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360ed Impact Evaluation Report

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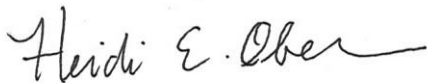
Image of Myanmar Students by AP; April 20, 2017

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- Quality management;
- HSSE and risk management;
- Financial management and Value for Money (VfM);
- Personnel recruitment and management;
- Performance Management and Monitoring and Evaluation (M&E)



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Abbreviations

AR	Augmented Reality
Apps	Digital Applications
ART	Antiretroviral Therapy
BPE	Business Performance Evaluation
DFAT	Department of Foreign Affairs and Trade
DFID	Department for International Development
DID	Difference in Difference
FLS	Fieldwork Logistics Supervisor
FOM	Fieldwork Operations Manager
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
IE	Impact Evaluation
IP	Implementing Partner
KII	Key Informant Interview
NGO	Non-Government Organisation
PPE	Programme Performance Evaluation
PPI	Poverty Probability Index
SRH	Sexual and Reproductive Health
STI	Sexually Transmitted Infections
USAID	United States Agency for International Development
VR	Virtual reality
WDI	Washington disability index

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Executive Summary

Introduction

SPRING was a five-year accelerator programme funded by the United Kingdom's Department for International Development (DFID), the United States Agency for International Development (USAID), the Australian Department of Foreign Affairs and Trade (DFAT) and the Nike Foundation. It supported business ventures to develop products and services which could transform the lives of adolescent girls. As one component of the overall evaluation of SPRING, the Impact Evaluation (IE) gathers information on the economic and social outcomes on girls who benefit from products and services delivered by SPRING businesses. 360ed is one of eight businesses that are included in the SPRING IE.

360ed is an Ed-Tech¹ business in Myanmar that offers a suite of virtual reality (VR) and augmented reality (AR) digital applications (Apps) and hardware to supplement Myanmar's public education system. With the support of SPRING, 360ed have developed a new product called 'Bay Kin'. Bay Kin is comprised of eight booklets on body literacy, sexual and reproductive health and safety, and an accompanying App. The series of illustrated educational booklets supplemented by low-cost AR App targeted at girls is marketed through retailers and Non-Governmental Organisations (NGOs) to support learning of the Life Skills Education component of the Myanmar national curriculum.

Evaluation Questions

The Team developed evaluation questions based on 360ed's anticipated impact on girls. This was done through the following Girl Impact pathways:

- Girls access learning materials including AR content (aligned with the national Life Skills Curriculum and its focus on sexual reproductive health, bullying and personal security).
- Girls utilise techniques for dealing with verbal sexual harassment and exercise their rights and legal options in Myanmar.
- Girls are better equipped to manage menstruation, avoid early sexual debut, unwanted pregnancy, human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs).
- Girls are safer, healthier and more self-confident. Social norms begin to shift toward providing girls with more support and decision-making power, particularly with regard to their bodies.

Guided by 360ed's Theory of Change and impact pathways, the IE evaluated the impact of the Bay Kin prototype directly on adolescent girls aged 13-16. The overall SPRING Evaluation Questions and the focus of the IE were:

- E2 To what extent have girls improved their safety and well-being as a result of accessing products, services, or business opportunities provided by SPRING businesses?
- E3 What has the Team learned about girls as end-consumers or beneficiaries in the value chain?

Under these questions were sub-questions. More on the evaluation questions in [Section 2.1](#)

Evaluation Methodology

The IE adopted a quasi-experimental difference-in-differences methodology with supporting qualitative interviews. To test the effectiveness of the App component, the study design included two Treatment groups (App, No App) and one Comparison group. Both Treatment groups were given all eight booklets to read while the Comparison group was provided with no stimuli.

To test the impact of the App containing the AR component, one of the two Treatment groups also engaged with the AR App associated with the eighth booklet while the other Treatment group only read the text in the booklet. Comparison group participants who did not engage with the booklet nor the AR were also administered the baseline questionnaires for all eight booklets

¹ EdTech ("educational technology") refers to hardware and software designed to enhance teacher-led learning in classrooms and improve students' education outcomes. Source: <https://www.investopedia.com/terms/e/edtech.asp>

Key Findings

In what ways did SPRING products, services, and business models intend to improve girls' safety and wellbeing? (E2.1)

The IE found that reading Bay Kin booklets had a range of immediate and longer-term effects on girls' knowledge and understanding related to different aspects of safety and wellbeing. These effects included increasing knowledge and understanding related to body literacy, self-defence, puberty, sexual and reproductive health, HIV protection and laws and rights.

The impact of the Bay Kin App used in conjunction with booklet 8 was limited. However, one significant positive effect was found for the ability of girls from the Treatment Group 1 (App) to correctly recall at least one way that HIV can be contracted compared to the Treatment Group 2 (No App). It is important to note that the App was a prototype still undergoing development during the IE. As a result, some of the functionality and image rendering were limited. It was also a new style of learning tool which girls had not encountered before. These were both likely to have influenced the extent to which the App could be effective for learning at this stage.

Did SPRING target girls show improved perceptions of their safety and wellbeing? (E2.2)

The Bay Kin booklets improved girls' perceptions of actions that were inappropriate for a teacher and who to tell about allegations of sexual abuse. The booklets also impacted on girls' ability to identify situations where they may be unsafe, and the App impacted on girls' perception that children must be protected from physical, psychological or sexual abuse.

This change in understanding, better equipped girls with the ability to identify and respond appropriately to risks and threats and improve their safety and wellbeing.

The extent to which girls perceive key risk factors to their safety and wellbeing have decreased between baseline and endline (E2.3)

The topics used to assess this evaluation question were not directly covered by the Bay Kin App. Therefore, assessment of the impact of Bay Kin content focused on girls' engagement with the stories in the booklets.

Learning content provided through the Bay Kin booklets was effective in increasing girls' understanding of key risk factors to their safety and wellbeing. With this improved knowledge, it is reasonable to believe that girls will have an improved ability to evaluate risks they may face and actions to take to limit harm and promote their wellbeing.

What factors helped or hindered girls from using SPRING products, services, or business opportunities? (E3.1)

Factors that hindered girls' ability to continue to engage with Bay Kin content included girls having other study commitments, parental concern regarding the content and teachers mistakenly collecting the booklets handed out after the baseline research.

There was an overall sense that the booklets were clearly written, and girls were able to read them independently. Parents were mostly encouraging about the girls learning the topics covered by Bay Kin, with only a few reporting concerns.

Parents and family members played an important role encouraging girls to engage with the content and download the App. The availability of a mobile phone and internet access was key for girls being able to download the App and access the AR content.

Girls reported that there were challenges with some aspects of the functionality of the App including the time it took for content to load and the way some of the images appeared on the screen.

Were there any unintended consequences? (E3.2)

Parents, siblings and friends of the girls had the opportunity to learn about the topics covered, and this was one of the unintended consequences of girls engaging with Bay Kin content after taking part in the baseline research activities. Other unintended consequences included friends of the App Treatment girls downloading the Bay Kin App on to their own phones and borrowing booklet 8 to use with the App.

Whilst overall reaction to the Bay Kin content was positive there was concern expressed by some parents that learning about some of the topics covered by the content may lead to more risk-taking behaviours amongst girls.

Conclusion

The IE found that the Bay Kin booklets were effective in developing knowledge and understanding of topics related to girls' safety and well-being. As well as finding evidence of shorter- and longer-term impacts amongst the girls in the Treatment group in this study, the Bay Kin booklets and App stimulated wider interest with engagement reported by siblings and friends, increasing the potential for Bay Kin products to support wider learning.

Consideration should be given to the likelihood that many of the girls in the App Treatment group would not have, previously, engaged with any form of AR. Therefore, their initial engagement with the App required them to learn to use the App itself, as instructed through the learning video, and doing so may have limited the potential for them to take on board the full range of learning points. As girls increase in their confidence to use mobile Apps with AR features, it is likely that their engagement with learning delivered through the App will increase.

Business Implications

The Bay Kin App was found to enhance the learning experience for topics related to girls' safety and, in particular, their knowledge of self-defence techniques. This aspect of learning was supported by animated characters demonstrating the physical techniques to use for self-defence. This may suggest that behavioural modelling is an aspect of learning that the AR App is well placed to support and is an area for 360ed to consider for focused development to cover a wider range of learning points.

The schools where girls participated in the research were supportive of Bay Kin learning content and girls reported instances of teachers taking the booklets to put in the school library to meet wider learning needs within the school. This provides evidence to support 360ed continuing to develop learning products that can support the Life Skills Education component of Myanmar national curriculum delivery.

Parents were mostly supportive of the Bay Kin learning content and siblings and friends were both reported to have engaged with the content demonstrating its potential to attract a wider learning audience. This provides evidence of a wider market for the Bay Kin booklets and App beyond availability through schools. In turn, this organic adoption supports 360ed's strategy of marketing the products more widely and making the booklets available to buy at an affordable price through bookstores.

The limited functionality of some of the image rendering within the App, due to it being a prototype under development, may have limited the extent to which it was able to deliver learning. Before wider circulation it is recommended that 360ed further develop the functionality and through user testing, assess the Apps ability to deliver a smooth learning experience for girls.

Programmatic Implications

The IE has identified that the Bay Kin booklets and App are a viable prototype for girls from middle income households who are able to read and have access to a mobile phone or tablet and the ability to download the App.

The Bay Kin booklets serve as effective stand-alone learning tools while the App component is not essential for learning to take place. The additional action related learning benefits of the App were found only where physical self-defence techniques were modelled using animation.

In addition to providing learning support for girls in the demographic group covered by the study, the body literacy, sexual and reproductive health and safety learning topics covered by the booklets and App are relevant for all girls. This includes girls without access to information and communication technology (ICT) and girls with lower levels of literacy. Consideration should therefore be given to identifying opportunities to effectively provide learning to girls with lower literacy levels, from poorer backgrounds and without access to technology. A number of girls who engaged with the App reported seeking the support of brothers and parents for support downloading the App. This resonates with previous SPRING analysis that identified a digital divide between girls and boys in terms of their ICT access and competencies, making boys, as well as parents, potential enablers of girls' ICT engagement.

Recommendations

Based on this impact evaluation of the following recommendations regarding the further development of the Bay Kin prototype. We have separated these recommendations into four clusters; those relating to design, content, broader reach, and the development of the App.

In terms of the **overall intervention design**, to ensure suitability and appropriateness of learning and to ensure the smooth and intuitive functionality of App based technology solutions, 360ed should recruit a research panel of girls for user testing and rapid feedback during content and App development. This would be fully in line with the HCD principles which SPRING promoted.

Regarding the further **development and refinement of the content** there is evidence the booklets 1 to 7 promoted learning independently of the content of booklet 8. 360ed might consider distributing the non-AR and AR related booklets separately as stand-alone learning resources. In line with this thinking booklets 1 to 7 are currently best read in sequence. It is recommended that 360ed develop these booklets as stand-alone stories, showcasing the same characters, to allow readers to learn about topics which have the greatest interest for them. It is also suggested that further content be developed to reinforce learning points; developments might include fun quizzes or puzzles that engage the reader.

In terms of **broader reach** by separating the booklets into AR and non-AR supported packages 360ed could reach a demographic of girls who do not have access to Facebook accounts and smart phones. While we understand that the booklets currently can be used as stand-alone learning resources, the current emphasis on AR might dissuade girls without these resources from engaging. Producing the booklets in additional indigenous languages would also increase the potential reach. Developing learner support guides for parents and teachers that speak to these groups' concerns may encourage greater support from these gatekeeper groups.

Aside from **refining the App** in terms of its rendering, to provide a better quality interface, and line with the recommendations above, 360ed should consider marketing the App bundled with AR supported booklets, to a different audience demographic. The company might also consider developing a community page on Facebook (Facebook is currently used as a logging portal for the App) that girls may join to feel part of a wider community. To overcome issues relating to the downloading and application of the App the company might consider developing a step-by-step pictorial guide illustrating this process.

1. Context

1.1 Purpose and structure of this document

This document presents the findings of an IE study conducted for 360ed; a business supported during the fourth SPRING cohort (October 2018 – July 2019). The report is divided into four sections. [Section 1](#) provides an overview of the SPRING IE, and introduces 360ed's SPRING prototype, Bay Kin. [Section 2](#) presents the IE design and methodology and [Section 3](#) presents the research findings in line with the SPRING and 360ed evaluation questions. [Section 4](#) presents the conclusions against the evaluation questions along with lessons learned and recommendations.

The report also has one attached annex:

- [Annex A: 360ed's Theory of Change](#)

The Baseline, Post-exposure and Endline Survey instruments as well as the guide for the Key Informant Interviews (KII) are provided as stand-alone annexes, as they are substantial given their graphic content and translation in the Burmese. Annex B includes all baseline tools (pre-post quantitative questionnaire for both treatment group and comparison), Annex C includes all endline tools (endline quantitative questionnaire for both treatment groups and KIIs) and Annex D includes the Girls Safety Protocols.

1.2 Overview of the SPRING Impact Evaluation

SPRING was a five-year programme that supported business ventures to develop products and services to help girls earn, learn, save, keep safe and experience increased well-being. SPRING envisaged that successful engagement with businesses will lead to a broader shift in markets that enable girls and their communities to contribute to ending the cycle of poverty. The programme was funded by the Department of International Development (DFID), the United States Agency for International Development (USAID) and the Australian Department of Foreign Affairs and Trade (DFAT). Donors also included the Nike Foundation, which funded the programme until February 2018.

The overall SPRING Evaluation is comprised of three components: The Programme Performance Evaluation (PPE), the Business Performance Evaluation (BPE) and the Impact Evaluation (IE). Tetra Tech conducted IE of two selected SPRING businesses in each of the four cohorts of the SPRING programme to assess the impact of SPRING-supported products and services on the lives of adolescent girls and the wider market.

As one of the three components of the SPRING evaluation, the IE provides evidence of the overall effects of SPRING in terms of improvements in economic and social outcomes for girls as a result of using products and services delivered by SPRING businesses. While other components focus on how well the programme works and what works (or does not work) well, the IE contributes evidence to help understand the effect of SPRING-funded business prototype activities on the lives of adolescent girls. The IE establish the extent to which SPRING has enabled girls to enhance their earning, saving, learning, safety and well-being, as well as measure any spill over, replication or demonstration effects of SPRING on the wider market for products, services or business models benefitting girls.

Following an evaluability assessment of Cohort 4 businesses, and in consultation with the programme's implementation partner (IP), LearnOBots and 360ed were selected as participants for Cohort 4 IEs. This report presents the findings from the IE research for the 360ed SPRING product prototype.

1.3 Introduction to 360ed

1.3.1 Description of the business and prototype

360ed is an Ed-Tech business in Myanmar that offers a suite of virtual reality² (VR) and augmented reality³ (AR) Apps and hardware to supplement Myanmar's public education system. With the support of SPRING, 360ed have developed a new product called 'Bay Kin'. Bay Kin is comprised of eight booklets on body literacy, sexual and reproductive health and safety, and an accompanying App. It is a series of illustrated booklets supplemented by a low-cost AR product (translated into Birman) targeted at girls and marketed through retailers and Non-Governmental

² Virtual reality is a realistic and immersive simulation of a three-dimensional environment, created using interactive software and hardware, and experienced or controlled by movement of the body. Source: <https://www.dictionary.com/browse/virtual-reality>

³ Augmented reality is an enhanced image or environment as viewed on a screen or other display, produced by overlaying computer-generated images, sounds, or other data on a real-world environment. Source: <https://www.dictionary.com/browse/augmented-reality>

Organisations (NGOs) to support learning of the Life Skills Education component of the Myanmar national curriculum. The first seven booklets can be read as a hard copy. The eighth booklet, also a hard copy with text and illustrations, has additional AR learning content that must be accessed through the Bay Kin App⁴.

Each booklet is roughly 20-25 pages of text and illustrations, and costs just over US\$1 per booklet. The Bay Kin booklets are also available in a box set of eight for equivalent of US\$6. To illustrate the booklets, 360ed have hired the same individual who illustrates the Myanmar curriculum textbooks, so the illustrations are high quality and credible. At present, 360ed are distributing the pack of booklets through private clients who then donate the booklets to schools across the country as part of their corporate social responsibility.

The target audience for Bay Kin are girls aged 13-16. The booklets are meant to be read by individuals independently and not as part of a class.

Bay Kin App

At the time of the IE, the Bay Kin App was available on the Android platform with access requiring registration using a Facebook username and password. The App currently has two different sections: i) the 'Home' area, which has gamified quizzes⁵ on the key themes taught in the booklets, and ii) the 'Library', which is where the AR content of booklet 8 is accessed. As of October 2019, only the eighth booklet was connected to the App⁶. 360ed are in the process of digitising the other seven booklets which will be hosted in the 'Library'. Booklets 1-7 will not have accompanying AR content. However, Bay Kin will further integrate learning points into the 'Home' function (through expanding the number of quizzes) to reiterate learning. The additional booklets were not uploaded onto the App during the IE.

