Articles and inspiration

International Center for Research on Women's report which finds that spreading information is the best way to reduce rates of child marriage:
https://www.icrw.org/wp-content/uploads/2016/10/Solutions-to-End-Child-Marriage.pdf

United Nations Population Fund article on Bandhan Tod:
https://www.unfpa.org/news/crashing-wedding-saving-child-bride-app-helps-girl-avoid-child-marriage

GPower, another app developed by Accenture and Child in Need Institute:
https://www.linkedin.com/pulse/gapp-more-than-200-saved-from-human-trafficking-julia-branch/

Interview questions

What does your organization do?

In what areas does your organization operate?

Have you (personally) been involved in similar projects before?

How has your organization used mobile applications in areas like this?

Are there any methods of fighting child marriage that we might not have thought of?

Do you know of any regional differences with regards to child marriage which would be of interest to the project?

Is there a gap in digital competency between young and old in areas where child marriage happens?

Do you have any tips for implementing the project?

Other comments

GLOBAL POLICY
SAFEGUARDING CHILDREN AND YOUNG PEOPLE

SAY YES! TO KEEPING CHILDREN AND YOUNG PEOPLE SAFE AND PROTECTED

Lead	PII Safeguarding Children and Young People Unit
Version Number	Final
Date of Approval by Members' Assembly	November 2017
Effective Date	November 2017
Review Date	November 2020

APPLICATION

As a Global Policy, this policy applies to:

    a. Plan International, Inc. ("PII"), including its headquarters in the United Kingdom (operating through its UK subsidiary, Plan Limited), and all of its country offices, regional offices, liaison offices, and any other offices, some of which operate as branches and some as subsidiaries;

    b. All National Organisations that have signed a Members' Agreement and License Agreement with PII; and

    c. All other entities that agree to be bound by the Global Policies.

(together, "Plan International Entities", or may be referred to as "we" or "us" in this document).

All of the Plan International Entities, including PII, shall enact their own procedures which must be in line with global procedures, regulations, or other regulatory documents that enable compliance by its employees (and/or, when appropriate, contractors and other partners) with this Global Policy. Where required by law or local practices, PII offices and National Organisations may enhance the standards and requirements set out in this policy.

Girls

Due to our Purpose, this Global Policy, has a particular focus on girls and young women aged up to and including 24 years. Girls may be especially vulnerable and at risk from certain forms of violence, including sexual and gender-based violence[1]. Violence against girls is not only against the values and principles we uphold as described in this Global Policy, but also in direct opposition to the aims of our work. As such, we are particularly concerned with ensuring that girls do not experience harm, abuse, exploitation, or any other form of violence as a result of their engagement with us or our programmes, projects, events, and processes. Furthermore, we need to ensure that our safeguarding approach and response to safeguarding concerns are gender responsive.

Young People

We work with Young People, and therefore the protective scope of this Global policy extends to young people we are supporting or are in contact with, through our youth engagement work. We recognise that young people have particular safeguarding needs requiring distinct consideration. For example, some young people engaging with and attending events supported by a Plan International Entity may be over the formal age of majority and so face fewer legal restrictions in what is permissible, but still require protection from violence and we retain a duty of care towards them.

PURPOSE

Plan International recognises that violence against children and young people is prevalent throughout the world and in all societies. Violence against children includes physical or mental violence, injury and abuse, neglect or negligent treatment, maltreatment and sexual abuse. Furthermore, children and young people may be vulnerable and at risk due to, for example, reasons of gender, sexual orientation, ethnic origin, disability and age or illness.

Plan International is fully committed to ending violence against children and acknowledge that we have a duty to promote the gender responsive safeguarding of children and young people and particularly those with whom we work or are in contact.

The purpose of this policy is to ensure that:

- all who work for and engage with us are skilled, confident, understand, and are well supported in meeting their responsibilities to safeguard children and young people from violence and engage positively with them in ways that enhance the achievement of our Purpose;
- we have in place procedures to prevent and deal with the actions/behaviour of our Staff, Associates, Visitors or us as an organisation that result in violence against a child or young person and/or places them at risk of the same; and
- children and young people we work with are aware our responsibilities to prevent and respond to any harm against them arising from actions and behaviours of our Staff, Associates and Visitors, and, the routes for reporting such incidents.

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[1] Boys are also vulnerable to sexual abuse and exploitation but the overwhelming majority of reported incidents identify girls as the victims.

POLICY STATEMENT

We are fully committed to the gender responsive safeguarding of all children and young people from all forms of violence. We take very seriously our responsibility and duty to ensure that we, as an organisation, and anyone who represents us does not in any way harm, abuse or commit any other act of violence against children and young people or place them at risk of the same.

We promote child and youth safe practices, approaches, interventions and environments which respects, recognises and responds to the specific safeguarding needs and addresses the protection risks of the differing gender and other identities. We will challenge and do not tolerate inequality, discrimination or exclusion.

We respond to a child or young person who may be in need of protection and or psycho-social support and intend that their welfare and best interests will at all times be paramount consideration.

We ensure all who work with and engage with us understand and are supported in their meeting safeguarding roles and responsibilities. We take positive action to prevent anyone who might be a risk to children and young people from becoming involved with us and take stringent measures against any Staff, Associate or Visitor who perpetrates an act of violence against a child.

We promote the active involvement of children and young people in their own protection.

APPLICABLE REQUIREMENTS

This Global Policy is underpinned by the following set of principles that guides its implementation:

1. All children and young people aged under 18 years have equal rights to protection from all forms of violence as declared in Article 19 of the United Nations Convention on the Rights of the Child. In addition, the Universal Declaration of Human Rights recognises fundamental human rights, the dignity, worth and equal rights of people at **any** age, thus including young people aged 18 to 24 years old.

2. The human rights of children and young people will be respected and applied to all irrespective of age, sex, gender, gender identity, sexual orientation, nationality, ethnic origin, colour, race, language, religious or political beliefs, marital status, disability, physical or mental health, family, socio-economic or cultural background, class, any history of conflict with the law or any other aspect of their background or identity. Inequality, exclusion, and discrimination will be challenged and will not be tolerated.

3. All children and young people should be empowered and encouraged to fulfil their potential. Decisions made about children and young people will be made as far as possible with their participation and in their best interest giving full consideration to how such decisions will affect them. Children will be encouraged to express their views this will be given 'due weight' in accordance with their age and lev el of maturity.

4. We have a responsibility to care for and protect children and young people, especially those that are vulnerable, and make sure they are not harmed.