2. Impact Evaluation Design and Methodology

2.1. Evaluation questions

The IE is guided by the overall IE questions from the SPRING M&E Evaluation Framework. Building on this framework, the evaluability assessment identified the following pathways to impact adolescent girls:

- Girls access learning materials including AR content (aligned with the national Life Skills Curriculum and its focus on sexual reproductive health, bullying and personal security).
- Girls utilise techniques for dealing with verbal sexual harassment and exercise their rights and legal options in Myanmar.
- Girls are better equipped to manage menstruation, avoid early sexual debut, unwanted pregnancy, human immunodeficiency virus (HIV) and other STIs.
- Girls are safer, healthier and more self-confident. Social norms begin to shift toward providing girls with more support and decision-making power, particularly about their bodies.

Guided by 360ed's Theory of Change ([Annex A](#)) and impact pathways, the IE assessed the impact of the Bay Kin prototype directly on adolescent girls aged 13-16. The specific areas for evaluation and their alignment with the overall SPRING Evaluation Questions are detailed in the right-hand column in [Error! Reference source not found.](#) (below).

Table 1: Bay Kin Impact Evaluation Questions

Overall Spring Evaluation Question	Area for Evaluation
E2 To what extent have girls improved their safety and well-being as a result of accessing products, services, or business	E2.1 In what ways did SPRING products, services, and business models intend to improve girls' safety and wellbeing? Do girls understand that no one can touch their body without their permission? Do girls understand that physical or psychological abuse is a criminal offence?

⁴ Booklet 8 can be understood with just the written text and images, but the accompanying AR file provides interactive content.

⁵ At present, there are roughly 20 multiple choice questions in the Home section of the App.

⁶ The AR content of each page of booklet 8 is on average 30-60 seconds long.

Overall Spring Evaluation Question	Area for Evaluation
<p>opportunities provided by SPRING businesses?</p>	<p>Do girls understand that it is their right to protect themselves from physical or psychological abuse?</p> <p>Do girls understand self-defence techniques?</p> <p>Do girls understand that becoming a mother when young has health risks?</p> <p>Do girls understand that condoms provide protection from HIV and STIs?</p> <p>Do girls understand that HIV can be treated using pills such as ART?</p> <p>Do girls understand that contraceptive pills can be taken to avoid pregnancy?</p> <p>Do girls feel they have a better understanding of puberty?</p> <p>E2.2 Did SPRING target girls show improved perceptions of their safety and wellbeing?</p> <p>Do girls feel confident to use self-defence techniques?</p> <p>Does knowledge of self-defence techniques make girls feel safer?</p> <p>Do girls know they should tell their parent or a trusted adult if a teacher acts inappropriately?</p> <p>E2.3 Extent to which girls perceive key risk factors to their safety and wellbeing have decreased between baseline and endline.</p> <p>Do girls understand not to trust strangers?</p> <p>Do girls feel more aware of dangers they may face and know how they can avoid or tackle them?</p> <p>E3.3 To what extent and how did SPRING products, services or business models contribute to this change, as opposed to other factors?</p> <p>What role did the Bay Kin products play in any changes in knowledge, perceptions and confidence related to body literacy, sexual and reproductive health and safety?</p>
<p>E3 What has the team learned about girls as end-consumers or beneficiaries in the value chain?</p>	<p>E3.1 What factors helped or hindered girls from using SPRING products, services, or business opportunities?</p> <p>What helped or hindered girls continuing to engage with Bay Kin products between baseline and endline?</p> <p>Did girls download the AR App between baseline and endline and what helped or hindered them doing so?</p> <p>E3.2 Were there any unintended consequences?</p> <p>Did any other family members or friends engage with the Bay Kin products between baseline and endline?</p> <p>Were there any negative reactions to the content of Bay Kin products?</p>

2.2 360ed Impact Evaluation Methodology Summary

To answer these questions, data was collected in the field, and TetraTech partnered with Kantar, a Burmese data collection company.

The IE adopted a quasi-experimental difference-in-differences (DID) methodology⁷ with supporting qualitative interviews. To test the effectiveness of the App component, the study design included two Treatment groups (App, No App) and one Comparison group. Both Treatment groups were given all eight booklets to read while the Comparison group was not.

To test the impact of the App containing the AR component, one of the two Treatment groups also engaged with the AR App associated with the eighth booklet, Treatment Group 1 (App), while the other Treatment group, Treatment

⁷ Difference in differences (DID) is a statistical technique used in econometrics and quantitative research in the social sciences that attempts to mimic an experimental research design using observational study data, by studying the differential effect of a treatment on a 'treatment group' versus a 'control group' in a natural experiment

Group 2 (No App), only read the text in the booklet. Comparison group participants were administered the baseline questionnaires for all eight booklets but did not engage with Bay Kin content.

The App was accessed using tablets and a Facebook account⁸ was set up for each user in the App Treatment group. All users were given log in information for accessing the App.

There were three rounds of data collection. The beneficiaries completed a baseline questionnaire before engaging with the Bay Kin content and completed the same questionnaire right after engaging with the Bay Kin booklets and App, referred throughout as ‘baseline’ and ‘post-exposure’ data collection period. The reason for conducting the post-exposure measurement directly after the Treatment group had engaged with Bay Kin products was to assess any immediate changes in outcomes. The additional Treatment and control group endline measurement was designed to assess the extent to which any changes occurred or sustained over time.

After baseline and post-exposure data collection was completed, each Treatment group girl was left with the pack of booklets to continue to use until endline data collection. By leaving the booklets with the girls, the intention was to create the opportunity for girls’ natural exposure to the intervention which included them being able to download the App if they have access to a phone and want to.

The third round of data collection at endline took place, approximately two months after the baseline collection, with both of the Treatment groups and the Comparison group completing an endline questionnaire. In addition to the quantitative surveys, the IE included KIIs with both Treatment group girls at endline. The data collection activities undertaken for the Treatment and Comparison groups are detailed in Error! Reference source not found. below.

Table 2: Data collection activities

	Baseline (Pre-exposure) Survey Measurement	Post-exposure Survey Measurement	Endline Survey Measurement	Endline In-depth interviews
Treatment Group 1 (App)	X	X	X	X
Treatment Group 2 (No App)	X	X	X	X
Comparison	X		X	

Data collection for the IE took place in three public high schools in Yangon, identified in collaboration with 360ed (Error! Reference source not found.). Schools were selected based on having similar student catchment demographics, size and locations. Our local research partner ensured that the appropriate permissions and consent processes were in place. For more information on the team’s approach to safeguarding and securing permissions, please read the **SPRING girl safety protocols** (Annex D).

These schools provided access to the required number of girls aged 13-16 and made available suitable facilities for girls to convene, engage with the Bay Kin content and then complete the survey instruments. Conducting the research in schools also enabled the same group of girls to convene two months after baseline data collection.

Table 3: School Profiles

School name ⁹	Township	School profile	Area	Ages	Assignment	Stimulus
B.E.H.S. (2)	Thingangyun	Middle-income	Urban	13-18	Treatment 1 (App)	Bay Kin booklets 1-8 + App
B.E.H.S. (1)	Thanlyin	Middle-income	Urban	13-18	Treatment 2 (No App)	Bay Kin booklets 1-8 (No App)
B.E.H.S. (1)	South Oakkalapa	Middle-high-income	Urban	13-18	Comparison	No booklets (no App)

⁸ A Facebook account was necessary as an entry point to access the app. Source: Angrist, J. D.; Pischke, J. S. (2008). Mostly Harmless Econometrics: An Empiricist’s Companion. Princeton University Press. pp. 227–243. ISBN 978-0-691-12034-8.

⁹ B.E.H.S stands for “Basic Education High School”. For example, in a township like “Thanlyin”, there are four high schools. So, Ministry of Education named it as B.E.H.S (1) Thanlyin, B.E.H.S (2) Thanlyin, B.E.H.S (3) Thanlyin, B.E.H.S (4) Thanlyin. Numbers are given beside B.E.H.S just to be in order. In other townships, it has been named in the same way.

2.3 Data Collection Instruments

The quasi-experimental difference in difference methodology was executed using a series of surveys (quantitative and qualitative) with samples of girls from the Treatment and Comparison group schools

2.3.1 Quantitative survey

The team carried out supervised self-completion questionnaires. The questionnaires were designed to test the learning content of each booklet and its impact on girls' knowledge and confidence. The questionnaires were scripted into Kantar's proprietary digital data collection software and completed by each girl using a tablet.

All participants in both Treatment groups and the Comparison group completed the same baseline questionnaire. Treatment groups then reviewed the booklets. Treatment group 1 (App) also used the App for booklet 8, and then both groups completed post-engagement questionnaires that contained the questions relevant to the reviewed booklets.

The endline survey, completed by all participants, contained the same questions asked at baseline for both the comparison and Treatment groups. Additional questions were included to assess continued engagement with the booklets for both Treatment groups. For the Treatment group using the AR App, further questions were included at endline to also assess their continued engagement with the App.

The survey questionnaire gathered data on household demographics, socioeconomic characteristics, disability, general well-being questions, Bay Kin awareness and use and knowledge, attitudes and behaviours related to Bay Kin content (standalone Annexes B and C). To limit survey fatigue at endline, disability and demographic questions were removed as those were unlikely to change between baseline and endline.

A sample of 150 girls aged 13-16 was randomly selected within each school using school register lists. The achieved sample included 10% oversampling to mitigate against survey attrition between baseline and endline data collection (Error! Reference source not found.).

Table 4: Achieved sample per school

School	Age	Baseline	Endline
B.E.H.S. (2) Thingangyun <i>TREATMENT 1 (App)</i>	13	37	30
	14	37	36
	15	38	36
	16	38	38
Sub-total		150	140
B.E.H.S. (1) Thanlyin <i>TREATMENT 2 (No App)</i>	13	37	36
	14	37	34
	15	38	36
	16	38	34
Sub-total		150	140
B.E.H.S. (1) South Oakkalapa <i>COMPARISON</i>	13	37	37
	14	37	37
	15	38	38
	16	38	35
Sub-total		150	147

2.3.2 Qualitative surveys

At endline only, a 30-minute semi-structured KII guide was designed for use with randomly selected girls from the Treatment groups (standalone Annex C). These interviews, gathered additional feedback on knowledge, attitudes and behaviours related to the Bay Kin content and included a section for Treatment group 1 (App) on girl's engagement with the App. The guide was designed to delve deeper into the evaluation questions and triangulate the findings from the survey data.

The 20 participants from the Treatment group 1 (App) school were randomly selected to participate in KIIs. This included 15 girls who reported continued use of the Bay Kin booklets App and five girls who reported they did not continue to use the App. 10 participants were randomly selected from Treatment group 2 (No App) to participate in KIIs. This included seven girls who reported continuing to use the Bay Kin booklets, and three girls who reported they did not continue to use the booklets (Error! Reference source not found.).

Table 5: Sample size achieved for each school, by user type, for KIIs

School Name	Users	Non-Users	Total
B.E.H.S (2) Thingangyun – Treatment 1 (App)	15	5	20
B.E.H.S (1) Thanlyin – Treatment 2	7	3	10
Total	22	8	30

2.3.3 Fieldwork schedule

The details of the fieldwork schedule for both baseline and endline can be found in Error! Reference source not found. below.

The baseline data collection took place over three days to allow enough time for girls to complete the baseline survey and engage with Bay Kin booklets and App content. This was done to ensure the girls were not overwhelmed with too much content and prevent survey fatigue, particularly for both Treatment groups.

On Day 1 both Treatment groups and the Comparison group received and completed the baseline survey. Both Treatment groups were then given booklet 1 and 2 to read (for approximately 20 mins). After that, both Treatment groups were given the post-engagement survey.

Days 2 and 3 only involved the Treatment groups, in two consecutive sessions. On Day 2, both Treatments groups were first given booklets 3 to 5 for 30 min and then completed the post-engagement survey for those booklets. This process was repeated as a second session for booklets 6 and 7.

Finally, on Day 3 both Treatment groups received booklet 8, and the Treatment 1 group (App) were given additional time to engage with the App. Then both groups completed the post-exposure survey on booklet 8.

For endline, data collection took place over two days, one day to administrate the quantitative survey from all groups and one day to conduct the KIIs with the Treatment groups¹⁰.

Table 6: Fieldwork Reschedule

BASELINE		
Day 1	Day 2	Day 3
Treatment 1 (App)		
Baseline survey	Engagement booklets 3-5	Engagement booklet 8 + App
Engagement booklets 1-2	Post-engagement survey (3-5)	Post-engagement survey (8)
Post-engagement survey (1-2)	Engagement booklets 6-7	

¹⁰ A full detail of piloting and other fieldwork activities can be found in the Tetra Tech Impact Evaluation Report: 360ed, SPRING Monitoring and Evaluation, December 2019.

BASELINE		
Day 1	Day 2	Day 3
	Post-engagement survey (6-7)	
Treatment 2 (No App)		
Baseline survey	Engagement booklets 3-5	Engagement booklet 8 (No App)
Engagement booklets 1-2	Post-engagement survey (3-5)	Post-engagement survey (8)
Post-engagement survey (1-2)	Engagement booklets 6-7	
	Post-engagement survey (6-7)	
Comparison		
Baseline survey		
ENDLINE		
Day 1	Day 2	Day 3
Treatment 1 (App)		
Endline survey	In-depth-interviews	
Treatment 2 (No App)		
Endline survey	In-depth-interviews	
Comparison		
Endline survey		

2.4 Enumerator training

At endline, Tetra Tech carried out a refresher training over the phone with the Kantar Fieldwork Manager on 7th January 2020 to reiterate the background study objectives and design, survey techniques, sampling methodology, fieldwork management structure and ethical research and enumerator code of conduct. In addition, the session provided an overview of the changes made to the survey and introduced the KII guide.

2.5 Survey data analysis

The data was cleaned, processed and analysed using the statistical software STATA. Data was checked and screened for data errors and outliers. There were no outliers identified.

To calculate statistical differences between Comparison and Treatment groups, statistical tests were run through STATA. These included the Student's t-test and DID (Difference in Difference) regression analysis using the STATA command. The team then used the p-values of the interaction variable of time and Treatment status.

For questions relating to booklets 1 to 7, the results for Treatment group 2 (No App) were analysed. Comparison of data between baseline and post-Treatment exposure identified any immediate effect of Bay Kin content. DID analysis of differences between the Comparison group and Treatment group 2 (No App) at baseline and endline identified any longer-term effects of Bay Kin content.

For questions relating to booklet 8, comparisons of data between baseline and post-Treatment exposure for Treatment group 1 (App) and Treatment group 2 (No App) were analysed to identify any immediate effect of Bay Kin content. DID analysis of differences between Treatment group 1 (App) and Treatment group 2 (No App) at baseline and endline identified any longer-term effect of the Bay Kin App.

Throughout the analysis section, comparative DID coefficients were identified and highlighted in green or red when statistically significant at $p < 0.05$ or less, to indicate the statistically significant impact of the Bay Kin products. The green and red colours aimed at identifying positive and negative results from participation, i.e. results that were expected (in green) and unexpected results (in red).

Where relevant, individual attitude statements reported in the analysis section tables were marked either [+] or [-]. This was to indicate whether an increase or decrease in agreement was an indication of Bay Kin impact.

Where relevant, individual scenario statements reported in the analysis section tables were marked either [√] or [x]. This was to indicate whether the reported data indicates a correct [√] identification of the scenario or incorrect [x] identification”

At baseline and endline, each respondent was allocated (the same) unique identifier. The sample file and anonymised database were held under separate cover by both Tetra Tech and Kantar. The electronic databases were securely stored on multiple platforms to avoid data loss, on the computers of both the study coordinator and field coordinator, on an external hard drive, and in protected cloud storage. Anonymised electronic copies of KIIs transcripts will be similarly stored for three years. Finally, paper consent forms were filed and will be held in hardcopy by the local research partner for three years.

2.6 Methodological limitations and mitigation

In the following section, we outline the key limitations in the evaluation methodology: design, internal and external validity and sampling and non-sampling errors. The following limitations were identified and mitigated against during the design of the evaluation (

). The middle column of the table details the planned mitigation actions and right-hand column speaks to whether the mitigation strategy was successfully implemented, if needed.

Table 7: 360ed evaluation limitations and mitigation strategies

Risks	Mitigation	Endline
Lack of demographic comparability between Treatment and control schools	Treatment and control school locations will be reviewed before selection to assess comparability with alternative schools identified if necessary.	Mitigation strategy was successful, and no issue was encountered.
Varying levels of prior knowledge and confidence amongst Treatment and control girls	Age stratification and random selection will be used to maximise comparability and limit confounding with equal numbers of girls randomly sampled in Treatment and control schools by year of age.	Mitigation strategy was successful, and no issue was encountered.
Girls have experienced negative events portrayed in the Bay Kin product	The Safeguarding protocol shall include a clear referral system where a girl raises a concern during the course of the research.	Mitigation strategy was successful, and no safeguarding issues were reported by the data collection team during the research.
Girls have limited digital literacy for interacting with the AR App	Girls will be provided with a clear explanation and guidance on how to use and engage with the App and moderators will be on hand to answer any questions they have to ensure they are able to interact with the App. Primary research conducted by 360ed and SPRING has confirmed that the target audience, and the schools identified in the MOU, have high mobile and digital literacy.	As the girls had been introduced to the App at baseline, there was no issue encountered at endline.
Inability to access schools to sample girls and carry out the Impact Evaluation	360ed have a Memorandum of Understanding (MOU) with the Ministry of Education and had provided a shortlist of schools where the team is approved to be able to conduct the Impact Evaluation. Six monastic schools have been	The same schools were accessible throughout the evaluation and no issue was encountered.

Risks	Mitigation	Endline
	identified by 360ed, of which three were selected. We therefore had a sufficient list of cleared back-up schools for participation.	
Attrition between baseline and endline data collection waves	The impact evaluation will be conducted in school locations which girls are required to attend. The duration between baseline and endline will be short and during the school year, which will be expected to further limit attrition. The local research partner has oversampled by 10% to minimise the effects of any potential attrition.	The mitigation strategy was successful, and no issue was encountered.
Girls display sensitivity towards content regarding sexual and reproductive health and dangerous situations	School, parental and student consent for participation will be sought and girls are free to leave any part of the evaluation questions that they are not comfortable with and talk with the research moderators if they are uncomfortable with any of the content.	During the pilot activity conducted at baseline, researchers noticed that some girls were shy and nervous when answering the questions around Reproductive and Sexual Health. In response, during baseline, the researchers engaged girls in some icebreaking activities and reiterated to them that their answers were anonymous and that there were no wrong answers. At endline, girls seemed more confident to answer and no issue was encountered.
The comparison and both Treatment group research participants engage with the Bay Kin booklets or App in the time between the post-engagement survey and endline survey	While booklets will be given to Treatment group participants to take home, it is not possible to control any naturalistic engagement with the App for both Treatment and Comparison groups, nor the booklets for the Comparison group, that may occur following the post-engagement survey. The endline survey included questions to measure the extent to which participants have engaged with either Bay Kin booklet's or the App. This data will be used to inform the extent of naturalistic engagement during the endline analysis.	While some of the Comparison group reported they had engaged with Bay Kin content between post-exposure and endline, data analysis did not identify any significant changes in the reported results due to the naturalistic engagement reported by the Comparison group.
Girls are pre-informed on the learning points covered by the Bay Kin App, therefore leading to a ceiling effect on knowledge measures	In addition to individual knowledge measures, the impact evaluation will include measures to assess self-perceptions of the combined impact of the Bay Kin content on confidence and knowledge in each of the five learning themes covered by the content.	The mitigation strategy was successful, and no issue was encountered.
A small number of girls mentioned that the booklets were taken away from them by the teachers.	Girls in the treatment groups were each given the booklet packs at the end of the baseline along with a thank you bag with a notebook, pen and sweets. They were told that these were for them to keep.	Despite being told that the booklets were for the girls to keep, instances of teachers taking the booklets were beyond the control of the research team. On investigation with our local research partner we found that the teachers were not specifically briefed to take them away. However, they took the booklets away to make them available for girls who did not participate to the study, with no intention on preventing girls who participated to access them.
The Bay Kin app is still at an early stage of	The version used for the Impact Evaluation will have been released to the public and will be available through the App store.	The image rendering and interactive functionality of some of the AR components of the app were found still in need of refining.

Risks	Mitigation	Endline
development and might impact girls learning.		

3. Respondents' profile and engagement with material

3.1. Progress out of Poverty Index and Washington Group short set of disability questions

Data was collected at baseline to profile the participants in the Treatment and Comparison groups. Error! Reference source not found. presents the profile of each group in terms of their likeliness to be living in a household that is below the poverty line. This was done using the Progress out of Poverty Index (PPI), and their level of disability measured using the Washington Group short set of disability questions (WDI).

Table 8: Respondents' profile

	Treatment 1 (App)	Treatment 2 (No App)	Comparison
Mean age	15.	14	14
Hills & Mountains	4%	3%	2%
Dry Zone	7%	5%	6%
Delta	3%	4%	1%
Coastal	0%	1%	1%
Yangon	86%	87%	89%
PPI Score	80 (2% household likeliness to be below poverty line)	73 (4.7% household likeliness to be below poverty line)	78 (3.2% household likeliness to be below poverty line)
WDI Score	19%	13%	21%
<i>n</i>	150	150	150

Each group was found to have a similar PPI score and there were no statistically significant differences between groups on their WDI score.

3.2 Bay Kin Awareness and Use

As mentioned previously, data was collected at baseline and endline on awareness and use of Bay Kin products. This is reported below in Error! Reference source not found..

Table 9: Respondents use of Bay Kin booklets

	Comparison		Treatment 1 (App)		Treatment 2 (No App)	
	Baseline	Endline	Baseline	Endline ¹¹	Baseline	Endline ¹²
Have you heard of the Bay Kin booklets?	32%	41%	23%	-	24%	-
Have you ever read any Bay Kin booklets?	18%	7%	11%	87%	9%	98%

¹¹ Note that data was not collected at endline as all Treatment individuals will have heard of Bay Kin Booklets

¹² Note that data was not collected at endline as all Treatment individuals will have heard of Bay Kin Booklets

Have you ever downloaded and used the Bay Kin App on a mobile phone or tablet?	5%	8%	3%	26%	1%	4%
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The baseline survey found that 32% of Comparison group girls said they had heard of Bay Kin booklets. This compares with 23% of Treatment group 1 (App) and 24% of Treatment group 2 (No App).

At endline, the Comparison group reported an increase in Bay Kin booklet awareness of 9%, from 32% at baseline to 41% at endline.

Although this result was not expected this can be explained by two things: either an over reporting from the girls or the gaining in traction by word of mouth of Bay Kin products. As mentioned later in this report, under [Section 4.5.2](#) on unintended consequences, girls mentioned speaking about the booklets with family and friends that did not participate in Bay Kin.

The proportion of girls reporting reading any Bay Kin booklets increased from 11% at baseline to 87% at endline for Treatment group 1 (App) and from 9% at baseline to 98% at endline for Treatment group 2 (No App). This reflects their participation in the Treatment groups where they were given booklets to read.

The proportion of girls in Treatment group 1 (App) who reported having ever downloaded the Bay Kin App on a mobile phone or tablet increased from 3% at baseline to 26% at endline.

Participants in both Treatment groups were asked how often they had read the booklets since participating in the baseline research in November 2010. This is reported below in Error! Reference source not found..

Table 10: Number of times respondents have read the booklets

	Treatment 1 (App)	Treatment 2 (No App)
<i>How many times did you read the Bay Kin booklets that you were given in November 2019?</i>	Endline	Endline
None	13%	3%
Once	50%	23%
2-5 times	36%	74%
6-10 times	0%	0%
More than 10 times	1%	0%

Treatment group 1 (App) participants were more likely to have read the booklets once (50%) compared with Treatment group 2 (No App) participants who were more likely to have read the booklets 2-5 times (74%).

Participants in Treatment group 1 (App) who reported using the Bay Kin App since taking part in the research project in November 2019 were asked how often they had used the App. This is reported below in Error! Reference source not found..

Table 11: Number of times respondents have used the App

	Treatment 1 (App)
How often have you used the Bay Kin App since taking part in the research project in November 2019?	Endline
More than once a week	16%
Once a week	39%

Less than once a week but more than once a month	14%
Once a month	14%
Less than once a month	18%

4. Findings

In this section we present the findings of the 360ed IE.¹³

4.1. In what ways did SPRING products, services, and business models intend to improve girls' safety and wellbeing? (E2.1.)

This evaluation question reviews whether 360ed's Bay Kin booklets and App have improved girls' safety and wellbeing in various areas, including general safety, sexual and reproductive health, HIV and other STIs, and child laws and rights.

4.1.1. Safety

This section presents findings on how the Bay Kin booklets improved girls' safety. It discusses how they helped girls understand self-defence techniques, that no one can touch their bodies without their permission and that it is their right to protect themselves from physical or psychological abuse.

Do girls understand that no one can touch their body without their permission?

- Reading the Bay Kin booklets had an immediate effect on teaching girls that they should not hug and kiss a boy if he threatens, that if they don't, he will never see them again.
- Reading the Bay Kin booklets had a longer-term effect on teaching appropriate information relating to a scenario where someone hugs and kisses them or touches the girl's body without her permission. Girls who read the Bay Kin booklets were more able to correctly identify that such actions should not be kept a secret.
- There was no evidence that the Bay Kin App provided additional learning beyond that provided by the booklets.

Booklet 2 tells a story about a girl who meets an unfamiliar boy living on the same street as her tutor. Through an encounter with him, by the lake, he tries to hug and kiss her without asking. The girl learns that it is not acceptable for someone to touch her body without her permission. These lessons were also reinforced in Booklet 8. To test their understanding of this lesson, girls were asked a number of related questions. The results are presented in Error! Reference source not found. and Error! Reference source not found..

Table 12: Effect of Bay Kin on girls understanding that no one can touch their body without permission

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>If a boy says that he will never see me again unless I hug and kiss him, I should do what he says (-)</i>	2.9	2.6	2.3	1.8	1.9	-0.5*	-0.1
<i>You have the right to say no if someone tries to hug and kiss you or touch your body (+)</i>	4.5	4.6	4.8	4.7	4.9	0.0	0.0
<i>You shouldn't give in to someone's demands even if they are pressuring you to do so (+)</i>	4.0	4.1	4.3	4.4	4.5	0.1	0.1

¹³ As mentioned in section 2.5 Throughout the analysis section, comparative differences and difference in difference (DID) coefficients are identified and highlighted in green or red when statistically significant at $p < 0.05$ or less, to indicate the statistically significant impact of the Bay Kin products. The green and red colours aim at identifying positive and negative results from participation, i.e. results that were expected (in green) and unexpected results (in red).

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
<i>You must always give your permission for someone to touch your body (+)</i>	1.2	1.1	1.2	1.1	1.0	-0.1	-0.1
<i>It can be the victim's fault if they are abused either mentally or physically - especially if they wear certain clothes or go to certain places (-)</i>	3.1	2.9	3.3	3.2	3.3	-0.2	0.2
'If someone hugs and kisses you or touches your body without your permission...' [% correct]							
<i>They are allowed to (X)</i>	99%	99%	99%	99%	100%	-1%	0%
<i>It is not a criminal offence (X)</i>	96%	100%	97%	97%	98%	0%	-3%
<i>It is a criminal offence (✓)</i>	40%	36%	47%	53%	51%	6%	7%
<i>I show not tell anyone about it (X)</i>	99%	100%	100%	100%	100%	0%	-1%
<i>I should tell someone I trust about it like my parents, elders or a teacher at school (✓)</i>	60%	69%	55%	54%	76%	-1%	12%
<i>It should be a secret that I should not tell (X)</i>	99%	98%	97%	97%	100%	0%	4%*
[mean] total correct scores out of 6	4.9	5.0	5.0	5.0	5.3	0.0	0.2*

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin App. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

Girls were asked to rate their agreement on a series of statements, with one seeing a statistically significant effect from reading Bay Kin booklets. The statement asking **'if a boy says that he will never see me again unless I hug and kiss him, I should do what he says'** saw a mean rating of 2.3 at baseline and decreased appropriately to 1.8 post-exposure, resulting in a statistically significant difference of -0.5 (p<0.05). Although when measured at endline the mean rating remained lower at 1.9, the longer-term difference in difference effect is weaker at -0.1 and not statistically significant.

Girls were presented with a scenario where **'someone hugs and kisses you or touches your body without your permission,'** and then asked to identify which of six statements correctly describe it. While the immediate effect of reading Bay Kin booklets on the total score is 0.0 and not statistically significant, the longer effect was found to be positive and statistically significant at +0.2 (p<0.05). It was found by looking at specific responses, there is a positive and statistically significant longer-term effect for girls' understanding that **'they should not keep it a secret if someone touches them without their permission'** (+4%, p<0.05).

Table 13: Effect of Bay Kin on girls understanding that no one can touch their body without permission (Booklet 8 questions)

	Pre/Post Diff (T1 App)	Pre/Post Diff (T2 No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	Est	est
True or false questions [% correct]					
<i>You must always give your permission for someone to touch any part of your body (✓)</i>	-1%	2%	-5%	0%	-6%
<i>It is acceptable for a love-mate or boyfriend to say that they will tell others if you have made love (X)</i>	0%	1%	-2%	-2%	1%
<i>No one is allowed to take naked or sexual photos of you, even your partner (✓)</i>	-2%	4%*	-1%	2%	-2%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

To identify any potential App effect, girls were asked a series of associated true or false statements linked with Booklet 8 content. The result of girls who read Booklet 8 using the App in Treatment group 1 (App) were compared with the results of girls who did not use the App in Treatment group 2 (No App). In almost all cases, it was found that there was no statistically significant immediate or longer-term effect from reading Bay Kin booklets for either Treatment group 1 (App) or Treatment group 2 (No App). The only exception was for the statement **‘no one is allowed to take naked or sexual photos of you, even your partner.’** Treatment group 2 (No App) saw an immediate effect of +4% (p<0.05), although its longer-term effect was weaker at 2% and not statistically significant. For all three statements, there was no statistically significant App effect when comparing differences between Treatment groups.

However, during the qualitative interviews, girls highlighted the relevance of booklet 2 as they mentioned that scenario occurs to them in real life. Particularly, nine out of 15 interviewed for Treatment 1 group (App) girls mentioned that booklet 2 was the most interesting booklet, suggesting that the retention around safety knowledge from the Treatment group 1 (App) girls could be higher than for Treatment 2 group (No App).

“[The stories] in booklet 2 are very relevant to the girls in my age as that kind of stories is happening in our environment so I know how to avoid if boyfriend persuade” T1 ID 238

“As far as I remember, Hnin Si and Thiha, Maung Tuu and Strangers are the most relevant for us to learn at the school because these stories are happening in reality and we didn’t know how to protect ourselves, how to stay confidently and not to trust people easily.”T1 ID 151

“For booklet 2, I found out boys or girls can be interested in opposite sex but should not look at the dirty pictures like this since it’s not appropriate to our culture and should not accept if teachers or someone whom you trust are doing sexually abused to you.” T1 ID 227

Do girls understand that it is their right to protect themselves from physical or psychological abuse?

- Reading the Bay Kin booklets did not have an effect on increasing levels of understanding that it is a girls’ right to protect herself from physical or psychological abuse as girls had already high levels of understanding at baseline, which limited the potential for improvement.

It was found that there was a significant immediate effect on girls understanding that they could not be punished by law for defending themselves, that everyone should learn how to defend themselves and that it is right to use self-defence when needed. Girls were asked their levels of disagreement or agreement with a series of statements relating to their rights to protect themselves from physical or psychological abuse. These themes are discussed in Booklet 2, 3 and 4. The results are presented in Error! Reference source not found..

Table 14: Effect of Bay Kin on girls understanding their right to protect themselves from physical and psychological abuse

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>It is a girl's right to protect herself from physical or psychological abuse (+)</i>	4.7	4.7	4.8		4.8		0.0
<i>You can be punished by the law if you hurt someone while protecting yourself from them (-)</i>	2.6	2.3	2.3	1.5	1.6	-0.8*	-0.4
<i>Everyone should learn to defend themselves from dangerous situations (+)</i>	4.8	4.8	4.7	4.9	4.9	0.2*	0.1
<i>It is right for a person to use self-defence to protect themselves if they are in danger (+)</i>	4.6	4.7	4.7	4.9	4.8	0.3*	0.0

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin App. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

When asked to rate their agreement to the statement **‘it is a right for a person to use self-defence to protect themselves if they are in danger,’** there was a statistically significant immediate effect of +0.3 (p<0.05) after reading the Bay Kin booklets, even with a high rating at baseline of 4.7. However, the longer-term effect was 0.0 and not statistically significant.