5. We have particular responsibilities to children and young people with whom we come into contact. No child or young person must suffer harm, intentionally or unintentionally, as a result of their engagement, association or contact with us whether as a sponsored child, a participant in our programmes, projects, events, processes, or youth advisory panels or as part of a fundraising or influencing campaign.

6. We have a responsibility to inform and empower children and young people so that they learn about and are better able to exercise their rights to protection. We will work with children and young people ensuring they understand the essence of this policy, our safeguarding commitment and the means via which they can report policy breaches. We will also involve them in the development of safeguarding measures within Plan International in accordance with their evolving capacities.

7. We are open and transparent, and will hold ourselves to account for our commitment to safeguard children and young people. Safeguarding concerns can be raised and discussed, poor practice and inappropriate behaviour challenged and addressed, and our safeguarding measures continuously reviewed and strengthened to ensure we remain accountable to children, young people, and their families.

8. We will act on on safeguarding concerns, ensuring that our actions are timely, appropriate and centered around the child or young person, taking into account their gender and other specific safeguarding needs and vulnerabilities.

9. We work together in partnership with other agencies to promote the safeguarding of children and young people within organisations engaged with us and in the wider community.

10. Our safeguarding approach recognises and responds to the specific safeguarding risks and needs of the differing gender and other identities. It takes appropriate measures to address gender bias and other forms of discrimination and violence which may arise as a result of these. It supports the empowerment and fosters the inclusion of girls in the safeguarding process, in a manner that promotes equality, equity and ultimately their increased safety and protection.

11. Our safeguarding approach is mainstreamed in all stages of our operations, thematic portfolios, programmes, projects, activities, influencing work, and interventions in both development and humanitarian settings thus ensuring that these are designed and delivered in a manner that does no harm to children and young people.

In light of our commitment and accompanying principles, we give the highest priority to the safety and protection of children and young people.

We will ensure our Staff, Associates, and Visitors are supported to meet their safeguarding responsibilities and requirements, understand the specific risks to children and young people of differing gender and other identities and how they can work and engage in ways that increase the safety and protection of children and young people with whom we are in contact.

Our Safeguarding Implementation standards lays down the requirements for ensuring safeguarding measures are embedded in all parts of our operations and interventions.

Sanctions

Breaches of this policy will be investigated in accordance with disciplinary procedures and contractual agreements, or a referral may be made to statutory authorities for criminal investigation under the law of the country in which they work. Breaches may incur sanctions including disciplinary action leading to possible dismissal, termination of all relations including contractual and partnership agreements, and where relevant, appropriate legal or other such actions.

If a legitimate concern about the suspected abuse of a child or young person is raised but proves to be unfounded on investigation, no action will be taken against the reporter. However, appropriate sanctions will be applied in cases of false and malicious accusations.

ROLES AND RESPONSIBILITIES

1. **All Staff, Associates and Visitors shall:**
   a. commit and contribute to an environment where children and young people feel respected, supported, safe and protected
   b. never act or behave in a manner that results in violence against a child or young person or places a child or young person at risk of violence;
   c. be aware of and adhere to the provisions of this Global Policy.

2. **All Staff shall:**
   a. comply with this Global Policy, including the Safeguarding Code of Conduct (Annex 1); and
   b. report and respond to safeguarding concerns and breaches of the policy in line with the applicable procedures of the applicable Plan International Entity.

3. **Associates and Visitors shall:**
   a. agree, by signing, to complying with either:
      i. the Safeguarding Code of Conduct (Annex 1); or
      ii. other appropriate guidance developed by a Manager at the relevant Plan International Entity on appropriate behaviour towards children and young people as relevant to their engagement using the Safeguarding Code of Conduct (Annex 1) as a guide; or
   b. comply with his/her own Code of Conduct, provided the contracting Manager ensures that it complies and is consistent with this Global Policy.

4. **Managers shall ensure that:**
   a. Children, young people and communities with which we engage, work or are in contact are made aware of the provisions of this Global Policy to ensure they have the confidence and ability to report any incidents occurring against children and young people;
   b. Staff, Associates, and Visitors are aware of the Safeguarding Implementation Standards that are applicable to their role or engagement with us;
   c. they support and develop systems which maintains an environment which is safe for and prevents violence against children and young people; and
   d. they are accountable for ensuring that the policy is fully embedded within their areas of responsibility in accordance with the Safeguarding Implementation Standards (Annex 2).

5. **Directors shall ensure that:**
   a. the relevant Plan International Entity has in place local procedures that are consistent with this Global Policy and with the global document *Reporting and Responding to Safeguarding Issues* which outlines the reporting requirements and the manner in which they are escalated within each Plan International Entity. These local procedures should be developed with the assistance of local advisers and updated regularly. The policy and applicable procedures must be made available in local languages and child-friendly formats; and
   b. the relevant Plan International Entity implements our Safeguarding Implementation Standards as they apply to their context, the people (Staff, Associates, and Visitors), children and young people with whom they engage, as well as the processes, programmes, projects, events and activities they undertake.

6. **Organisations that work with us** in carrying out our programmes, projects, processes, events and/or activities involving children and young people must comply with the Safeguarding Guidelines contained in Annex 2.

7. **All Plan International Entities** shall monitor compliance with this Global Policy through the mandatory tracking and auditing of the Safeguarding Implementation Standards and Safeguarding Code of Conduct (see Annex 1). Auditing against the standards will be lead by PII's Global Assurance Department. In addition, we will work with and ensure the participation of children, young people, staff, associates and visitors to review, monitor and evaluate the implementation of this Global policy.

TERMS AND DEFINITIONS

When used in this document:

"Associate" refers to a range of contracted paid and non-paid individuals who have committed to work with or support a Plan International Entity. It includes, among others, board members, volunteers (including community volunteers), interns, sponsors, researchers, donors, consultants and contractors, staff and/or representatives of partner organisations and local governments (when operating in partnership agreement with a Plan International Entity).

"Child" in line with the United Nations Convention on the Rights of the Child and for the purposes of this Global policy, is defined as any person – girl, boy, young woman, young man, and children of other gender identities - under the age of 18 years (UNCRC Article 1). (See definition of Young Person/People or Youth below).

"*Director*" is an Executive Director of PII or a National Director.

"Direct beneficiaries" are the people who are the target of and who we know will be immediately affected by one or more project outputs; irrespective of whether these are delivered directly by Plan International or by partners or organisations who are acting on behalf of Plan International.

o   Direct beneficiaries are individuals who receive materials, equipment; interventions such as training, awareness raising, mentoring or other personal support.

o   Direct beneficiaries may be a single member of a household (for example a mother participating in training on nutrition); or it may be all members in the household (for example, distribution of hygiene kits or malaria nets that the whole family use).

"**Harm"** is any detrimental effect on a child's or young person's physical, psychological, or emotional wellbeing. Harm may be caused by abuse or exploitation whether intended or unintended.

"Manager" refers to a Staff member who has responsibility for line managing or supervising the work of Staff or Associates.

"National Organisation" or "NO" refers to a legal entity that has signed a Members' Agreement and License Agreement with PII.

"PII" refers to Plan International, Inc., including when operating through one of its subsidiaries. It generally includes international headquarters, regional offices, liaison offices, and country offices.

"**Safeguarding children and young people**' is the responsibilities, preventative, responsive and referral measures that we undertake to protect children and young people, ensuring that no child or young person is subject to any form of harm as a result of their association with the organisation. This includes, ensuring that their contact with us and those associated with us and/or their participation in our activities, interventions and operations is safe and where there are concerns over a child or young person's welfare or where a child or young person has been subject to violence, appropriate and timely actions are taken to address this and incidents are analysed so as to ensure continued learning for Plan International Entities.

"**Safeguarding - Gender Responsive Safeguarding"**[2] is a safeguarding approach that:
- takes full account of gender in considering the specific safeguarding needs of girls, boys and other gender identities;
- integrates safeguarding measures that address protection risks for children and young people (girls, boys, young women, young men, and children of other gender identities) that stem from issues relating to gender bias and discrimination; and
- supports the empowerment and fosters the inclusion of girls, particularly in the safeguarding process, in a manner that promotes equality, equity and ultimately their increased safety and protection

"**Staff"** refers to individuals who receive a regular salary for work in any Plan International Entity as well as individuals paid by or through a Plan International Entity but located in another entity.

"Violence" against a child or young person[3] includes all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, emotional ill-treatment or psychological violence, sexual abuse and exploitation, harassment, and commercial or other exploitation of a child or young person. Acts of violence can also take place online through, for example, the web, social media or mobile phones. It may be an intentional act involving the use of physical force or power or it may be failing to act to prevent violence against a child or young person. Violence consists of anything which individuals, groups, institutions or organisations do or fail to do, intentionally or unintentionally, which either results in or has a high likelihood of resulting in actual or potential harm to the child or young person's wellbeing, dignity and survival and development.

"Visitor" refers to a range of persons who are visiting our offices or programmes and may come into contact with children and young people through a Plan International Entity, including journalists, media, researchers, visiting sponsors and celebrities.

"Young Person/People" or "Youth" in line with United Nations definitions, include individuals – young women, young men, and young persons of other gender identities - aged 15 years to 24 years old. This group spans the categories of 'children', 'adolescents' and 'adults' but regards young people as having particular safeguarding needs and requiring distinct consideration aside from younger children and older adults.

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[2] A working definition developed by PII Child and Youth Safeguarding Unit which may change on completion of our Gender Responsive Safeguarding toolkit.
[3] A working definition. Awaiting final definition from International Programmes.

ANNEX 1:
SAFEGUARDING CODE OF CONDUCT

Plan International is committed to creating a safe environment for children and young people. All staff have a duty to uphold the principles of the Global Policy on Safeguarding Children and Young People and commit to maintaining an environment that prevents violence against children and young people. Further to this, sexual exploitation and abuse by staff (including those that work in our humanitarian response) constitutes acts of gross misconduct and is therefore grounds for termination of employment.

As such, I agree that I will:

a.   Adhere to the Global Policy on Safeguarding Children and Young People and be open and honest in my dealings with children and young people, their families, and communities participating in programmes, projects, processes, events, and activities.

b.   Treat children and young people in a manner which is respectful of their rights, integrity, and dignity and considers their best interests regardless of age, sex, gender, gender identity, sexual orientation, nationality, ethnic origin, colour, race, language, religious or political beliefs, marital status, disability, physical or mental health, family, socio-economic or cultural background, class, or any history of conflict with the law.

c.   Create and maintain an environment which prevents the abuse and exploitation of children and young people ensuring that I am aware of potential risks with regards to my conduct and work, and take appropriate action so as to minimise risks to children and young people.

d.   Contribute to building an environment where children and young people we engage with are:
   i.   respected and empowered to participate in and discuss decision making and interventions into their safeguarding in accordance with their age, maturity and evolving capacities; and
   ii. well informed on their safeguarding and protection rights and what to do if they have a concern.

e.   Display high standards of professional behaviour at all times, providing a positive role model for children and young people.

f.   Comply with all relevant international standards and local legislation in relation to child labour, and refrain from using children and young people aged below 18 years for domestic or other labour, if such work is inappropriate, exploitative or harmful given their age or developmental capacity, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury, exploitation, or violence. In addition, I understand that I must not use children and young people of any age that we work with for domestic or other labour.

g.   Respect the privacy and confidentiality of children and young people associated with Plan International. This means I will:
   o   Never ask for or accept personal contact details or invitations to share personal contact details (this includes email, phone numbers, social media contacts, address, webcam, skype, etc.) from any child or family associated or formerly associated[4] with our work or share my own personal contact details with such individuals except where this has been explicitly authorised by Plan International and/or for Plan International business purposes.[5]
   o   Never disclose, or support the disclosure of, information that identifies sponsored families or children, through any medium, unless that disclosure is in accordance with standard Plan International policies and procedures and/or has the explicit consent of Plan International.[6] Media include paper, photographs, and social media.
   o   Never make any contact with a child, young person, or family members associated with Plan International's work that is not supervised by a (or another) member of Plan International Staff. Such contact may include but is not limited to visits and any form of communication via social media, emails, and letters.

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[4] Where the child is a sponsored child requests for continued communication upon 'graduation' of the sponsorship (when the sponsored child reaches 18 years) must comply with Plan International's Sponsorship guidelines on the same.
[5] Plan International will seek informed consent as appropriate from the child or young person.
[6] Plan International will seek informed consent as appropriate from the child or young person.

o Always ensure that when on an official or work visit with Plan International and I wish to take pictures of children and young people associated with the organisation, for personal use, I will:

➢ Always consult first with the local Plan International office so as to make sure that it is ok to take pictures in the local context and that the intended use of the pictures does not conflict with Plan International's policies.

➢ Ask permission of the child or young person (or in the case of young children, their parent or guardian) informing them of the specific purpose(s) and intended use (including how and where) and respect their decision to say no making it clear that there will be absolutely no negative repercussions from denying such consent.

➢ Ensure the images are respectful and do not impact negatively on their dignity and privacy.