Similarly, for the statement that **‘everyone should learn to defend themselves from dangerous situations,’** although agreement at baseline was high at 4.7, there was a positive and statistically significant immediate effect of +0.2 (p<0.05) found. Again, this was not sustained over time, with a longer-term effect of +0.1 that was not statistically significant.

When presented with the statement **‘you can be punished by law if you hurt someone while protecting yourself from them,’** the mean rating at baseline was 2.3, suggesting girls did not know the statement is false. Encouragingly, there is a statistically significant immediate effect of -0.8 (p<0.05) with less girls in agreement after reading the booklets. The longer-term effect is -0.4, although not statistically significant.

Do girls understand self-defence techniques?

- Reading the Bay Kin booklets had a significant immediate and longer-term effect on girls’ understanding of what actions to take to fight back an attacker.
- The DID analysis found no evidence that the App provided additional learning for girls’ understanding of self-defence techniques beyond that provided by the booklets.

Booklet 8 provided girls with illustrations of basic self-defence techniques which became animated when used with the AR App. The booklet and App teach self-defence moves to use if attacked from the front, behind, side or on top. To test knowledge of self-defence techniques, girls were presented with four scenarios involving an attacker and asked to identify the correct self-defence manoeuvres from a series of ten illustrations, each of which appeared in the booklet and were the basis of the App animation. The results are presented in Error! Reference source not found..

Table15: Effect of Bay Kin on girls understanding of self-defence techniques (Booklet 8 question)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
Knowledge of what actions to take to fight back an attacker [mean total score]					
<i>Scenario 1: Attacker is in front of you (out of 4)</i>	1.1*	1.0*	0.6*	0.6*	0.0
<i>Scenario 2: Attacker is to the side of you (out of 2)</i>	0.5*	0.6*	0.4*	0.5*	-0.1
<i>Scenario 3: Attacker is behind you (out of 2)</i>	0.6*	0.6*	0.4*	0.6*	-0.2
<i>Scenario 4: You were lying down (out of 2)</i>	0.3*	0.5*	0.1	0.4*	-0.2*
Agreement with various statements [mean rating between 1-5]					
<i>I know a lot about self-defence techniques (+)</i>			0.2	0.2	0.1

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

Overall, the Bay Kin booklets were found to have a positive and statistically significant immediate and longer-term effect on girls’ **knowledge of what actions to take to fight back an attacker**, for both Treatment groups and for all four scenarios. Often, the effect was similar for both Treatment groups, although in one case, the App effect was statistically significant. For scenario 4 where you are lying down, the App effect is negative and statistically significant at -0.2 (p<0.05), suggesting the App hinders learning for this learning point.

Girls were also asked to rate the statement, **‘I know a lot about self-defence techniques.’** While there were positive longer-term effects found from reading Bay Kin booklets for both Treatment groups, they were not statistically significant. The App effect was also positive, but also not statistically significant.

4.1.2 Sexual and Reproductive Health

This section looks at how girls’ understanding of sexual and reproductive health was improved by reading the Bay Kin booklets. This includes their knowledge of puberty, ways to avoid pregnancy, health risks involved with becoming a mother when young, symptoms of pregnancy, the understanding that pregnancy should not be kept a secret and that they can speak to their parents if they have concerns related to sexual and reproductive health.

Do girls feel they have a better understanding of puberty?

- Reading the Bay Kin booklets had a significant immediate effect on girls being able to correctly identify risks or dangers that a teenager may face.
- Reading the Bay Kin booklets had a significant immediate and longer-term effect on the ability of girls to correctly identify how the body physically changes during puberty.
- Reading the Bay Kin booklets had a significant immediate effect on the ability of girls to correctly label parts of the female and male reproductive systems and correctly ordering the stages of the menstrual cycle.
- The DID analysis found no evidence that the Bay Kin App provided additional learning, beyond that provided by the booklets.
- The Bay Kin App was still under development and did not have full functionality for the interactive components relating to these topics. It is likely that this had an impact on the reduction in positive learning outcomes on these topics for girls using the App compared to those who just read the booklet.

Girls were asked a series of questions to test their understanding of puberty, including how their bodies change. These learning points were taught in Booklet 8 using augmented reality features which were used by girls in Treatment group 1 (App). The results are presented in [Error! Reference source not found.](#)

Table 16: Effect of Bay Kin on girls understanding of puberty (Booklet 8)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
Agreement with various statements [mean rating between 1-5]					
<i>I feel that I have a full understanding of puberty and how my body will change as I grow up (+)</i>			0.1	0.2	-0.2
'Which of the following are risks or mood swings that teenagers may face?' [% correct]					
<i>Drug addiction (√)</i>	19%*	27%*	1%	6%	-5%
<i>Promiscuity (√)</i>	16%*	20%*	8%	10%	-3%
<i>Loss of confidence (√)</i>	16%*	11%	-4%	1%	-5%
<i>Alcohol addiction (√)</i>	20%*	30%*	8%	17%	-10%
<i>Tendency to want to fight (√)</i>	11%*	12%*	4%	16%*	-12%
[mean] total score out of 5	1.0*	1.2*	0.2	0.6*	-0.4
Listing of the physical changes that females/males go through [mean count of correct answers]					
Changes for females	2.2*	2.8*	0.7*	1.4*	-0.8*
Changes for males	2.1*	3.4*	1.1*	1.5*	-0.4
Labelling part of the female/male reproductive system on a diagram [mean score out of 7]					
Changes for females	0.6*	2.4*	-0.5	0.3	-0.8*
Changes for males	0.4*	0.8*	0.2	0.2	-0.1
Ordering the steps of the menstrual cycle [% correct]					
[%] Responded with full correct order or one mistake	3%	21%*	-4%	4%	-8%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

Girls were asked to rate their agreement with the statement, '***I feel that I have a full understanding of puberty and how my body will change as I grow up.***' For both Treatment groups, the longer-term effect from reading the Bay Kin booklets was found to be positive, but not statistically significant.

The App effect comparing the two Treatment groups was negative, but not statistically significant.

Although the effect was found not to be significant over the evaluation period, girls in Treatment 1 group (App) highlighted booklet 8 during the KIIs as one of the most interesting booklets (10 out of 15 girls interviewed), recalling acquiring knowledge on puberty and body changes, suggesting that the App might have had a higher positive effect than suggested by the quantitative findings.

“From booklet 8, it taught about menstruation cycle, male and female changes, body changes during puberty, reproductive organs which I think I have to know in this age. And also, these are beneficial and useful knowledge and information for the girls in our age” T1 ID 224

“...some contents like menstruation cycle, female and male changes in booklet 8” T1 ID 273

To test whether girls **understand the risks that teenagers face**, the questionnaire asked girls to identify from a list of items which were risks and which were not. Looking at overall scores (out of 5), there were positive and statistically significant immediate effects for both Treatment groups at +1.0 points ($p < 0.05$) for Treatment group 1 (App) and +1.2 points ($p < 0.05$) for Treatment group 2 (No App). The longer-term effects were also found to be positive, although weaker, and only statistically significant for Treatment group 2 (No App) at +0.6 points ($p < 0.05$). The App effect is negative but not statistically significant.

Looking at the individual items, for both Treatment groups, almost all items had a positive and statistically significant immediate effect but a reduced longer-term effect that was not statistically significant. All the items saw a negative App effect, although none were statistically significant. This means that the App had no effect on increasing the girls’ understanding.

Girls’ **ability to list the physical changes that females and males go through during puberty** was found to have a positive and statistically significant immediate and longer-term effect from reading Bay Kin booklets, for both Treatment groups, and for both female and male changes. For **changes to females**, the immediate effect was +2.2 correct answers ($p < 0.05$) for Treatment group 1 (App) and +2.8 ($p < 0.05$) for Treatment group 2 (No App). The longer-term effect, though weaker, was still statistically significant at +0.7 ($p < 0.05$) and +1.4 ($p < 0.05$), respectively. Here, the App effect comparing Treatment group effects was statistically significant although negative at -0.8 ($p < 0.05$), suggesting the finding that the App hindered girls’ learning. Bay Kin’s effect on girls’ ability to list physical **changes for males** follows a similar trend although the App effect was not statistically significant. As mentioned above, girls of Treatment 1 group (App) recall learning about body changes for both males and females with booklet 8 during the KIIs.

The questionnaire also asked girls to **label parts of the female and male reproductive system on a diagram**. For both male and female labelling, the impact of the Bay Kin booklets was positive and statistically significant for the immediate effect. Out of the seven parts to label for each sex, Treatment group 1 (App) was able to correctly label +0.6 ($p < 0.05$) parts for females, and +0.4 ($p < 0.05$) parts for males after reading the Bay Kin booklets. Treatment group 2 (No App) could label an additional +2.4 ($p < 0.05$) and +0.8 ($p < 0.05$), respectively. The longer-term effects were less positive and not statistically significant. The only statistically significant App effect was for change in females at -0.8 ($p < 0.05$) suggesting that the App hindered some of the girls trying to learn about their reproductive systems. The reasons for this were previously stated.

Girls’ **ability to order the steps of the menstrual cycle** after reading the Bay Kin booklets only saw a statistically significant impact for Treatment group 2 (No App)’s with an immediate effect at +21% ($p < 0.05$).

Do girls understand that becoming a mother when young has health risks?

- Reading the Bay Kin booklets and using the Bay Kin App had no effect on increasing understanding of the health risks of becoming a mother when young.

To evaluate understanding that becoming a mother when young has health risks, girls were asked to rate their agreement with various statements. This concept was taught in Booklet 6, in which a girl learns the risks of becoming pregnant at an early age from her mother after having unprotected sex with her boyfriend and missing her period. The results are presented in [Error! Reference source not found.](#)

Table 17: Effect of Bay Kin on girls’ understanding the health risks of becoming a mother when young

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							

<i>Becoming a mother when young has health risks (+)</i>	4.4	4.5	4.5	4.7	4.6	0.2	0.0
<i>Girls should avoid becoming pregnant at an early age (+)</i>	4.8	4.8	4.9	5.0	4.9	0.1	0.0

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

For the two statements (*'becoming a mother when young has health risks'* and *'girls should avoid becoming pregnant at an early age'*), it was found that there was little or no immediate or longer term impact from reading Bay Kin booklets, with none of the effects being statistically significant. This is most likely due to ceiling effects, as girls had a high level of understanding at baseline with a mean agreement rating of 4.5 for the former statement and 4.9 for the latter. This makes it difficult for the effects to be large and statistically significant, as there is less room for improvement.

Do girls understand they can speak to their parents if they have any concern during puberty or about pregnancy?

- It was found that reading the Bay Kin booklets had a significant immediate effect on girls' understanding that they should speak to their parents during puberty if they have any concerns or questions.

Girls were asked questions to test their understanding that they can speak with their parents if they have any concerns during puberty or about pregnancy. This concept is illustrated in Booklet 6 in which a girl, who thinks she is pregnant, receives good advice from her mother; and in Booklet 5, where a boy learned to talk to his parents about issues related to puberty and growing up. The results are presented in ..

Table 18: Effect of Bay Kin on girls' understanding that they can speak to their parents if they have any concern during puberty or about pregnancy

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>You should speak to your parents during puberty if you have any concerns or questions (+)</i>	4.7	4.7	4.6	4.8	4.7	0.2*	0.2
'If a friend of yours is worried that she might be pregnant...' [% correct]							
<i>Tell them to talk to their parents or an adult they trust (✓)</i>	55%	62%	67%	59%	69%	-7%	-5%

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

It was found that Bay Kin booklets had a positive and statistically immediate effect on **girls agreeing that they can speak to their parents about puberty**, despite already having a strong understanding at baseline. The mean agreement level increased from 4.6 at baseline to 4.8 post-exposure, representing an immediate effect of +0.2 ($p < 0.05$). The longer-term effect is similar in magnitude but is not statistically significant.

The lack of longer-term effect is also supported by the qualitative findings. Booklet 5 was not mentioned by any of the Treatment groups as being one of the most interesting booklets, either suggesting that girls didn't find the topics interesting or they still perceive the topics as a taboo and that reading Bay Kin booklet did not change that.

In addition, five girls from both Treatment groups mentioned that when they came home and wanted to discuss the content of these booklets, some parents were not interested or were unhappy as they found the subjects uncomfortable, which reinforces the interpretation that there is a taboo around those subjects.

"I showed this to my parent and elder brothers. My parent and elder brother didn't like me to read and learn the knowledge from these booklets because they thought the contents and topics are uncomfortable and embarrassed to be discussed in the public." T2 ID 147

"If possible, booklet 1, 2 and 8 should be most priority for girls nowadays because these contents are not openly discussed among youths, adults and elders. So, if it's promoted through these booklets and even adults and elders are reading this, it's good that they would have learned some knowledge and information from this." T1 ID 235

Learning to talk to parents about pregnancy is the central plotline to Booklet 6, but this did not have a statistically significant effect on **the girls encouraging their friend who might be pregnant to talk to their parents or an adult they trust.**

Do girls understand that contraceptive pills/condoms can be used to avoid pregnancy?

- It was found that reading the Bay Kin booklets, had a significant immediate effect on girls’ understanding that condoms can protect a girl from becoming pregnant and their ability to correctly identify that condoms can stop a girl getting pregnant.
- Reading the Bay Kin booklets had a significant immediate and longer-term effect on girls’ knowledge that condoms were the best way to prevent pregnancy and sexually transmitted diseases during sexual intercourse.
- The DID analysis found no evidence that the Bay Kin App provided additional learning on what is the best way to prevent pregnancy and sexually transmitted diseases during sexual intercourse.

Girls were asked a series of questions to determine whether they understood that contraceptive pills and condoms can be used to avoid pregnancy. This concept is taught in Booklet 6, in which a girl has unprotected sex and misses her period, learning later from her mother to use condoms to avoid pregnancy and STIs. The results are presented in Error! Reference source not found. and Error! Reference source not found..

Table 19: Effect of Bay Kin on girls understanding that contraceptive pills/condoms can be taken to avoid pregnancy

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>Condoms can protect a girl from becoming pregnant (+)</i>	3.5	3.4	3.0	4.1	4.0	1.1*	1.1*
True or false statements about condoms [% correct]							
<i>Condoms can stop a girl getting pregnant (√)</i>	37%	46%	35%	59%	56%	25%*	13%
<i>Condoms are not effective for avoiding pregnancy (X)</i>	93%	91%	90%	92%	91%	2%	2%
'What is the best way to prevent pregnancy and sexually transmitted diseases during sexual intercourse?' (open ended) [% correct]							
[%] Mentioned 'condoms'	30%	59%	15%	62%	76%	47%*	33%*

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

When asked if they agreed that **'condoms can protect a girl from becoming pregnant,'** the immediate effect of reading Bay Kin booklets was a positive and statistically significant increase of +1.1 (p<0.05), from a mean agreement score of 3.0 at baseline to 4.1 post-exposure. Notably, the longer-term effect is the same at +1.1 (p<0.05) and also statistically significant.

When asked in a true or false statement whether **'condoms can stop a girl getting pregnant,'** the immediate effect from reading Bay Kin booklets was also positive and statistically significant with a +25% (p<0.05) increase in the proportion of girls answering correctly. The longer-term effect was positive but not statistically significant.

Girls were asked in an open-ended question: **'what is the best way to prevent pregnancy and sexually transmitted diseases during sexual intercourse.'** A small proportion of girls were able to write the correct answer of 'using condoms' at baseline, at 15%. This increases to 62% after reading the Bay Kin booklets, representing a positive and statistically significant immediate effect of +47% (p<0.05). The effect was also sustained with a longer-term effect of +33% (p<0.05), also statistically significant.

Table 20: Effect of Bay Kin on girls understanding that contraceptive pills/condoms can be taken to avoid pregnancy (Booklet 8 questions)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
'Write down the methods that can be used to avoid unwanted pregnancy?' (open ended) [% correct]					
[%] Mentioned any correct answer	9%*	-1%	7%	0%	8%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

When asked to **write down methods that can be used to avoid unwanted pregnancy** (taught in Booklet 8), the Bay Kin booklets only led to a positive and statistically significant immediate effect for Treatment group 1 (App) at +9% (p<0.05). Treatment group 1 (App)'s longer term effect while positive was not statistically significant. The immediate and longer-term effect for Treatment group 2 (No App) was minimal and not statistically significant. The app effect comparing the two Treatment groups was positive but not statistically significant.

Although the longer term effect was not statistically significant for Treatment group 1 (App), during the KIIs, 10 out of 15 girls from Treatment group 1 (App) mentioned they learned a lot from booklet 6 and booklet 8, with five of these specifically mentioning how to avoid unwanted pregnancy, suggesting that the retention might be more significant than suggested by the quantitative findings.