➢ Ensure that the use of the images does not put the child or young person at risk of being identified or located.

➢ Never upload the images of children and young people associated with Plan International to non-Plan International social media pages without the full and explicit consent of Plan International[7].

h. Report and respond to any concerns, suspicions, incidents or allegations of actual or potential abuse to a child or young person in accordance with applicable procedures of the engaging office.

i. Cooperate fully and confidentially in any Plan International investigation of concerns or allegations of abuse to children and young people.

j. Immediately disclose all charges, convictions, and other outcomes of an offence, which occurred before or occurs during association with Plan International that relate to exploitation and abuse of a child or young person.

I will not:

a. Abuse or exploit a child or young person or behave in any way that places a child or young person at risk of harm, including through harmful traditional practices such as, for example, Female Genital Mutilation, forced or child marriage.

b. Engage in any form of sexual activity or develop physical/sexual relationships with anyone under the age of 18 regardless of the age of consent locally. Mistaken belief in the age of a child is not a defence.[8]

c. Engage in sexual relationships with Plan International youth direct beneficiaries aged 18 to 24 years as these undermine the credibility and integrity of Plan International's work and are based on inherently unequal power dynamics'.[9]

d. Use physical punishment/discipline or use of physical force of any kind towards children and young people.

e. Engage young people in any form of sexual activity which involves the exchange money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading or exploitative behaviour. This includes exchange of assistance that is due to beneficiaries[10]

f. Use language or behave towards a child or young person in a way that is inappropriate, offensive, abusive, sexually provocative, demeaning or culturally inappropriate.

g. Fondle, hold, kiss, hug or touch children or young people in an inappropriate or culturally insensitive way.

h. Have a child/children/young person with whom I am in contact in a work related context, stay overnight at my home or any other personal residential location or accommodation.

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[7] Plan International will seek informed consent as appropriate from the child or young person and parents or guardians where applicable.

[8] ST/SGB/2003/13: UN Secretary-General's Bulletin on Special measures for protection from sexual exploitation and sexual abuse, 2003 (endorsed by Plan International).

[9] We recognise that our incentive Workers and Community Volunteers live in communities where we operate and so on rare occasions, relationships may develop that may be seen as acceptable in the community but would breach this element of the code. However, we expect Incentive Workers and Community Volunteers working in Programme areas to make known to the relevant manager any potentially compromising relationship they are in or considering, that involve a beneficiary who is aged 18 years and above.

[10] ST/SGB/2003/13: UN Secretary-General's Bulletin on Special measures for protection from sexual exploitation and sexual abuse, 2003 (endorsed by Plan International).

i.   Sleep in the same room or bed as a child or young person with whom I am in contact in a work related context. Where it is necessary to sleep close to unaccompanied children and young people, I will make sure that another adult is present and it is in line with authorised procedures.

j.   Do things of a personal nature for children or young person, with whom I am in contact in a work related context, (e.g. taking a child/young person to the toilet/bathroom; helping them get un/dressed etc.) that they can do for themselves.

k.   Spend time alone away from others with children and young people with whom I am in contact in a work related context; I will always make sure that another adult is with me and/or I am with the child/young person in an open public place, where others are around and in plain view of others.

l.   Hit or otherwise physically assault or physically abuse children or young people.

m.   Act in ways that shame, humiliate, belittle or degrade children and young people, or otherwise perpetrate any form of emotional abuse.

n.   Discriminate against, show differential or preferential to, or favour particular children and young people to the detriment of them or others.

o.   Develop relationships with, engage in any practice with or develop behaviour towards children and young people which could in any way be deemed or interpreted as exploitive or abusive.

p.   Condone or participate in behaviour of children or young people which is illegal, unsafe, or abusive.

q.   Use any computers, mobile phones, video and digital cameras, or any such medium to exploit, harass or bully children or young people.

r.   Use computers, mobile phones, or video/digital cameras or other electronic devices, to access, view, create, download, or distribute pornography, especially abusive images of children or young people.

The above is not an exhaustive list. Staff, Associates, and Visitors should consider all related actions and behavior which may compromise the rights and safeguarding of children and young people.

Personal Conduct outside Work or Engagement with Us

We do not dictate the belief and value systems by which Staff, Associates, and Visitors conduct their personal lives. However, actions taken by them out of working hours that are seen to contradict this policy will be considered a violation of the policy.

Our Staff, Managers, Associates, and Visitors are required to adhere to principles of the Global Policy on Safeguarding Children and Young People both at work and outside work.

ANNEX 2: GUIDELINES FOR IMPLEMENTING SAFEGUARDING IN PRACTICE

These guidelines outline the requirements for safeguarding children and young people that are applicable to organisations that work with Plan International Entities in carrying out our programmes involving children and young people.

They are particularly applicable to organisations assessed as having contact with children and young people, working with children and young people, and/or whose projects, programmes, processes, activities, advocacy and influence work impact on children and young people. Organisations funded by a Plan International Entity are expected to build on these guidelines as appropriate based on the nature of their activities and risks to children and young people.

The guidelines illustrate our commitment to support and respect children's and young people's rights to be protected from harm, and to provide a safe and protective environment for children and young people who are involved with any programmes funded by a Plan International Entity.

The guidelines should be applied in relation to children and/or young people as appropriate, depending on *the group the organisation works with.*

1. **Prevention:** The Organisation must take appropriate measures to manage child and/or youth safeguarding risk factors and prevent abuse and exploitation before it occurs. Prevention measures should include organisational safeguarding policies, codes of conduct and associated procedures; the management of safeguarding risks in relation to its operations, activities and interventions; and the production and promotion of 'child and young person friendly' safeguarding information and resources.

2. **Code of Conduct:** Each Organisation is required to ensure that their personnel avoid any behaviour or conduct that compromises the safety and protection of children and/or young people within its activities, operations and programmes. In addition, programmes and activities working directly with children and/or young people or involving direct contact between the same should develop guidance on expected and acceptable behaviour for children and/or young people towards each other. This should be incorporated into policy and practice documents.

3. **Gender Equality and Non-Discrimination:** The Organisation should ensure that all Safeguarding Children and/or Young People policies and procedures take into account gender equality and non-discrimination requirements. Recognising that girls, boys, young women, young men, and children and young people of different gender identities may face different risks relating to their safety and protection and that all children and/or young people have an equal right to protection, irrespective of: age, sex, gender, gender identity, sexual orientation, nationality, ethnic origin, colour, race, language, religious or political beliefs, marital status, disability, physical or mental health, family, socio-economic or cultural background, or class.

4. **Screening Procedures:** There should be detailed screening procedures for all personnel (including unpaid volunteers) who will come into contact with children and/or young people (directly or indirectly). Screening procedures should be as available in each country and updated on a regular basis, where possible. Screening procedures may include: certificate of good conduct, police reference checks or equivalent, verification that applicants are not listed in national registries of child offenders; a detailed application and interview process; references who support the applicant's suitability to work with children and/or young people.

5. **Awareness:** The Organisation should ensure that all personnel, sub-contractors or consultants or affiliates involved with children and young people's programmes are aware of safeguarding risks, policies and procedures; and their safeguarding responsibilities. In addition children and/or young people engaged and their parents, guardians or carers should be informed of the same so that they know what behaviours to expect and how to report any concerns.

6. **Capacity Building:** The Organisation should develop the capacity of all who work with and for children and/or young people to appropriately prevent, detect, report and respond to safeguarding concerns and particularly as they pertain to differing gender and other identities. Efforts should be made to ensure organisational policies and practices are understood and can be effectively implemented through mandatory inductions and on-going training courses for all employees and volunteers and other associates.

7. **Participation of children and/or young people:** Children and/or young people should be actively, meaningfully and ethically involved in the development of safeguarding measures in accordance with their evolving capacities. Children and/or young people must not be treated simply as objects

of concern but rather listened to and taken seriously and treated as individual people with their own views.

8. **Reporting Mechanisms for children and/or young people and Staff:** Mechanisms should be established that enable the safe reporting of safeguarding concerns. Such mechanisms should ensure appropriate escalation of concerns within the organisation, referral to the appropriate authorities and confidentiality. In addition child and youth reporting mechanisms should be accessible, friendly and sensitive to their differing needs

9. **Response and Follow Up:** Organisational policies and procedures should include appropriate measures to support and protect children and/or young people when concerns arise. All measures taken to respond to a safeguarding concern should take into account the best interest of the child or young person and be sensitive to their differing gender and other identities ensuring they are kept safe and protected. Response measures should be appropriately risk assessed and endeavour to ensure no further harm comes to the child and/or young person as a result of any actions taken by the Organisation.

   Concerns should be written up and information kept in accordance with the privacy and confidentiality policies of the Organisation and/or local legislation. In addition, organisational processes should ensure response evaluation and follow up for organisational learning.

   The Organisation should also advise Plan International of any complaints of abuse to children and/or young people in line with the working agreement.

10. **Implementation, Monitoring and Review:** The implementation and monitoring the Safeguarding Children and/Young People Policy for each Organisation should be reviewed at regular intervals as determined necessary by the Organisation, preferably at least every three (3) years, where possible.

11. **Sanction and Discipline of Organisation personnel:** The Organisation policies and procedures should provide for appropriate sanctions and disciplinary measures which ensures children and young people are protected from further potential harm. This may include the immediate suspension of personnel until such time as the allegations are followed up and either substantiated or refuted and/or where personnel is convicted of abusing a child or young person, the said personnel is immediately terminated with cause from his or her position.

12. **Informed Consent:** The Organisation should provide children and/or young people (and their parent(s)/legal guardian(s) where applicable), with all necessary details (including on any associated risk,) to make an informed decision regarding their participation in programmes and activities, including any voice recordings, video or photographs of children and/or young people (including how and where these will be used). Participation and/or usage of information and/or images should only take place after consent is obtained.

13. **Protection of Personal Information:** Personal information regarding any Child or children and/or young people, whether or not such information is obtained as part of the programmes involving children and/or young people, should be treated confidentially. There should be clear procedures showing the responsibilities within the organisation for accessing and using such data with appropriate authorisations. In addition such data should not be disclosed to any third party, except in accordance with the policies of the Organisation or as required by applicable local laws. Personal information includes, but is not limited to, any information that can be linked to or used to identify a Child and/or Young Person.

14. **Working with partners:** The Organisation should ensure adequate safeguarding assessments are made as part of its due diligence processes when it comes to partnership working. Third party entities that are contracted or supported to work with children must be subject to the same safeguarding principles and approach outlined in the Organisations policy and procedures. Vendors, suppliers and other contractors that may be in direct or indirect contact with children must also be subject to appropriate safeguarding measures.

Questions about software against child marriage - Lilongwe/Mulanje

General

What is your name?

How old are you?

Who do you live with?

Are you going to school? How long have you been to school?

What do you want to do when you grow up?

Mobile phones

Do you or someone you live with have a mobile phone?

If yes, what do they use that phone for? What kind of phone?

If no, what would you use it for if you had one?

How do you communicate with people far away?

Internet

Do you use the internet?

What do you use/would use the internet for?

What prevents you from using the internet?

Marriage

In your words, what is marriage?

When do you plan to get married?

What is the normal age to get married?

Why do people get married?

Do you know at what age you are allowed to get married?

Do you want to get married before you finish school?

Do you want to be married before you turn 18 years old?

Why do you think organizations like Plan Malawi try to prevent child marriage?

Designs

Informational

Is there a place (library, school, or similar) you can go to to find information about marriage?

Argumentative

Why do girls under 18 get married?

Do you think this is a good reason?

What arguments do people have for early marriage?

Story based

Are you used to stories being used for education?

Do you have any examples of stories about child marriage that might work?

Videos

https://www.youtube.com/watch?v=IVzvoU219F4 **Let's end child marriage in Africa**
https://www.youtube.com/watch?v=mvo2PRNaJyo **They tried to marry a 10-year-old girl**

What was this video about?

How did it make you feel?

Did you learn anything?

Did it change your opinion about marriage?

How often are videos used in your education?

Contact

Do you know of any organizations that try to prevent child marriage?

Where would you go to find more information about child marriage?

If you were forced to marry someone against your will, what would you do?

Links

Who do you trust to give you correct information about laws in Malawi?

Who do you trust to give you correct information about child marriage?

Social

If you are going to talk to someone about marriage, who do you talk to?

Why do you talk to them?

If you are going to talk to someone about sex, who do you talk to?

Why do you talk to them?

Would you be more comfortable if you could talk to an anonymous person?

Questions about software against child marriage - Lilongwe/Mulanje

General

What is your name?

How old are you?

Who do you live with?

Are you going to school? How long have you been to school?

What do you want to do when you grow up?

Are you part of a youth group?

Mobile phones

Do you or someone you live with have a mobile phone?

If yes, what do they use that phone for? What kind of phone?

If no, what would you use it for if you had one?

How do you communicate with people far away?

Internet

Do you use the internet?

What do you use/would use the internet for?

What prevents you from using the internet?

Marriage

In your words, what is marriage?

When do you plan to get married?