“Booklet 6 and 8 because the information and knowledge in booklet 6 are very relevant to the girls in my age as that kind of stories is happening in our environment so I know how to avoid if boyfriend persuades, how to protect not to get pregnant, the ways for unwanted pregnancy, how to live ... if contracted with HIV/AIDS” T1 ID 238

“From booklet 8, I have learned many different topics which I haven’t known before.” T1 ID 229

Do girls understand the symptoms of pregnancy?

- Reading the Bay Kin booklets had a significant immediate effect on girls’ knowledge of symptoms associated with being pregnant, it was found.
- The DID analysis found no evidence that the Bay Kin App provided additional learning in this area, beyond that provided by the booklets.

To test whether girls understand the symptoms of pregnancy (taught in Booklet 8), they were asked to write down the symptoms they knew. The results are outlined in [Error! Reference source not found.](#)

Table 21: Effect of Bay Kin on girls’ understanding the symptoms of pregnancy (Booklet 8 questions)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
'Write down the symptoms that are associated with being pregnant' (open ended) [% correct]					
[%] Mentioned any correct answer	5%	9%*	1%	6%	-5%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

The Bay Kin booklets only had a positive and statistically significant immediate effect on girls **understanding of the symptoms of pregnancy** for Treatment group 2 (No App) at +9% (p<0.05). Treatment group 2 (No App)'s longer term effect is weaker and not statistically significant.

Do girls understand that pregnancy shouldn’t be kept secret and what can be done if unwanted?

- It was found that reading the Bay Kin booklets had both a significant immediate and longer term effect on girls understanding that they should advise a friend to take a pregnancy test, if they are worried the friend is pregnant or advise them to take emergency contraception between three and five days after sexual intercourse, if the friend does not want to be pregnant.

Girls were asked whether they understood that pregnancy should not be kept secret (taught in Booklet 6) and what to do if they have an unwanted pregnancy (taught in Booklet 7). Booklet 7 tells the story of a girl who recommended emergency contraceptive pills to her friend who had unprotected sex and is worried about being pregnant. The results are presented in [Error! Reference source not found.](#).

Table 22: Effect of Bay Kin on girls’ understanding that pregnancy shouldn’t be kept secret and what can be done if unwanted

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
'If a friend of yours is worried that she might be pregnant, tell them' [% correct]							
To talk to their parents or an adult they trust (√)	55%	62%	67%	59%	69%	-7%	-5%
To take a pregnancy test (√)	55%	52%	47%	67%	65%	19%*	21%*
[mean] total correct scores out of 2	1.1	1.1	1.3	1.5	1.5	0.1*	0.2*
'If a girl is worried that she might be pregnant after having sexual intercourse and doesn't want to be, what can you advise her to do between three and five days after having sexual intercourse?' (open ended) [% correct]							
[%] Mentioned emergency contraceptive pills	7%	13%	2%	73%	49%	71%*	40%*

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

Girls were asked to select responses for what they would do **‘if a friend is worried that she might be pregnant.’** Bay Kin booklets made girls more aware that they should tell their friend to take a pregnancy test, with an immediate effect of +19% (p<0.05) and a higher longer-term effect of +21% (p<0.05), both found statistically significant.

Few girls were familiar with the emergency contraceptive pills at baseline, and therefore it was found that the Bay Kin booklets greatly increased their **understanding of what to do within a few days after sexual intercourse if they are worried they might be pregnant.** At baseline, only 2% of girls mentioned unprompted the option of taking emergency contraceptive pills. After reading the booklets, this jumped to 73%, resulting in an immediate effect of +71% (p<0.05). The longer-term effect was weaker, but still statistically significant at +40% (p<0.05). This means that around half of girls who learn what emergency contraceptive is after reading about them will not retain this information. Indeed, during KIIs, half of Treatment 1 Group who mentioned booklet 6 as the most interesting booklet recall learning how to avoid unwanted pregnancy.

“For me, booklet 6 because that kind of scenario is happened a lot in our environment nowadays. Girls have boyfriends and they are staying together but they don't have knowledge about how to protect not to get pregnant and the way for unwanted pregnancy. So, it's very much related to our real life so I have read as I can prepare”
T1 ID 223

4.1.3 HIV and STIs

The section explores findings on whether the Bay Kin booklets improved girls’ understanding of STIs and HIV. It examines whether girls understand ways STIs can be contracted and transmitted, that condoms can provide protection from HIV and STIs and that there is medication for the HIV virus to prevent those infected from feeling unwell.

Do girls understand that condoms provide protection from HIV and STIs?

- Reading the Bay Kin booklets had a significant immediate and longer-term effect on girls’ understanding that condoms can protect from sexually transmitted infections and that condoms were the best way to prevent STIs and pregnancy.
- Reading the Bay Kin booklets had a significant immediate and longer-term effect on girls’ understanding that having unprotected sexual intercourse can be a mode of HIV transmission.

Girls were asked a number of questions to test their understanding of condoms providing protection from HIV and STIs. These concepts were taught in Booklet 6 and 7. The results are presented in [Error! Reference source not found.](#).

Table 23: Effect of Bay Kin on girls' understanding that condoms provide protection from HIV and STIs

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with statements [mean rating between 1-5]							
<i>Condoms can protect a girl from sexually transmitted infections (+)</i>	3.3	3.1	3.1	4.0	3.9	0.9*	1.0*
True or false statements about condoms [% correct]							
<i>Condoms can protect against sexually transmitted infections (√)</i>	33%	41%	34%	41%	64%	7%	21%*
<i>Condoms do not stop infections being transmitted (X)</i>	79%	80%	76%	84%	91%	8%	14%*
'What is the best way to prevent pregnancy and sexually transmitted diseases during sexual intercourse?' (open ended) [% correct]							
[%] Mentioned 'condoms'	30%	59%	15%	62%	76%	47%*	33%*

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

When asked if they agreed that '**condoms can protect a girl from sexually transmitted infections,**' after reading the Bay Kin booklets, resulted in girls having an increased agreement with this fact. At baseline, the mean agreement rating was 3.1 and this rose to 4.0, resulting in a statistically significant immediate effect of +0.9 (p<0.05). Encouragingly, the longer-term effect was even higher at +1.0 (p<0.05).

When this concept was framed as a true or false question, the immediate effect was positive, although not significant (7%) while the longer-term effect was much stronger and statistically significant at +21% (p<0.05). The false statement that '**condoms do not stop infections being transmitted**' also saw a positive and statistically significant longer-term effect at +14% (p<0.05), despite a less strong and non-statistically significant immediate effect.

When asked '**what is the best way to prevent pregnancy and sexually transmitted diseases during sexual intercourse,**' a small proportion of girls at baseline (15%) were correctly able to mention unprompted 'using condoms'. This increases to 62% after exposure to the booklets, representing a statistically significant increase of +47% (p<0.05). The longer-term effect was also statistically significant at +33% (p<0.05).

Do girls understand how STIs can be contracted and transmitted?

- Reading the Bay Kin booklets resulted in a significant immediate and longer-term effect on girls' knowledge that having unprotected sex was a mode of HIV transmission.
- It was found that Bay Kin App use resulted in a significant longer-term effect on girls' knowledge of at least one way which HIV can be contracted.

Girls were asked a number of questions to test their understanding of how HIV can be contracted and transmitted, which was taught in Booklet 8 with AR for Treatment group 1 (App). The results are presented in [Error! Reference source not found.](#)

Table 24; Effect of Bay Kin on girls' understanding of how STIs can be contracted and transmitted (Booklet 8 questions)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
'Which of the following are ways that the HIV virus can be transmitted' [% correct]					
<i>Receiving an infected blood transfusion (√)</i>	-1%	-3%	3%	-8%	11%

<i>Having unprotected sexual intercourse</i> (✓)	-1%	19%*	-3%	22%*	-25%*
[mean] total correct scores out of 2	0.0	0.2*	0.0	0.1	-0.1
'Write down all the ways that you know that the HIV virus be contracted' (open ended) [% correct]					
[%] Mentioned a correct response	3%	-12%*	40%*	22%*	18%*

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

In a multiple response question, girls were asked to **identify ways that HIV can be transmitted** from a list of five activities. The correct response of 'receiving an infected blood transfusion' saw no statistically significant effect, whereas the other correct response of 'having unprotected sexual intercourse' saw statistically significant immediate (+19%, $p < 0.05$) and longer term (+22%, $p < 0.05$) effects for Treatment group 2 (No App) only. Treatment group 1 (App) however, saw minimal effects, resulting in an app effect of -25% ($p < 0.05$), suggesting that the App may have hindered learning for this question.

Girls were also asked to **write down, without being prompted, ways that HIV can be contracted**. Reading the Bay Kin booklet resulted in a statistically significant longer-term effect of being able to mention a correct mode of transmission for both Treatment groups. Treatment group 1 (App) experienced a higher longer-term effect of +40% ($p < 0.05$) compared to Treatment group 2 (No App) at +22% ($p < 0.05$). This resulted in an app effect of +18% ($p < 0.05$) that is statistically significant.

Do girls understand that HIV can be treated using pills such as anti-retroviral Treatment (ART)?

- Reading the Bay Kin booklets had a significant immediate and longer-term effect on girls' understanding that HIV can be treated using ART pills.

Girls were asked questions to test their understanding that HIV can be treated using pills such as ART. This is taught in Booklet 7 in which the main character learns from her friend, who has the HIV virus, that he is able to live a normal life with the ART pill. The results are presented in [Error! Reference source not found.](#)

Table 25: Effect of Bay Kin on girls understanding that HIV can be treated using pills such as ART

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
If a person has the HIV virus, is there any medication or Treatment that will prevent them becoming unwell? [% correct]							
[%] Answered 'Yes'	61%	59%	51%	89%	82%	38%*	33%*
'What medication or Treatment is there for the HIV virus' (open ended) [% correct]							
[%] Mentioned anti-retroviral (ART) pills	0%	0%	0%	39%	17%	39%*	17%*

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

Around half of girls were **aware that there is medication available that will prevent a person with the HIV virus from becoming unwell**, with close to no girls able to name the ART pill. The immediate effect of reading the booklets was a +38% ($p < 0.000$) increase in knowledge of HIV medication, with a similar longer-term effect of +33% ($p < 0.05$), also statistically significant.

In terms of being able to **name the ART pill** in an open-ended question during qualitative data collection, this increased from 0% at baseline to 39% post-exposure, then to 17% at endline (with the comparison remain at 0% between baseline and endline). This represented an immediate effect of +39% ($p < 0.05$) and a longer-term effect of +17% ($p < 0.05$) both statistically significant.

4.1.4 Child Laws, Rights and Equality

This section discusses findings on how the Bay Kin booklets helped girls understand child laws, rights and equality. Specifically, it explores whether girls understand rights relating to education, equality and self-defence, and laws regarding to work and sexual exploitation involving children.

Do girls understand that physical or psychological abuse is a criminal offence?

- Bay Kin booklets had a significant immediate and longer term effect on girls’ understanding that it is against the law for children to be used as soldiers, it is against the law to ask children to carry a weapon and it is against the law to ask children to take part in any military action.
- It was found that there was no evidence that the Bay Kin App provided additional learning in this area, beyond that provided by the booklets.

Booklet 8 aims to teach girls that physical and psychological abuse is a criminal offence. To test their understanding, girls were asked a series of true or false statements. The results are presented in

Table 26: Effect of Bay Kin on girls understanding that physical or psychological abuse is a criminal offence (Booklet 8 questions)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
True or false statements about child law and physical/psychological abuse [% correct]					
<i>It is against the law for children to be used as soldiers (√)</i>	9%*	13%*	3%	11%	-8%
<i>It is against the law to ask children to carry a weapon (√)</i>	-2%	4%*	-7%	-1%	-6%
<i>It is against the law to ask children to take part in any military action (√)</i>	0%	10%*	-5%	7%	-12%*
<i>It is against the law for children to be murdered, or injured for their body parts (√)</i>	6%*	4%	-3%	2%	-5%
<i>It is against the law to sell children (√)</i>	-1%	4%	-7%	-1%	-6%
<i>It is against the law to remove body parts from a child (√)</i>	0%	1%	-4%	-1%	-3%
<i>It is against the law to torment someone, either physically or mentally (√)</i>	0%	1%	-3%	-1%	-2%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

The effect of reading the Bay Kin booklets was found to be minimal for both Treatment groups, and this was mainly due to ceiling effects, as a large majority of girls were able to answer questions correctly prior to Bay Kin exposure. For the questions ‘**it is against the law to torment someone either physically or mentally**’ there was no statistically significant immediate or longer-term effect for either Treatment group.

Questions relating to using children as soldiers and in the military saw statistically significant effects. For the statement ‘**it is against the law for children to be used as soldiers**,’ there was an immediate effect of +9% ($p < 0.05$) of girls answering correctly for Treatment group 1 (App) and +13% ($p < 0.05$) for Treatment group 2 (No App). The longer-term effects were also positive, but not statistically significant (+3% and +11%, both $p < 0.05$). The App effect is -8% but not statistically significant.

When asked ‘**it is against the law to ask children to carry a weapon**’ and ‘**it is against the law to ask children to take part in any military action**,’ Treatment group 1 (App) saw no statistically significant immediate effect. However, both statements saw a statistically significant effect for Treatment group 2 (No app) at +4% ($p < 0.05$) for the first statement and +10% ($p < 0.05$) for the second. The longer-term effects were not statistically significant. However, for the second statement, the App effect comparing the two Treatment groups was -12% suggesting that the app feature hindered learning for this topic.

Do girls understand the child law in terms of educational rights, work, sexual exploitations?

- Bay Kin booklets had a significant immediate effect on girls’ understanding that every child is able to learn in Government schools for free, children under 14 years old are not allowed to work, and it is against the law to ask children to be beggars.
- The DID analysis found no evidence that the Bay Kin App provided additional learning in this area, beyond that provided by the booklets.

Girls were asked a series of true or false questions to evaluate their understanding of their educational rights and child law relating to work and sexual exploitation. These concepts were explored in Booklet 8. The results are presented in [Error! Reference source not found.](#)

Table 27: Effect of Bay Kin on girls’ understanding the child law in terms of educational rights, work and sexual exploitations (Booklet 8 questions)

	Pre/Post Diff (T1-App)	Pre/Post Diff (T2-No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
True or false statements about basic rights for children, including education rights [% correct]					
Every child has the right to say their opinions and beliefs freely (✓)	0%	-1%	-3%	-3%*	0%
Every child has the right to receive medical care without facing discrimination (✓)	5%	5%	3%	-1%	4%
Every child is able to learn in Government schools for free (✓)	0%	4%*	-4%	0%	-3%
Every child from all ethnic groups have the right to learn their language, culture and customs (✓)	1%	1%	1%	0%	1%
True or false statements about child law regarding work [% correct]					
Children are not allowed to work when they may be at risk of physical or mental harm (✓)	2%	3%	-4%	-2%	-2%
Children can work even when it may be dangerous or harmful to their health (X)	2%	3%	0%	1%	-1%
Children under 14 years old are not allowed to work (✓)	24%*	8%	8%	11%	-3%
It is against the law to ask children to be beggars (✓)	3%	6%*	-3%	2%	-5%
True or false statements about child law and sexual exploitation [% correct]					
It is against the law for anyone to be persuaded, bought or offered to work as sex-workers (✓)	0%	2%	-9%	-3%	-6%
It is against the law to sexually abuse a child (✓)	1%	4%	-6%	0%	-6%
Raping a child is punishable by a prison sentence between 10 years and life (✓)	-1%	0%	-1%	0%	-1%
It is against the law to take sexual pictures of children (✓)	-1%	1%	-11%*	-9%*	-3%
It is against the law to sell sexual pictures of children (✓)	-1%	4%	-9%*	-2%	-8%*
It is against the law to offer anyone sexual pictures of children (✓)	1%	2%	-9%*	-8%*	-2%
It is against the law to encourage children under the age of 18 to get married (✓)	5%	8%*	-5%	3%	-9%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

Overall, regarding statements about basic rights for child, both Treatment groups experienced little statistically significant effects from girls reading the Bay Kin booklets. The exceptions include one statement asking whether **‘every child is able to learn in Government schools for free’** (a true statement). This experienced a statistically significant immediate effect of +4% (p<0.05) more correct answers for Treatment group 2 (No app). However, the longer-term effect was not statistically significant, nor were the estimates for Treatment 1 (App) and the estimate for the app effect.

When asked about children having **‘the right to say their opinions and beliefs freely’** (a true statement), the longer-term effect for Treatment group 2 (No App) saw a negative and statistically significant effect of -3% (p<0.05). However, this is from the Treatment group estimate decreasing from 100% at baseline to 99% at endline, and the Comparison group increasing from 99% at baseline to 100% at endline.