What is the normal age to get married?

Why do people get married?

Do you know at what age you are allowed to get married?

Do you want to get married before you finish school?

Do you want to be married before you turn 18 years old?

Why do you think organizations like Plan Malawi try to prevent child marriage?

Designs

Informational

Is there a place (library, school, or similar) you can go to to find information about marriage?

Is there anything about child marriage (or other subjects) you would like to know more about?

When would you use this design/who would use this?

Argumentative

Why do girls under 18 get married?

Do you think this is a good reason?

What arguments do people have for early marriage?

When would you use this design/who would use this?

Story based

Are you used to stories being used for education?

Do you have any examples of stories about child marriage that might work?

Do youth groups use stories to fight child marriage? What kind of stories?

When would you use this design/who would use this?

Videos

https://www.youtube.com/watch?v=IVzvoU219F4 **Let's end child marriage in Africa**
https://www.youtube.com/watch?v=mvo2PRNaJyo **They tried to marry a 10-year-old girl**

What was this video about?

How did it make you feel?

Did you learn anything?

Did it change your opinion about marriage?

How often are videos used in your education?

Which of these videos was the best?

When would you use this design/who would use this?

Contact

Do you know of any organizations that try to prevent child marriage?

Where would you go to find more information about child marriage?

If you were forced to marry someone against your will, what would you do?

Would you be more likely to use the phone number or map?

When would you use this design/who would use this?

Links

Who do you trust to give you correct information about laws in Malawi?

Who do you trust to give you correct information about child marriage?

Social

If you are going to talk to someone about marriage, who do you talk to?

Why do you talk to them?

If you are going to talk to someone about sex, who do you talk to?

Why do you talk to them?

Would you be more comfortable if you could talk to an anonymous person?

Favorite design

Which design was your favorite?

Vil du delta i forskningsprosjektet

"Utvikling av mobile hjelpemidler for bekjempelse av barneekteskap"?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å utvikle mobilapplikasjoner for å spre kunnskap om barneekteskap i området hvor dette forekommer. Dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål
Prosjektet vil utvikle og teste ulike design som kan være relevante for en mobilapplikasjon som skal informere om farene ved barneekteskap til mennesker i områder hvor dette er ubredt. Målet er å etablere hvilke designvalg som er effektive for dette, samt etablere andre problemstillinger man må ta hensyn til under utvikling av applikasjonen. Prosjektet vil så gjennomføre brukertester av disse prototypene i felt.
Prosjektet er en del av en masteroppgave ved NTNU i Trondheim.

Hvem er ansvarlig for forskningsprosjektet?
Institutt for datateknologi og informatikk ved NTNU er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?
Du kontaktes på bakgrunn av din stilling ved en organisasjon som jobber med barneekteskap. Din kontaktinformasjon er innhentet fra nettsiden til organisasjonen.

Hva innebærer det for deg å delta?
Hvis du vil delta i prosjektet, innebærer det at du fullfører et intervju på 30-60 minutter. Intervjuet vil omhandle barneekteskap og mobilutvikling i lavutviklede områder. Utdrag av intervjuet vil bli transkribert og brukt i masteroppgaven.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.
Intervjuet vil bli tatt opp for senere transkribering av studenten som skriver masteroppgaven, og vil ikke deles med andre. Under lagring vil intervjuet kun være navngitt med et nummer som ikke kan spores tilbake til deg. All informasjon om deg vil anonymiseres

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes 11.06.10. Alle opptak vil slettes innen dette.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,

- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra NTNU har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- Veileder Letizia Jaccheri ved NTNU på epost: letizia.jaccheri@ntnu.no eller telefon 91897028
- Masterstudent Jostein Brevik på epost: jostein.brevik@gmail.com eller 98860574
- Vårt personvernombud: Thomas Helgesen, thomas.helgesen@ntnu.no eller 93079038
- NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen

Prosjektansvarlig   *Eventuelt student*
(Forsker/veileder)

Samtykkeerklæring
Jeg har mottatt og forstått informasjon om prosjektet *[sett inn tittel]*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i intervju

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. *[oppgi tidspunkt]*

(Signert av prosjektdeltaker, dato)

Designing Software to Prevent Child Marriage Globally

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ABSTRACT

Child marriage is any marriage where one or both of the participants is under the age of 18. Today, more than 12 million such marriages happen every year [11]. Giving children and the communities around them access to information about the dangers of child marriage is crucial in order to change the cultural norms that enable and perpetuate it. Mobile applications have so far seen sparse use to combat this problem. This paper covers a project that looks to evaluate the effect of different design options for mobile applications in this field. It covers seven different design approaches, as well as the testing and evaluation of these in a case study amongst youth in Malawi. During Spring 2019, an initial testing round will be held there in cooperation with Plan International. There, we will gather
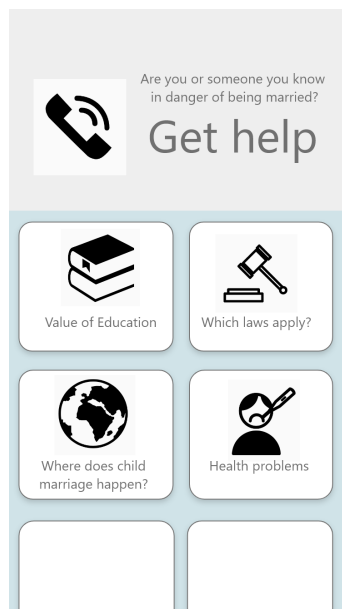
Figure 1: The "Informational" design, based on providing easy access to information, statistics, and local laws

feedback from local youths on what they know and think about child marriage, as well as seeing how they interact with the designs we have made.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; **Interaction design**; **Empirical studies in interaction design**.

KEYWORDS

child marriage; ICT4D; software design; social computing; prototyping

INTRODUCTION

The eradication of child marriage is target 5.3 of the UN's Sustainable Development Goals, but at the current rate it is far from reaching its 2030 deadline [12]. Combating child marriage is a complex project which requires changing cultural, religious and ethical norms and traditions [5].This paper explores the design and use of digital tools for spreading information about the dangers of child marriage in affected areas. Through cooperation with international NGOs and other organizations which operate in such areas, it will identify design challenges and opportunities that arise when developing and designing for people who are often on the fringes of internet and mobile device availability. In addition, it will prototype and produce several designs and approaches to spread information about child marriage, and test these in the field. The following research questions will be answered:

(1) RQ1: What is the current state of the art of using apps to combat child marriage?
(2) RQ2: How do different design choices influence conveying information about child marriage?

BACKGROUND

Reducing the rate of child marriage has been an important focal point of multiple projects and research efforts, with many different methods being tried [7] [1]. Roudi-Fahimi and Ibrahim [10], looking at the Arab region, identified some underlying reasons for child marriage: poverty, family honor, financial incentives, low education, patriarchal laws, non-enforcement of anti-child marriage laws, public awareness and low literacy.

Figure 2: The "Story based" design, which explains the dangers of child marriage through stories

In 2011, the International Center for Research on Women published "Solutions to End Child Marriage - What the Evidence Shows" [5]. This review looked at 23 programs which utilized five main strategies for delaying or preventing child marriage

(1) Empowering girls with information, skills, and support networks
(2) Educating and mobilizing parents and community members
(3) Enhancing the accessibility and quality of formal schooling for girls
(4) Offering economic support and incentives for girls and their families
(5) Fostering an enabling legal and policy framework

The strongest performers were those focusing on methods 1 and 2, fostering long-term changes in social and cultural practices. Our project aims to follow these two methods, changing norms by informing people about the dangers and drawbacks of child marriage.

Apps and Child Marriage

Designing applications around child marriage is not a simple task; it happens mostly in areas with little or no access to internet, electricity, and mobile phones. Thus, the user group is often unfamiliar with mobile phones and applications. Three projects have been found that use mobile applications to prevent and delay child marriage which are presented in this section.

In 2015, Accenture in cooperation with CINI (Child in Need Institute) produced GPower, which tackled multiple issues such as school drop-out, human trafficking and child marriage [2].

Another project in the Indian state of Bihar called Bandhan Tod ("Break your Shackles") gave young girls access to reach out to member organizations of the Gender Alliance in Bihar, if they or someone they knew were in danger of being married away [4].

Recently, in early 2018, Plan International and the government of Bangladesh launched a system which helps marriage registrars verify the age of potential brides and grooms [8] using their phones. Widespread document forgery has made it possible for parents to circumvent the legal age of marriage in the country, lessening the impact of laws that ban child marriage.

Of these three, Bandhan Tod is the only one that combats child marriage by communicating information about it to the user. While its results have been promising, it is limited to a single state in India. Our project aims to expand upon Bandhan Tod both by testing new design approaches and by bringing the concept to other areas of the world.

DESIGN APPROACHES

The end goal of this project is to create a system that allows for easy design and creation of apps combating child marriage, custom made for a distinct area. With a solid foundation of modular and well-tested components in place, all that would be needed to create an application custom-made for a
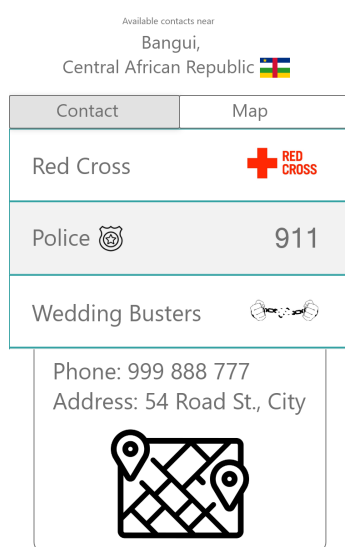
Figure 3: The "Contacts" design, displaying information on local organizations that can help victims of child marriage

new location is to select the most relevant components for that area (depending on local customs and needs) and input any location specific data.

The designs discussed below cover different approaches to spread information. They are meant to be used based on the local customs. As an example, if a culture is used to teach through story telling, the story telling design as shown in figure 2 is likely to work well. Similarly, if a village has previously shown itself to be sceptical of governmental data and statistics, the informational module in figure 1 should not be used. The "Contact" design as seen in figure 3 is one that can and should be added to any implementation of the system, as this information is important for further help.

The designs that will be tested in the initial phase are as follows:

(1) **Informational**
This design, as shown in figure 1, attempts to display and explain statistics, information and facts about child marriage. Testing this design would find how easily the information is understood, the believability of it, the differences between how young people and older people handle the information, and how the statistics should be illustrated.

(2) **Argumentative**
This design, while similar to the Informational approach as seen above, instead orders its information in the form of arguments against common misconceptions about child marriage. It is organized on themes, as the conversation in question is likely to focus on one theme at a time.

(3) **Story Based**
This design, as shown in figure 2, is based on emotions and feelings, telling the story of how a child's life would differ if they are subject to early marriage or not. It has been shown by Freij [3] that telling young girls stories about other women who have had successful lives by avoiding early marriage is an effective way of conveying information.

(4) **Videos**
This design is not a separate method in and of itself, but rather an option that can be implemented into other designs. The use of videos lets people who are unable to read still make use of the application, increasing its usability. It is also an effective and often more interesting way of learning than text, as shown in Maredia et. al. [6]. However, it requires cheap or free internet access, which is often not available in low-development or rural areas [13].

(5) **Contacts**
This design, as shown in figure 3, is simply an overview of local and national agencies that can be contacted for information, legal assistance, police help, or emergencies. In order to be effective this approach must be highly localized to each area, and requires that the agencies displayed in the app are aware of the project and capable of handling any inquires they receive.
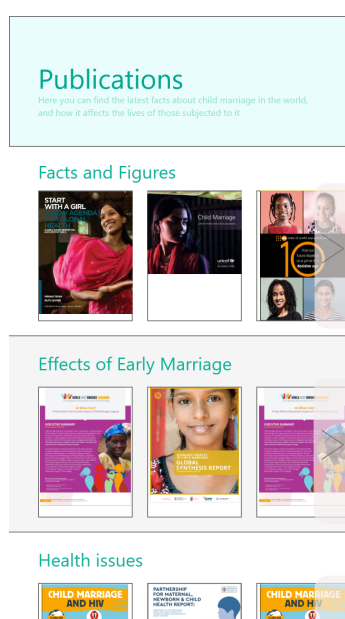
Figure 4: The "Links" design, providing easy access to publications and other information that is already available

(6) **Links**

This design, as shown in figure 4, aims to simplify the development process by not displaying any information or assistance in itself, instead linking to other web sites that already have this available. The use of external sources makes it easy to localize information and update it, as everything is based on adding and removing links. One glaring problem with this design is that it requires a constant internet connection, as the user will have to load each link they want to visit. Since internet access is often sparse in areas where child marriage is prevalent, this could prove a serious obstacle in many places [13].

(7) **Social**

This design is meant to act as a social platform in which people can get in contact with others in similar situations, either for advice, emotional support or if they are in need of urgent help. Renken and Heeks [9] provide an overview of the use of social networks for ICT4D (Information Communications Technology for Development) development, finding it highly relevant to the field. Using existing social networks like Facebook and WhatsApp is also possible, and might in many cases be better than trying to create a new one from scratch.