Looking at the true or false statements regarding children laws and work, two experienced positive and statistically significant effects. For the statement **‘children under 14 years old are not allowed to work’** (a true statement), Treatment group 1 (App) saw a statistically significant immediate effect of +24% (p<0.05). For the statement **‘it is against the law to ask children to be beggars’** (a true statement), Treatment group 2 (No app) saw a statistically significant immediate effect of +6% (p<0.05). None of the statements saw any statistically significant app effect.

Statements about sexually abusing child, raping child, persuading children to marry or work as sex-workers saw no statistically significant impact due to girls reading the Bay Kin booklets. This was mostly due to ceiling effects of girls already understanding these concepts prior at baseline.

Conversely, the **statements about taking, selling and offering sexual pictures of children** saw longer-term effects that were negative and statistically significant. Girls’ understanding that it is against the law to take these pictures saw a statistically significant longer-term effect of -11% and -9% (both p<0.05) for Treatment group 1 (App) and Treatment group 2 (No App), respectively. For selling pictures, Treatment group 1 (App) saw a statistically significant longer-term effect of -9%. The offering pictures, the longer-term effect was -9% and -8% (p<0.05). Only one of these three statements experienced a statistically significant app effect at -8% (p<0.05): selling sexual pictures of children. These negative effects were influenced by an increase in knowledge amongst the Comparison group as opposed to decreases in understanding amongst Treatment groups.

For the statement **‘it is against the law to encourage children under the age of 18 to get married,’** Treatment group 2 (No App) experienced a statistically significant immediate effect of +8% (p<0.05). None of the other estimates for this statement were statistically significant.

Do girls understand there shouldn't be any discrimination between boys and girls?

- The DID analysis found no evidence that the Bay Kin booklets or App had an effect on girls’ understanding that there should not be any discrimination between boys and girls.

Booklet 1 aimed to teach girls that there should not be any discrimination between boys and girls. To test for impact, girls were asked to rate their agreement with various statements on this topic and were asked a number of true or false question. The results are presented in Error! Reference source not found..

Table 28: Effect of Bay Kin on girls’ understanding there should not be any discrimination between boys and girls

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>Girls and boys should be treated equally (+)</i>	4.3	4.4	4.2	4.4	4.4	0.1	0.1
<i>When they are old enough, girls should have the same chance to work outside the home as boys (+)</i>	3.9	4.0	3.8	3.8	3.8	0.0	-0.1
<i>Girls should help with household chores like cleaning, preparing meals and bathing younger siblings, more than boys (-)</i>	4.4	4.2	4.3	4.2	4.3	-0.1	0.2

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2-No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
<i>Boys should not have to do as many household chores as girls (-)</i>	2.8	2.8	3.0	3.0	3.1	0.0	0.0
<i>In daily life, there are some things that are okay for a boy to do that are not okay for a girl to do (-)</i>	3.9	3.6	3.8	3.7	3.7	-0.1	0.1
<i>Any task a boy can do a girl can do just as well (+)</i>	3.9	3.9	3.8	3.7	3.7	0.0	-0.1
<i>Girls are more likely to forget things than boys are (-)</i>	3.2	3.5	3.1	2.9	3.1	-0.2	-0.3
True or false statements [% correct]							
<i>Girls and boys have equal rights to be educated (✓)</i>	98%	100%	99%	100%	99%	1%	-1%

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

All statements which girls were asked to rate their agreement on saw no statistically significant effect due to girls reading the Bay Kin booklets. The one true or false statement ('girls and boys have equal rights to be educated,' a true statement) also did not see any statistically significant effect from girls reading the booklets.

In addition, during KIIs, 10 (out of 15 girls) from Treatment 1 group (App) mentioned booklet 1 as the most interesting booklet, but the girls mostly remembered learning about not trusting strangers. This is an indication that booklet 1 content might need to be adjusted to better convey the message around discrimination.

4.2. Did SPRING target girls show improved perceptions of their safety and wellbeing? (E2.2.)

This evaluation question reviews whether 360ed's Bay Kin booklets and App have improved girls' perception on their safety and wellbeing.

4.2.1. Self-defence Safety and Wellbeing

This section looks at how the Bay Kin booklets improved girls' perception of their safety and wellbeing. Specifically, it discusses whether girls feel more confident using self-defence techniques, know to inform an adult if a teacher acts inappropriately, and have improved perception on how to be safer and knowledge that it is their right to protect themselves from abuse.

Do girls feel confident to use self-defence techniques? Does knowledge of self-defence techniques make girls feel safer?

- The DID analysis found no evidence that the Bay Kin booklets had an effect on girls' knowledge about self-defence and being confident to use it.

Booklets 3 and 4 included a focus on raising girls' interest in and understanding of self-defence techniques. Girls were asked to rate their level of agreement or disagreement with two statements regarding their knowledge and confidence in using self-defence techniques. The results are presented in Error! Reference source not found..

Table 29: Effect of Bay Kin on girls' confidence to use self-defence techniques

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est

Agreement with various statements [mean score between 1-5]							
<i>I know a lot about self-defence techniques (+)</i>	3.9	4.1	3.9		4.2		0.2
<i>I am confident that I know how to use self-defence techniques if I need to (+)</i>	3.9	4.0	4.0		4.3		0.2

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

For the statement ‘*I know a lot about self-defence techniques*’ and ‘*I am confident that I know how to use self-defence techniques if I need to,*’ there was no statistically significant effect on mean agreement score due to the Bay Kin booklets.

Do girls know they should tell their parent or a trusted adult if a teacher acts inappropriately?

- Bay Kin booklets had a significant immediate and longer-term effect on girls’ understanding that they should not always do what a teacher asks them without question and that they should not sit on a teachers’ lap if asked to.
- The Bay Kin booklets had a significant immediate effect on girls’ understanding that it was not appropriate for a male teacher to give a boy a magazine with pictures of naked foreign girls or show a boy videos with naked foreign girls in them.
- The Bay Kin booklets had a significant immediate and longer-term effect on girls’ ability to correctly identify situations where a teacher was doing something that they should not be doing and their correct knowledge of who to tell about allegations of the sexual abuse of children.
- It was found that the Bay Kin booklets had a significant immediate and longer-term effect on girls’ knowledge of the correct person to tell (parent or trusted adult) about allegations of sexual abuse of underage children.
- The DID analysis of the App effect found no evidence that the Bay Kin App provided additional learning in this area, beyond that provided by the booklets.

Girls were taught about the threats of teachers acting inappropriately in Booklet 5, which tells a story about a boy who starts avoiding class because his teacher was showing him inappropriate magazines. The evaluation asked questions to determine whether girls knew how to recognise and respond to teachers acting inappropriately, and the results are presented in Error! Reference source not found..

Table 30: Effect of Bay Kin on girls knowing they should tell their parent or a trusted adult if a teacher acts inappropriately

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>It is appropriate for a male teacher to give a boy a magazine with pictures of foreign girls in it (-)</i>	1.2	1.1	1.3	1.1	1.1	-0.2*	-0.1
<i>It is appropriate for a male teacher to show a boy videos with naked foreign¹⁴ girls in them (-)</i>	1.2	1.1	1.2	1.0	1.1	-0.1*	-0.1
<i>You should always do what your teacher tells you without questioning them (-)</i>	3.3	3.1	3.3	2.6	2.5	-0.8*	-0.6*
<i>You should sit on your teacher’s lap if they ask you to (-)</i>	1.6	1.7	1.7	1.3	1.3	-0.4*	-0.4*
<i>Family members would think a boy was trying to skip tuition if he told them he was having a problem with a teacher (-)</i>	2.9	3.0	3.1	3.3	3.7	0.2	0.5*

¹⁴ The term ‘foreign;’ was based on Bay Kin content translation provided by 360ed which in turn was used to create the related question that was used by Kantar for data collection.

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
'If your friend is in a situation where they feel a teacher is doing something they shouldn't, what would you tell them to do?' [% correct]							
<i>Keep quiet about it and tell no (X)</i>	98%	100%	99%	99%	100%	0%	-1%
<i>Tell your parent(s) or an adult you trust (√)</i>	52%	66%	57%	82%	89%	25%*	18%*
<i>Tell a friend about the problem (√)</i>	7%	9%	5%	18%	17%	13%*	10%*
<i>Ask the teacher to stop what they are doing (√)</i>	47%	37%	45%	31%	33%	-14%*	-3%
<i>Do whatever the teacher asks (X)</i>	95%	99%	95%	99%	97%	3%	-2%
[mean] total correct scores out of 5	3.0	3.1	3.0	3.3	3.4	0.3*	0.2*
'Who should be told about allegations of sexual abuse of under-age children? (open-ended)' [% correct]							
<i>[%] Provided response: tell parents and the authorities</i>	85%	92%	62%	73%	84%	11%*	15%*

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

There were many statements on which Bay Kin had a statistically significant effect, with some showing longer-term impact. When asked if **'you should always do what your teacher tells you without questions them,'** the mean agreement rating was 3.3 at baseline. The immediate effect of reading the booklets led to an appropriate drop of -0.8 ($p < 0.05$) which was statistically significant. Although slightly weaker, the longer-term impact was also statistically significant at -0.6 ($p < 0.05$).

While the majority of girls appropriately disagreed with the statement that **'you should sit on your teacher's lap if they ask you to'** at baseline, reading the Bay Kin booklets still produced a statistically significant immediate and longer-term effect, both at -0.4 ($p < 0.05$).

For the statements about whether **'it is appropriate for a male teacher to give a boy a magazine with pictures of foreign girls in it'** and whether **'it is appropriate for a male teacher to show a boy videos with naked foreign girls in them,'** both saw a statistically significant and appropriately negative immediate effect, but not a statistically significant longer term effect. The former statement had an immediate effect of -0.2* ($p < 0.05$), and the latter had an immediate effect of -0.1 ($p < 0.05$).

Girls were asked what to do if their **'friend is in a situation where they feel a teacher is doing something they shouldn't'** and were presented with five response options. Reading the Bay Kin booklets had a statistically significant and lasting impact on the total score (out of five) with an immediate effect of +0.3 ($p < 0.05$) and a longer-term effect of +0.2 ($p < 0.05$).

Out of the five response options, only two statements had a statistically significant and positive increase in the percentage of correct answers. Through reading the Bay Kin booklets, girls had developed a stronger understanding that it was safe to talk about these inappropriate situations to a family member or a friend. However, girls were less confident about asking the teacher to stop what they were doing, which saw a statistically significant and negative immediate effect.

Girls were asked in an open-ended question about **'who should be told about allegations of sexual abuse of under-age children.'** The immediate effect of reading Bay Kin booklets was an increase of correct answers of +11% ($p < 0.05$) and the longer-term effect was +15% ($p < 0.05$), both statistically significant.

Do girls have improved' perceptions of how to be safer?

- Bay Kin booklets had a significant immediate effect on girls' understanding that it was important to consider if there were any dangers if a boy is interested in talking to a girl, and that it was not safe for children to go out on their own without telling anyone where they were going.
- The DID analysis of the App effect found no evidence that the Bay Kin App provided additional learning in this area, beyond that provided by the booklets.

Many of the Bay Kin booklets provide lessons on how to be safer, including how girls should act in various situations and what situations can be unsafe for them. Girls were asked a series of question to test their perception of how to be safe. The results are presented in Error! Reference source not found. and Error! Reference source not found..

Table 31: Effect of Bay Kin on girls' perception on how to be safer

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>I am confident that I can recognise situations where I may not be safe (+)</i>	4.2	4.2	4.3		4.4		0.2
<i>I feel confident that I know what to do if someone tries to touch or abuse me physically or mentally (+)</i>	3.9	4.0	4.1		4.5		0.2
<i>I should trust my instincts to tell me when a situation is unsafe (+)</i>	4.4	4.3	4.4	4.6	4.5	0.2	0.2
<i>It is important to consider if there are any dangers when a boy is interested in talk to a girl (+)</i>	4.4	4.4	4.5	4.8	4.7	0.3*	0.2
<i>You should use your intelligence to avoid someone if you think they are trying to take advantage of you (+)</i>	4.6	4.6	4.8	4.9	4.7	0.0	-0.1
<i>Children on their own can be at risk of being kidnapped (+)</i>	4.4	4.4	4.4	4.7	4.3	0.3*	-0.2
<i>It is safe for children to go out on their own without telling anyone where they are going (-)</i>	1.3	1.2	1.3	1.1	1.2	-0.2*	0.0
'Which of these places do you think could be the least safe?' [% correct]							
<i>[%] Provided response: A quiet place with no one nearby</i>	40%	43%	53%	62%	64%	9%	9%

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

Girls were asked to rate their agreement with a number of statements about how to be safe. Overall, girls had a strong understanding of safety at baseline which continued through to endline. Nevertheless, the Bay Kin booklet led to statistically significant impact for three of the statements. When asked to rate their agreement with the statement '**it is important to consider if there are any dangers when a boy is interested in talking to a girl**' the mean agreement rating was 4.5 at baseline. This shifted to 4.8 post-exposure, resulting in an immediate effect of +0.3 ($p < 0.05$). The longer-term effect was also positive but not statistically significant.

For the statement '**children on their own can be at risk of being kidnapped**' the mean score was 4.4 at baseline and increased to 4.7 post-exposure. This resulted in an immediate effect of +0.3 ($p < 0.05$). The longer-term effect was not statistically significant.

When asked to rate their agreement with the statement '**it is safe for children to go out on their own without telling anyone where they are going**' the mean score was appropriately low at 1.3 at baseline. This dropped further to 1.1, resulting in an immediate effect of -0.2 ($p < 0.05$). The longer-term effect was however lower and not statistically significant.

Girls were asked a multiple-choice question asking, '**which of these places do you think could be the least safe?**' The options included 'a park with people walking through it,' 'the street in my neighbourhood,' 'an empty tea shop with only the owner in it,' and the correct answer of 'a quiet place with no one nearby.' The proportion of girls answering correctly saw an increase, although this was not statistically significant.

Table 32: Effect of Bay Kin on girls’ perception on how to be safer (Booklet 8 questions)

	Pre/Post Diff (T1 - App)	Pre/Post Diff (T2 - No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
True or false statements [% correct]					
When you go into new or unfamiliar places it is important to know where the entrance and exit is (√)	0%	0%	3%*	3%*	1%
If you have a phone it is important to check it is fully charged when you go to new places (√)	0%	1%	-1%	1%	-1%
When a boyfriend asks to meet his girlfriend in secret, she should bring a friend along with her (√)	2%	4%*	4%	4%	-1%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

Booklet 8 provided teaching on how to feel safer in potentially unsafe situations. Girls were asked true or false questions to test their understanding. For the statement ‘**when you go into new or unfamiliar places it is important to know where the entrance and exit is**’ the immediate effect for both Treatment groups was 0% and not statistically significant. However, the longer-term effect was +3% ($p < 0.05$) and statistically significant for both Treatment groups. The app effect was +1% but not statistically significant.

For the statement ‘**when a boyfriend asks to meet his girlfriend in secret, she should bring a friend along with her**’, the immediate and longer-term effect for both Treatment groups was positive but not statistically significant, with one exception. The immediate effect for Treatment group 2 (No App) was +4% ($p < 0.05$). The app effect was negative but not statistically significant.

Do girls understand that it is their right to protect themselves from physical or psychological abuse?

- The DID analysis found no evidence that the Bay Kin booklets had an effect on girls’ perception that it is their right to protect themselves from physical or psychological abuse.
- The Bay Kin App had an immediate effect on girls’ perception that children must always be protected from any physical, psychological or sexual abuse.

Booklet 2 addressed the topic of girls’ rights to protect themselves from physical and psychological abuse. Girls were asked questions to evaluate their perception that it is their right to protect themselves from physical or psychological abuse. The results are presented in Error! Reference source not found..

Table 33: Effect of Bay Kin on girls’ perception that it is their right to protect themselves from physical or psychological abuse

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
It is a girl's right to protect herself from physical or psychological abuse (+)	4.7	4.7	4.8		4.8		0.0
I know a lot about what to do if someone tries to touch or abuse me physically or mentally (+)	3.4	3.8	3.7		4.3		0.2

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for $p < 0.05$ and are marked in green for desired effects and red for undesired effects.

For the statement ‘**it is a girl's right to protect herself from physical or psychological abuse**’ and ‘**I know a lot about what to do if someone tries to touch or abuse me physically or mentally,**’ there was no statistically significant effect on mean agreement score due to the Bay Kin booklets as shown in

below.

Table 34: Effect of Bay Kin on girls’ perception that children must always be protected from any psychological or sexual harassment

	Pre/Post Diff (T1 - App)	Pre/Post Diff (T2 - No App)	Pre/End DID (T1 vs C)	Pre/End DID (T2 vs C)	App Effect (T1 vs T2)
	est	est	est	est	est
True or false statements [% correct]					
<i>Children must always be protected from any physical, psychological or sexual harassment (✓)</i>	6%*	0%	0%	-1%	1%

Note: Point estimates (for baseline, post-intervention and endline) are excluded due to limited space but are provided in the annex. Significant levels are indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

Booklet 8 provided teaching aimed to increase girls’ perception that children must always be protected from any physical, psychological or sexual abuse. Girls were asked a true or false question to test their understanding. For the statement ‘**children must always be protected from any physical, psychological or sexual abuse**’ Treatment group 1 (App) saw an immediate statistically significant effect of +6% (p<0.05). However, the longer-term effect reduced to +1% and was not statistically significant.

4.3. Extent to which girls perceive key risk factors to their safety and wellbeing have decreased between baseline and endline (E2.3)

This evaluation question reviews whether 360ed’s Bay Kin booklets and App have improved their ability to understand and identify their risks to their safety and wellbeing and how this has changed between baseline and endline. The topics used to assess this evaluation question were not directly covered by the Bay Kin App. Therefore, assessment of the impact of Bay Kin content focuses on girls’ engagement with the stories in the booklets.

4.3.1. Understanding dangers and risks

This section looks at findings on whether the Bay Kin booklets have decreased how girls perceive key risk factors to their safety and wellbeing by helping girls to improve their awareness of potential dangers and how to avoid or tackle them, and their understanding not to trust strangers.

Do girls understand not to trust strangers?

- Bay Kin booklets had a significant immediate effect on girls’ understanding that it is not safe to trust people you do not know.
- Bay Kin booklets had a significant immediate and longer-term effect on girls’ understanding that you should not always do work if asked to by someone that you don’t know.

In booklets 2 and 3 the story included explaining some of the dangers that girls may face. Girls were asked to rate their level of agreement with various statement relating to how they should act around strangers. The results are shown in [Error! Reference source not found.](#)

Table 35: Effect of Bay Kin on girls’ understanding not to trust strangers

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>It is safe to go with a boy you do not know (–)</i>	1.4	1.4	1.4	1.2	1.2	-0.2	-0.1
<i>It is safe to trust people you do not know (–)</i>	1.4	1.3	1.4	1.2	1.2	-0.2*	-0.1
<i>It is safe to go with or follow strangers if they ask you to (–)</i>	1.3	1.2	1.2	1.1	1.1	-0.1	0.1

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
<i>If someone you do not know asks you to do some work for them, you should always do it (-)</i>	2.1	2.1	1.9	1.4	1.5	-0.4*	-0.4*
<i>Children should not sit on the thighs of men who are strangers (-)</i>	1.0	1.0	0.9	1.0	1.0	0.0	0.0

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

When asked if **‘it is safe to trust people you do not know’** the mean rating was appropriately low at 1.4 at baseline and decreased encouragingly to 1.2 post-exposure, resulting in an immediate effect of -0.2 (p<0.05). The longer-term effect was weaker and not statistically significant.

Although the overall effect was not statistically significant regarding the statement “it is safe to trust people you do not know”, 10 (out of 15) girls from Treatment 1 group (App) and all (7) Treatment 2 group (No App) mentioned learning not to trust strangers from the booklets during the KIs.

“I have read booklet 1, 2 and 3 most interesting because in booklet 1, I have got knowledge about I should not trust strangers and should not go alone to meet with strangers even I like them. In the booklet 3, it’s related to the real life story since many children today are being kidnapped by strangers and I could teach to the children around my environment that they should not follow strangers without letting their parents know and even if strangers persuade them with candies or snacks, they should not follow. In the booklet 2, it’s similar to the scenario that is happening around our environment. This applied to girls also and we should not believe and trust someone who abuse you sexually, mentally and physically” T1 ID 235

“I found booklet 1, 3 and 6 most interesting because booklet 1 gave me the knowledge of not trusting to strangers and I should be confident in speaking to others, and booklet 3 gave me the knowledge that I have to take care of the younger children from being kidnapped by strangers”T2 ID41

For the statement **‘if someone you do not know asks you to do some work for them you should always do it’** the mean rating at baseline was appropriately low at 1.9 and dropped to 1.4 post exposure. This resulted in an immediate effect of -0.4 (p<0.05) which was statistically significant. The mean rating increased slightly to 1.5 at endline, but with the Comparison group seeing no change, the overall longer-term effect was -0.4 (p<0.05) and statistically significant.

Do girls feel more aware of dangers they may face and know how they can avoid or tackle them?

- Bay Kin booklets had a significant immediate and longer-term effect on girls’ ability to identify dangers they may face and their knowledge of how to respond in a situation where they felt unsafe.

Booklet 4 of the Bay Kin series tells a story that encourages girls to be more aware of dangers they may face and helps them learn how to avoid or tackle these situations. Girls were asked a series of questions to test their awareness, and the results are presented in [Error! Reference source not found.](#)

Table 36: Effect of Bay Kin on girls feeling more aware of dangers they may face and know how they can avoid or tackle

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
Agreement with various statements [mean rating between 1-5]							
<i>I am confident that I can recognise situations where I may not be safe (+)</i>	4.2	4.2	4.3		4.4		0.2
<i>I feel confident that I know what to do if someone tries to touch or abuse me physically or mentally (+)</i>	3.9	4.0	4.1		4.5		0.2
'When of the following are signs of danger to be aware of:' [% correct]							

	Comparison		Treatment Group 2 (No app)			Pre/Post Diff (T2 - No App)	Pre/End DID (T2 vs C)
	Base	End	Base	Post	End	est	est
<i>An older boy is looking at your body as you walk down the street (√)</i>	88%	93%	84%	93%	89%	9%*	1%
<i>A shopkeeper asks if they can help you (X)</i>	88%	86%	81%	83%	85%	3%	7%
<i>A friend asks for your help with their homework (X)</i>	96%	97%	96%	99%	96%	3%	-2%
<i>An older boy asking if you can tell them the time (√)</i>	6%	6%	7%	10%	9%	3%	2%
[mean] total correct scores out of 4	3.0	3.1	3.0	3.3	3.4	0.3*	0.2*
'If you are in a situation where you feel in danger from someone...' [% correct]							
<i>Stay where you are (X)</i>	95%	94%	98%	98%	99%	0%	1%
<i>Run away (√)</i>	34%	39%	37%	57%	49%	19%*	7%
<i>Try to kick at least once (√)</i>	12%	12%	13%	31%	31%	18%*	17%*
<i>Become friends with the stranger (X)</i>	97%	99%	97%	99%	99%	2%	-1%
<i>Shout to ask others for help (√)</i>	59%	61%	55%	46%	61%	-9%	5%
<i>Avoid making eye contact (X)</i>	88%	86%	89%	81%	79%	-9%	-8%
[mean] total correct scores out of 6	3.9	3.9	3.9	4.1	4.2	0.2*	0.2

Note: Data for Treatment group 1 is not shown, as the learning points for these questions do not involve use of the Bay Kin app. Statistical significance is indicated by * for p<0.05 and are marked in green for desired effects and red for undesired effects.

When asked to **identify signs of danger from a list**, the mean total score out of four was 3.0 at baseline. This increased to 3.3 post-exposure, resulting in a statistically significant immediate effect of +0.3 (p<0.05). The score increased to 3.4 at endline, with the Comparison group increasing only slightly, leading to a statistically significant longer-term effect of +0.2 (p<0.05). The results were driven by one of the list options ('an older boy is looking at your body as you walk down the street'), which saw a statistically significant immediate effect of +9% (p<0.05) of girls' understanding that this is a sign of danger.

Girls were asked to identify appropriate **responses to being 'in a situation where you feel in danger from someone.'** The mean total score out of 6 was 3.9 at baseline, which increased to 4.1 at post-exposure and 4.2 at endline, with the Comparison group staying at 3.9 for baseline and endline. This resulted in an immediate and longer-term effect of +0.2, although only the immediate effect was statistically significant (p<0.05). Some of the specific responses that saw a statistically significant effect on the proportion of girls answering correctly include 'run away' and 'try to kick at least once'. Both saw a statistically significant immediate effect, while only the latter also had one for its longer-term effect.

4.4. What factors helped or hindered girls from using SPRING products, services, or business opportunities? (E3.1.)

4.4.1. Summary

This evaluation question reviews the external factors that have supported or prevented girls to learn and changed behaviors and perceptions from 360ed's Bay Kin booklets and App.

The findings in this section are informed by the KIIs interviews.

4.4.2. Factors influencing Bay Kin use

What helped or hindered girls continuing to engage with Bay Kin products between baseline and endline?

This section looks at external factors that may have helped or hindered girls from using the Bay Kin booklets and the App.

Five girls from Treatment group 1 (App) and three from Treatment group 2 (No App) that did not continue to use the Bay Kin content were interviewed during KIIs. The main reasons identified for not using Bay Kin products were the same for both Treatment groups. They mentioned that that teachers mistakenly collected the booklets from the students (four out of eight mentioned that), or that their family prevented them from engaging with the content because they found the content inappropriate or did not feel that it was necessary additional learning for their children (three out of eight mentioned that). Only one girl mentioned being busy with other learning and forgot about Bay Kin.

'I didn't have a chance to read any of the booklets again because my classroom teacher asked me to give the booklets to her. She asked and collected the booklets I received from the event. She distributed these to other students in the classroom to study and learn from these one by one. I wanted to ask her but I dared so I didn't get the booklet back until endline.' T1 ID 292

'I haven't read any of the booklets because my mom said that it's just additional learnings or supplementary study for the students, so I don't need to read and learn now.' T1 ID 294

'I haven't read any of the booklets because of my family. My parent and my elder sister stopped me to read and learn the booklets because they think contents and topics are a little bit sensitive for girls and should not taught in that age.' T1 ID 297

'I didn't have a chance to read any of the booklets again because I've been busy with schooling, tuition and studying the subjects in these two months so I forgot to read this.' T2 ID 128

All girls that did continue to engage with the booklets (15 from Treatment group 1 (App) and seven from Treatment 2 group (No App)) shared that they did not need any help from others to engage with the booklets because the stories were clearly written.

'I didn't get any help from anyone for reading or understanding the booklets because it's written in simple words and I understand what the booklets want to teach and say.' T2 ID25

They also mentioned that the booklets were positively perceived by their family members and that they encouraged them to read them more.

*'My family encourage me to read the booklets since it had information and knowledge for the girls in my age to help become confident, not to be afraid and to avoid dangerous things'*T2 ID 29

'My family was reading and they said it's looked interesting and girls like my age should know about these information and knowledge very well. They even encourage me to read and learn from these booklets continuously' T2 ID 72

'My parent encouraged me to read this since it has knowledge, perception and information that I should know very well in that age' T1 ID 222

Did girls download the AR App between baseline and endline and what helped or hindered them doing so?

Although only 26% of Treatment Group 1 (App) girls mentioned to have downloaded the App between the baseline and the post-research activities in the quantitative survey (see Error! Reference source not found. in [Section 3.2](#)), all girls interviewed during the KIIs (15) were able to download and access the App. 10 girls mentioned using the App 1-2 times a week for between 45 min and 60 min, four girls mentioned once a week use of between 30 and 45 minutes, with one girl mentioning using the App only 1 or 2 times a month for 60 minutes.

All girls said that they use a mobile phone to access the App, mostly the ones from their family (only two girls had their own phone). All girls used the instruction letter provided to download the App but they needed support from family members (11 mentions) or friends who participated (4 mentions). They also mentioned accessing the App through their friends or family Facebook account or by setting up their own Facebook account.

'I have my own mobile phone and my parent let me use the internet on my own.' T1 ID 273

'During the event, they showed us the demonstration video but we didn't much time so it's very short. I didn't remember so I got help from cousin sister how to use it.' T1 ID 287

'I showed the instruction letter to my elder brother and he helped me downloading the application and opening it with his Facebook Account. He showed me that I can even download by myself from play store but I need to have Facebook Account.' T1 ID 235

The App was still in development stage and this was reflected during the KIIs, where four girls reported that at times they experienced issues with App's functionality.

'When I use the App, it sometimes has stopped while I was watching female, male changes, menstruation cycle and self-defence techniques. I think it's application error and it's better if it's fixed soon' T1 ID 204'

Also, sometimes the pictures are not appeared correctly so it's a little bit difficult for me using it' T1 ID 224

4.4.3. Bay Kin use benefits

What are the perceived benefits of using the app for girls?

During the KIIs, all girls from Treatment group 1 (App) mentioned enjoying the App and found that the App supplemented the booklet learning. In addition, 10 (out of 15) girls mentioned that the App was a more interesting learning tool than traditional learning booklets.

'I don't like just reading the booklets because there are only limited knowledge and understanding in the comics alone. When I use booklet with App, I like it and it's much better since there are full explanation in the app.' T1 ID 151

'If the booklets are with App, it's more interesting because children today likes using mobile phone or tablets rather than reading the books alone.' T1 ID 235

4.5. Were there any unintended consequences? (E3.2)

4.5.1. Summary

This evaluation question identifies the unintended consequences that occurred as the girl participated to 360ed's. This includes both positive and negative consequences.

4.5.2. Other users of Bay Kin products than beneficiaries

Did any other family members or friends engage with the Bay Kin products between baseline and endline?

This section looks at whether Bay Kin booklets and App have been made available, through girls' participation, to people other than the girls and considers related positive and negative reactions.

All (fifteen) Treatment 1 group (App) girls and four (out of seven) Treatment 2 group (No App) girls reported showing the booklets to their family (parents and siblings). In addition, six girls from Treatment 1 group (App) and six from Treatment 2 group (No App) mentioned sharing the booklet with some of their friends who did not participate to Bay Kin activity.

'I have given to my family especially my parent. They have just read the cover of the booklet' T1 ID 203

'I have given the booklets to my brothers and sisters who are 2-3 years younger than me to read' T1 ID 151

'So, I have lent the booklets to those friends who weren't able to attend the event' T2 ID 27

The booklets received positive feedback from the other users whose parents found the content useful and relevant to young girls.

'I have given to my family especially my parent. They have just read the cover of the booklet and they said it's good to know for the girls in your age' T1 ID12

'I shared this to my friends also and they said they've got different knowledge and learnings which they've never got before.' T1 ID 292

Did anyone else other than the targeted girls use the app?

Similarly, for the booklet, girls from Treatment group 1 (App) have shown the App to their family and to their friends that did not participate in Bay Kin. 10 (out of 15) mentioned to show it to their friends and four mentioned their family.

I showed this to the friends who were not able to attend the event and let them use if they want to use. But some of them asked me how to download and use in their phones so I helped them. They enjoyed using it since there are quizzes, beauty salon and hospitals for not only learning but also having fun.’ T1 ID 244

‘Yes, I showed this to not only my brother but also my dad and mom. I helped them how to use the App from the start (downloading the app) to the usage of app. My brother didn’t know how to use it properly after downloaded and opened the application, so I said that you need headphone and booklet 8 and then open the library and you can use the booklet 8 with app. My parent and brother said that learned from these booklets very carefully since it can open your mind and increase the knowledge’ T1 ID 151

Some of those friends downloaded it and started to use the app on their own and sometimes asked to borrow Booklet 8 while using the App.

‘I showed this to my friends who did not attend the event. For some friends who are interested in the App and they have own mobile phone and FB, I help them downloading and opening the account. For those who have downloaded app, they are using the app and sometimes, they hire the booklet 8 from me to learn about the things from it through library.’ T1 ID 238

4.5.3. Negative unintended consequences regarding Bay Kin products

Were there any negative consequences to the content of Bay Kin products?

There were no negative unintended consequences regarding the participation of girls to Bay Kin. On the other hand, there were some negative reactions from girls’ family and friends reported.

While some parents were a bit concerned or worried at first when shown the booklets, one girl explained the aim and the content better which helped alleviate parents worry.

‘At first, my parent was a little bit worried that I would go wrong ways after I have learned through these booklets. And, I explained for two to three times and showed them the booklets. After they have read, they accepted.’ T1 ID 223

All negative reactions regarding the content of the booklets were observed from parents of the Treatment 1 Group (App) while there was no negative reaction reported in Treatment 2 group (No App).

In total, 6 (out of 15) girls from Treatment 1 group (App) reported negative reactions.

Three reported that the content of the booklets was perceived as inappropriate by their parents, two girls said the family was afraid that girls are or would adopt wrong behaviour after reading the booklets and one girl reported that the family found that the content was not interesting.