EVALUATION

The initial testing and evaluation of these designs will be conducted Spring 2019 in Malawi. The planning and implementation of this project is done in close cooperation with the ICT4D manager of Plan Malawi, a local Malawian who has significant experience in organizing these kinds of events. It will take the form of two case studies in the cities of Lilongwe and Mulanje to gather feedback from young girls, youth clubs and traditional leaders living in areas where child marriage is prevalent. The participants are recruited by Plan Malawi, and representatives for the organization will be present to make sure ethical standards are upheld. A semi-structured interview format will be used. In addition to covering the aforementioned designs in particular, the interviews will also revolve around what the participants think about child marriage in general. Uncovering problems related to child marriage that have not been thought of previously in the project is of particular interest. The prototypes will be presented both on paper using a Wizard-of-Oz methodology, and as design with limited functionality on mobile phones that are brought to the research area.

The results will be of qualitative nature, in the form of feedback from the participants. Of particular importance is the usability of the designs, ensuring that even those with little or no experience with mobile phones can understand them, and to see if the users believe and understand the information being given to them. A long-term analysis to see if usage of the application has any impact on early marriage rates among participants as opposed to a control group would be beneficial, but due to the nature of such a study this would take many years.

As a key aspect of this project is to map and analyze the differences in what approaches are needed in separate areas, this first testing round will only be the first of many. Similar studies must be done wherever this approach is going to be used to create an application, uncovering the local needs and wants. If possible, the testing done in Malawi will take place in multiple locations, which can give useful insight into how these regional differences take place.

ACKNOWLEDGMENTS

REFERENCES

[1] Amin et al. 2018. Skills-Building Programs to Reduce Child Marriage in Bangladesh: A Randomized Controlled Trial. *Journal of Adolescent Health* 63, 2 (2018), 293–300.
[2] Kiran Balasubramanian. 2016. Accenture and CINI's Digital Solution 'GPower' Receives Vodafone Foundation's Mobile for Good 2015 Award for Women Empowerment and Inclusive Development. https://newsroom.accenture.com/news/accenture-and-cinis-digital-solution-gpower-receives-vodafone-foundations-mobile-for-good-2015-award-for-women-empowerment-and-inclusive-development.htm
[3] Leah Freij. 2010. "Safe Age of Marriage" in Yemen: Fostering Change in Social Norms". Brochure for USAID.
[4] United Nations Populations Fund. 2017. Crashing a wedding, saving a child bride: App helps girl avoid child marriage. https://www.unfpa.org/news/crashing-wedding-saving-child-bride-app-helps-girl-avoid-child-marriage
[5] ICRW. 2011. Solutions to End Child Marriage - What the Evidence Shows. https://www.icrw.org/wp-content/uploads/2016/10/Solutions-to-End-Child-Marriage.pdf
[6] Mywish K Maredia, Byron Reyes, Malick N Ba, Clementine L Dabire, Barry Pittendrigh, and Julia Bello-Bravo. 2018. Can mobile phone-based animated videos induce learning and technology adoption among low-literate farmers? A field experiment in Burkina Faso. *Information Technology for Development* 24, 3 (2018), 429–460.
[7] Nawal M Nour. 2009. Child marriage: a silent health and human rights issue. *Reviews in obstetrics and gynecology* 2, 1 (2009), 51.
[8] Plan International. 2018. MOBILE APP STOPS 3,700 CHILD MARRIAGES. https://plan-international.org/news/2018-05-07-mobile-app-stops-3700-child-marriages
[9] Jaco Renken and Richard Heeks. 2018. Social network analysis and ICT4D research: Principles, relevance, and practice. *The Electronic Journal of Information Systems in Developing Countries* 84, 4 (2018), e12036.
[10] Farzaneh Roudi-Fahimi and Shaimaa Ibrahim. 2013. Ending child marriage in the Arab region. *Population Reference Bureau* 1, 8 (2013).
[11] UNICEF. 2018. 25 million child marriages prevented in last decade due to accelerated progress, according to new UNICEF estimates. Press release. https://www.unicef.org/press-releases/25-million-child-marriages-prevented-last-decade-due-accelerated-progress-according
[12] UNICEF. 2018. Child Marriage: Latest trends and future prospects. Brochure. https://data.unicef.org/wp-content/uploads/2018/07/Child-Marriage-Data-Brief.pdf
[13] International Telecommunication Union. 2017. ICT facts and figures 2017.

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SECURITY BREIFING:

CRIME

Plan is committed to protect life, minimise fear and prevent injury as much as possible and practicable, however visitors are also responsible for their own safety and are advised to take caution and precautions to ensure their personal safety. This is very important when in the hotel and out for shopping.

Plan International Malawi will ensure that visitors are booked into safe and secure hotels at all times. Where something is noted of concern in the hotel in relation to their personal safety and security , visitors are advised to contact the Plan International Malawi security focal point person (Brenda Madeya) on +265 991913583) or the Country Director (Daniel Muchena) on +265997434398).

Malawi is generally a safe and pleasant country except for occasional pick-pocketing, petty theft and bag-snatchers. Avoid walking around quiet areas, especially after dark. In the event of an attack, offer no resistance and hand over your possessions without question. When travelling in a car, be alert to petty theft

and pickpockets, especially in crowded places like city centres. Always keep your doors locked and windows closed.

Safeguard valuables and cash; keep large amounts of money, expensive jewellery, cameras and cell phones out of sight. Do not change large sums of money in busy public areas. It is advisable to deposit them in hotel safes, where practical. Keep copies of important documents, including passports, in a separate place to the documents themselves. This will assist in replacement processing of lost documents.

Visitors have a responsibility to report to the local police and to Plan International Malawi staff with whom they are working any incident or event that may have an impact on security. The emergency line in Malawi is 990.

USE OF TAXIS

- Use a taxi identified by the hotel only.
- Always agree a price before you get into the vehicle.
- Remain alert to the route you are being taken, don't fall asleep.
- If offered a short cut, politely refuse and stick to the main roads.
- Do not let them pick up other passengers once you have started your journey.

- If someone else other than the driver is already in the taxi, don't get in.
- Make sure you have the money for your fare ready on hand not hidden away somewhere.
- Always put on your seatbelts once you enter the vehicle and ensure that the doors are locked at all times.
- Roll up the windows.

WELCOME TO THE WARM HEART OF AFRICA

Jostein Brevik

Designing Mobile Software to Prevent Child Marriage

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