‘My parent is a little bit worried when they see the booklets because they said there are some sensitive topics in the booklets like female changes, male changes, reproductive organs, body changes during puberty and what they worried is I’ll be interested in boys after reading this’ T1 ID 204

‘I have given the booklets to my parents and brother. But they showed no interests in it because they are very busy and they don’t have time for me to discuss about this.’ T1 ID 244

5. Conclusions

In this section, we present conclusions from the IE. Overall, the IE found that reading Bay Kin booklets had a range of immediate and longer-term effects on girls’ knowledge and understanding related to different aspects of safety and wellbeing. However, the App did not have the same effect.

The below table summarise the significant findings for each of the evaluation question:

Table 37: Summary findings per evaluation question

#	EQ	Summary findings	Report section
2.1	In what ways did SPRING products, services, and business models intend to improve girls' safety and wellbeing?	The IE found that reading Bay Kin booklets had a range of immediate and longer-term effects on girls' knowledge and understanding related to different aspects of safety and wellbeing. These effects included increasing knowledge and understanding related to body literacy, self-defense, puberty, sexual and reproductive health, HIV protection and child laws and rights. The impact of the Bay Kin App used in conjunction with booklet 8 was limited with a significant positive effect only found for the ability of girls to correctly recall at least one way that HIV can be contracted. As mentioned previously in the report, the App was a prototype still undergoing development during the IE meaning that some of the functionality and image rendering was limited. It was also a new style of learning tool that girls had not encountered before. These were both likely to influence the extent to which the App could be effective for learning at this stage	4.1
2.2	4.2. Did SPRING target girls show improved perceptions of their safety and wellbeing?	The Bay Kin booklets had an impact on improving girls' perceptions of actions that are inappropriate for a teacher and who to tell about allegations of sexual abuse. The booklets also had an impact on girls' ability to identify situations where they may be unsafe. The App had an impact on girls' perception that children must be protected from physical, psychological or sexual abuse. This understanding equipped girls with the ability to identify and respond appropriately to risks and threats and thereby improve their safety and wellbeing.	4.2
2.3	4.3. Extent to which girls perceive key risk factors to their safety and wellbeing have decreased between baseline and endline	Learning content provided through the Bay Kin booklets was effective in increasing girls' understanding of key risk factors to their safety and wellbeing. With this improved knowledge, it is reasonable to believe that girls will have an improved ability to evaluate risks they may face and actions to take to limit harm and promote their wellbeing	4.3
3.1	4.4. What factors helped or hindered girls from using SPRING products, services, or business opportunities?	Factors that hindered girl's ability to continue to engage with Bay Kin content included girls having other study commitments, parental concern and teacher's collecting in the booklets given out after the baseline research. There was an overall sense that the booklets were clearly written, and girls were able to read them independently. Parents were also, mostly encouraging about the girls' learning the topics covered by Bay Kin, with only a few reporting concerns. Parents and family members played an important role encouraging girls to engage with the content and download the App. The availability of a mobile phone and internet access was key for girls being able to download the App. Girls reported that there were challenges with some aspects of the functionality of the App including the time it took for content to load and the way some of the images appeared on the screen.	4.4
3.2	4.5. Were there any unintended consequences?	Unintended consequences of girls engaging with Bay Kin content after taking part in the baseline research activities included their parents, siblings and friends having the opportunity to learn about the topics covered. There were also instances recorded of friends of the girls going on to download the Bay Kin App on to their own phones and borrowing booklet 8 to use with the App. Whilst overall reaction to the Bay Kin content was positive there was concern expressed by parents that learning about some of the topics covered by the content may lead to more risk-taking behaviors amongst girls.	4.5

5.1. To what extent has girls' knowledge and perception around safety has improved as a result of engaging with Bay Kin content

There is clear evidence that Bay Kin booklets improved girls' knowledge and perception of safety.

Treatment girls' retention at understanding how to avoid situations of potential dangers (physical or psychological) and how to respond to a threatening situation was high relative to the Comparison group. There was also evidence of Treatment girls' retention around STIs (mode of transmission, risk, etc.) and how to protect themselves during intercourse and avoid pregnancy. Regarding their right to self-defence, Treatment girls reported high levels of understanding before participation about their right to defend themselves. As such, Bay Kin had limited impact, although showed an immediate positive effect on girls' knowledge.

Despite this knowledge, Treatment girls still did not feel confident regarding their self-defence technique. These self-defence techniques were not taught practically and were therefore untested. While the App had great potential to improve knowledge, as mentioned before, it was still under prototype and might impact girls' knowledge retention in the future. But at the time of the IE, the App had not improved knowledge.

The App did not have full functionality for the interactive components relating to safety and did not show any significant impact in improving the Treatment girls' knowledge regarding these topics. It is likely that this had an impact on the reduction in positive learning outcomes on these topics for Treatment girls using the App compared to those who simply read the booklet. Further, only a quarter of the Treatment girls who had access to the App,

downloaded it, perhaps indicating that the target audience is not quite ready for this level of technological intervention, at this time.

5.2. To what extent has girls' knowledge and perception around well-being improved as a result of engaging with Bay Kin content

There is evidence of Bay Kin's impact to improve girl's well-being although some subjects in this area, remain taboo.

Treatment girls' ability in recognising female health reproductive cycle systems, correctly ordering menstrual signs and recognising signs of pregnancy was high relative to that of the Comparison group. There was also greater ability of Treatment girls to correctly identify how the body physically changes during puberty and their understanding that HIV can be treated using ART pills.

Treatment girls also improved their knowledge on children's rights and law. Bay Kin booklets had a significant effect on girls' understanding that it is against the law: for children to be used as soldiers, to ask children to carry a weapon and to ask children to take part in any military action.

Although there is clear evidence that girls have improved their knowledge around puberty, STIs and how to protect themselves during intercourse, there is mixed evidence that Bay Kin succeeded in addressing taboos on blame and shame. Treatment girls did not show improved likelihood to report issues or questions regarding pregnancy to parents or a trusted adult. However, they reported a greater likelihood to provide the correct advice to their friends and there was improved likelihood for Treatment girls to report sexual abuse allegations to a parent or trusted adult.

Learning content provided through the Bay Kin booklets was effective in increasing girls' understanding of key risk factors to their safety and wellbeing. With this improved knowledge, it is reasonable to believe that girls will have an improved ability to evaluate risks they may face and actions to take to limit harm and promote their wellbeing.

The App did not show any additional impact in improving girls' well-being.

5.3. Factors influencing Bay Kin adoption and unintended consequences

5.3.1. Factors influencing Bay Kin adoption

Girls in both Treatment groups who did not engage with Bay Kin (booklets and App) were interviewed to understand the factors preventing them doing so. The main reasons for non-engagement was that the girls' families prevented this. There were two main reasons for this: either the family felt the content was not appropriate or the family felt it was not necessary for additional learning for their daughters. Only one girl stated that the reason for not engaging was due to her being busy with other learning and as a result she forgot about the Bay Kin booklets.

Two factors emerged as enabling drivers of the booklets; the clarity of the stories to the girls, and the fact that the stories were positively perceived by their family members who then encouraged the girls to read them.

Two enabling drivers regarding the App were the girls' ability to access the internet on mobile phones and the support provided by family and friends to help find and download the App. Additional feedback was that girls found that the App was enjoyable to use. Although, it is worth highlighting that four girls reported that the App was not functioning properly.

Unintended consequences

Girls who did engage with the booklets stated that they showed the booklets and App to their family and friends. The booklets received positive feedback from family. Parents found the content useful and relevant to young girls. Girls stated that their friends were also very interested in engaging with the booklets. Some of the Treatment girls' friends downloaded and started to use the App on their own. It was also found that some of those friends asked to borrow the booklet 8 while using the App.

There was only a small number of girls who reported that their parents had negative views about the booklet contents and as such were not able to engage with the booklets and the App.

6. Business and programme implications

6.1. Business implications

The IE found that the Bay Kin booklets were able to engage girls and improve their knowledge in a number of areas related to body literacy, sexual and reproductive health and safety learning topics. Girls in the Treatment group who only had the booklets reported reading the booklets more often compared with girls in the booklet and App Treatment group. In turn, girls in the booklet Treatment group showed more improvement in their knowledge in several areas compared to girls in the Treatment group with both the booklets and the App. This suggests that the booklets on their own were an effective learning tool, without the use of the App.

The Bay Kin App was found to enhance the learning experience for topics related to girls' safety and their knowledge of self-defence techniques. This aspect of learning was supported by animated characters demonstrating the physical techniques to use for self-defence. This may suggest that behavioural modelling is an aspect of learning that the augmented reality App is well placed to support and is an area for 360ed to consider for focused development to cover a wider range of learning points.

The schools where girls participated in the research were supportive of Bay Kin learning content. Additionally, girls reported instances of teachers taking the booklets to put in the school library to meet wider learning needs within the school. This provides evidence to support 360ed continuing to develop learning products that can support the Life Skills Education component of Myanmar national curriculum delivery.

Parents were mostly supportive of the Bay Kin learning content and siblings and friends were both reported to have engaged with the content demonstrating its potential to attract a wider learning audience. This provides evidence of a wider market for the Bay Kin booklets and App beyond availability through schools. In turn, this organic adoption supports 360ed's strategy of marketing the products more widely and making the booklets available to buy at an affordable price through bookstores. 360ed could also consider developing a parent support pack to accompany the booklets and App. This would provide parents with information about what is being taught and why, and would have the potential to address any concerns that parents may have about the topics covered

The limited functionality of some of the image rendering within the App, due to it being a prototype under development, may have limited the extent to which it was able to deliver learning. Before wider circulation, it is recommended that 360ed further develop its functionality through user testing to assess the Apps' ability to deliver a smooth learning experience for girls.

6.2. Programme implications

The IE has identified that the Bay Kin booklets and App were a viable prototype for girls from middle income households who were able to read and have access to a mobile phone or tablet and the ability to download the App.

The Bay Kin booklets serve as effective stand-alone learning tools and the App component is not essential for learning to take place. The additional action related learning benefits of the App were found only where physical self-defence techniques were modelled using animation. It is also important to consider that any technical glitches such as image rendering experienced by the App user will likely limit their ability to learn from the content.

In addition to providing learning support for girls in the demographic group covered by the study, the body literacy, sexual and reproductive health and safety learning topics covered by the booklets and App were relevant for all girls. This includes girls without access to ICT and girls with lower levels of literacy. Consideration should therefore be given to identifying opportunities to effectively provide learning to girls with lower literacy levels, from poorer backgrounds and without access to technology.

A number of girls who engaged with the App reported seeking support, on downloading the App, from brothers and parents. This resonates with previous evaluation analysis¹⁵ that identified a digital divide between girls and boys in terms of their ICT access and competencies, making boys, as well as parents, potential enablers of girls' ICT engagement.

6.3. Recommendations for the business

Given the findings above we have a number of recommendations for 360ed regarding any future development and rollout of the Bay Kin prototype. Recommendations below are clustered into four areas: overall design, content development, broader reach, and development of the app.

In terms of the **overall intervention design**, to ensure clearly articulated learning points, applicability and to ensure appropriateness of learning content and the smooth and intuitive functionality of App based technology solutions,

¹⁵ •Tetra Tech, (October 2019), SPRING Monitoring and Evaluation, "BPE Thematic Report on reaching girls through technology"

360ed should recruit a research panel of girls for user testing and rapid feedback during content development. This would be fully in line with the HCD principles which SPRING promoted.

Regarding the **refinement of current content in the development of future content**, there is clear evidence that learning booklets 1 to 7 promoted learning independently of booklet 8 and the use of the App. Therefore, 360ed should consider packaging booklets 1 to 7 together as a stand-alone resource possibly for as a library or classroom learning resource, for use by audiences which may not have access to the App.

Booklets 1 to 7 are currently best read in sequence as the story arcs span multiple booklets. Further developing the booklets as independent, stand-alone stories that do not link with each other, but feature the same characters, would enable readers to choose to learn about the topics they are most interested in.

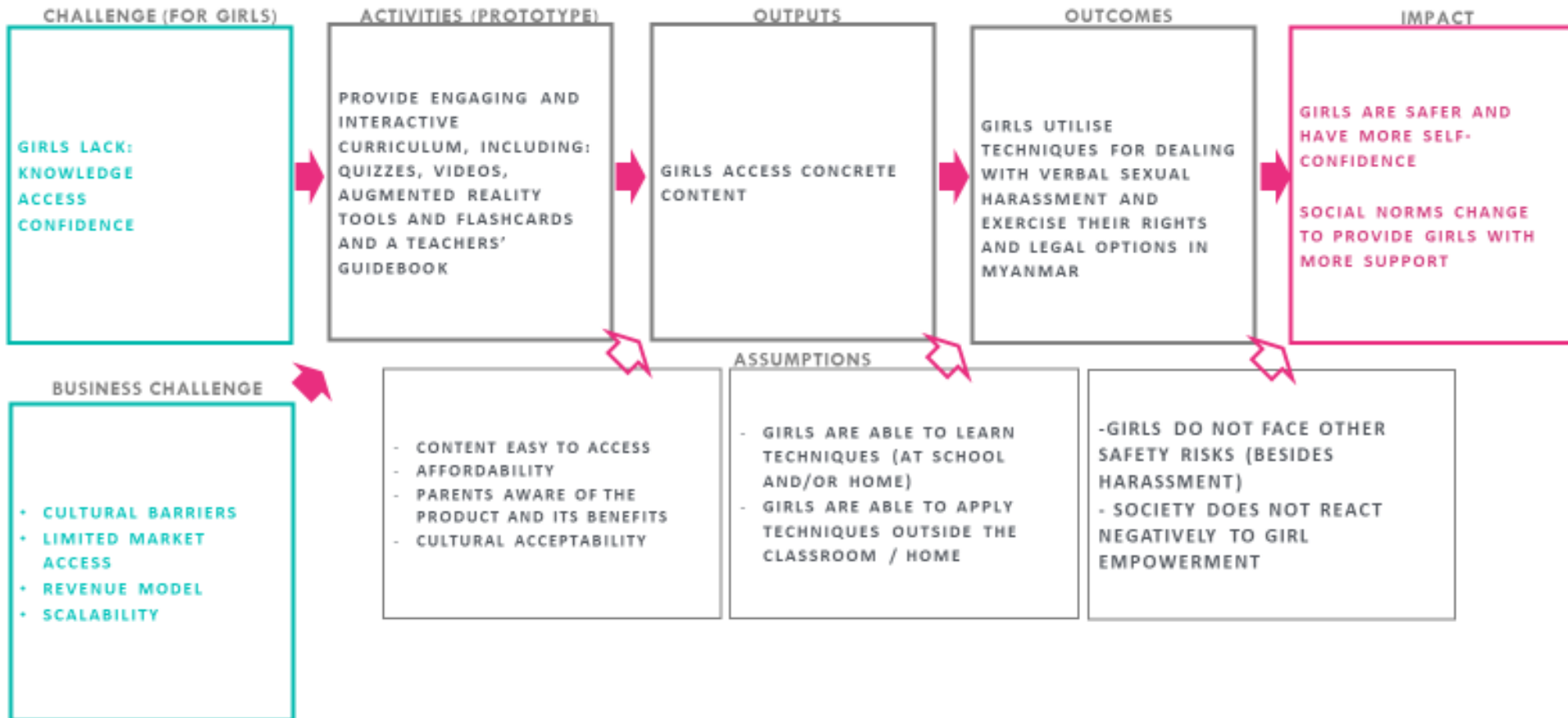
The booklet based learning content is currently passive and does not require the reader to carry out any follow up activities. Fun quizzes or puzzles embedded within the story content would reinforce the learning points that the content is seeking to deliver, and go some way to keeping the reader engaged. It was noted that the App did include a short set of multiple-choice questions based on some of the learning points covered in booklet 8.

Regarding **reaching a broader range of girls**, 360ed should consider producing the booklet and App content in additional indigenous languages and making booklets 1 to 7 available as a resource on their own. This would assist in making content learning available to girls who do not have access to both Facebook and smart phone technology. Further, 360ed should consider developing a parent and a teacher learning support guide to address any concerns about the learning content from either of these two gatekeeper groups and to provide additional learning support and resources, including guidance on installing and using the App.

In further **developing the App 360ed** might consider marketing the App and any AR related booklets, (currently booklet 8), as a stand-alone product. This separate bundle of products would be made available to girls with access to Facebook and a smart phone. Given the Facebook entry portal to the App, 360ed should also consider developing a Facebook community to its registered users, allowing the girls to feel part of a broader community or a larger group of girls who are interested in the same topics. To address low levels of technical literacy and enable girls to download and use the App independently, 360ed should including a step by step pictorial guide for downloading the App and using its AR features, and distributing these with any AR related bundle.

Annex A: 360ed Theory of Change

THEORY OF CHANGE WORKSHEET



SPRING