PILOTING PRIMARY SCHOOL TEACHING RESOURCES FOR INFORMED HEALTH CARE CHOICES IN AN URBAN SCHOOL SETTING IN KIGALI, RWANDA: A QUALITATIVE STUDY

A dissertation submitted in partial fulfilment of the requirements for the degree of

MASTER OF PUBLIC HEALTH

In the College of Medicine and Health Sciences

By

Michael MUGISHA

215040527

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DECLARATION

I, MICHAEL MUGISHA, HEREBY DECLARE THAT THE THESIS HAS BEEN WRITTEN BY ME WITHOUT ANY EXTERNAL UNAUTHORIZED HELP, THAT IT HAS BEEN NEITHER PRESENTED TO ANY INSTITUTION FOR EVALUATION NOR PREVIOUSLY PUBLISHED IN ITS ENTIRETY OR IN PARTS. ANY PARTS, WORDS OR IDEAS, OF THE THESIS, HOWEVER LIMITED, WHICH ARE QUOTED FROM OR BASED ON OTHER SOURCES, HAVE BEEN ACKNOWLEDGED AS SUCH WITHOUT EXCEPTION.

ABSTRACT

Introduction

Nearly everyone must make health care decisions that affect their health during their lifetime. People make health decisions based on claims they are exposed to in their community. Health care decision making starts at a young age. The Informed Health Care project (IHC) developed school resources to teach young children to assess treatment claims. We aimed to pilot teaching resources developed for use in Uganda and evaluate their applicability in Rwanda.

Methods

We used an iterative development approach that is grounded in a user-centered design. We used three qualitative methods: non-participatory observations, user test interviews, and focus group discussions. We used a convenient sampling strategy to select a school and purposive sampling to select children and the teacher. We used thematic analysis in three stages, organized according to the objectives: to explore the user experience of the teacher and children on the use of IHC school resources, to identify barriers and facilitators to implementing the resources in Rwanda, and to identify perceived user suggestions to improve the IHC resources.

Results

We conducted 10 cycles of non-participatory observations with at least two observers for each lesson, 10-test interviews with the teacher and 10 focus group discussions with the children including 3 participants each. The main problematic themes that emerged through the user experience analysis were “understandability” and “identification”. Children and the teacher experienced the use of IHC resources in a positive way with findings related to desirability, usability, and usefulness. The study highlighted several barriers related to use of IHC resources, among others literacy, beliefs, and understanding of content, clarity of the material. Facilitators for using IHC resources were the children’s motivation to learn, attitudes towards IHC resources (such as positive reception of the comic format) and teacher’s self-efficacy. Users suggested clearer presentation of the contents, key terms, and lesson instructions.

Conclusion

Overall the IHC resources appear to be feasible in the Rwanda context. This pilot test has shed light on the usefulness of piloting of health education resources in Rwanda. The study highlighted preliminary factors to consider when planning implementation of such resources in Rwanda.

Key words: informed health care choices, health literacy, children, teacher, and school resources.

RESUME

Introduction

Presque chacun doit prendre des décisions sur les soins de santé qui peuvent avoir des conséquences sur leur propre santé au cours de leur vie. Les gens prennent des décisions sur les soins de santé à la suite des allégations auxquelles ils sont exposés dans leur communauté. La prise de décision sur les soins de santé commence à un jeune âge. Le projet de Soins de Santé Eclairé (IHC) a développé des ressources scolaires pour enseigner aux jeunes enfants à évaluer les dites allégations. Nous avions l'intention de mener une étude pilote afin de tester les ressources pédagogiques développés pour être utilisés en Ouganda et d'évaluer leur applicabilité au Rwanda.

Méthodes

Nous avons évalué les ressources dans le contexte rwandais comme une partie plus vaste de développement itératif et d'une initiative d'évaluation en Afrique orientale. Nous avons utilisé trois méthodes qualitatives: observations non participatives, entretiens avec les utilisateurs, et des groupes de discussion focalisés. Nous avons utilisé une stratégie d'échantillonnage pratique pour sélectionner une école et un échantillonnage raisonné pour sélectionner les enfants et l'enseignant. Les données ont été analysées en trois phases, organisées en fonction des objectifs: identifier les résultats que l'équipe de projet IHC pourrait tirer directement et utiliser au cours de l'élaboration de la prochaine version des ressources, explorer l'expérience de l'enseignant et des enfants sur l'utilisation des ressources scolaires de l'IHC, et d'identifier les obstacles et les facteurs facilitant l'implémentation de ces ressources au Rwanda.

Résultats

Nous avons effectué 10 cycles d'observations non-participatives avec au moins deux observateurs pour chacune, 10 entretiens avec l'enseignant et 10 groupes de discussion avec les enfants dont 3 participants à chaque séance. Les utilisateurs ont suggéré une présentation plus claire du contenu, des termes clés, et des instructions de chaque leçon. Les principaux thèmes problématiques qui ont émergé à travers de l'analyse de l'expérience de l'utilisateur étaient "compréhension" et "identification". Les enfants et l'enseignant ont apprécié les ressources IHC de façon positive en ce qui concerne la désirabilité, l'utilisabilité et l'utilité. L'étude a mis en évidence plusieurs obstacles liés à l'utilisation des ressources IHC, entre autres le langage, les croyances, la compréhension du contenu, et la clarté de la matière. Les facteurs facilitant l' l'utilisation des ressources IHC étaient la motivation des enfants à apprendre, les attitudes envers les ressources IHC (comme la réception positive de la forme comique) et la capacité de l'enseignant.

Conclusion

En général, les ressources IHC semblent être réalisables dans le contexte du Rwanda. Cet essai pilote a mis en lumière l'utilité du pilotage des ressources de communication de l'éducation sanitaire au Rwanda. L'étude a mis en évidence les facteurs préliminaires à considérer lors de la planification de la mise en œuvre de ces ressources au Rwanda.

Mots clés: choix de soins de santé informé, langage sanitaire, enfants, enseignant, et ressources scolaires.

DEDICATION

I dedicate this book to my Almighty God, his Son Jesus Christ and the Holy Spirit. Through God's mercy and love I have been able to accomplish what I could not. God proved supremacy and faithfulness to me through this work.

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I would like to take this time to acknowledge all people who have inspired me, contributed directly or indirectly to this work. I wish to extend my sincere appreciation to all those that were involved in the development and shaping of my career in public health.

My sincere acknowledgement goes to my supervisors in this work; Sarah ROSENBAUM and Dr. Laetitia NYIRAZINYOYE. Your inspiration and guidance in the area of user testing methodology and qualitative research in general was invaluable, and through your encouragement, guidance, and tireless teaching, I learned a lot from you that will shape my career. Thank you Sarah for your endless time of support on Skype. Thank you Dr. Laetitia for your endless encouragement and training in conducting qualitative research.

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I cannot forget to thank and appreciate my friend Christopher Harvey for your kind support in grammar check and financial support to my studies. You have been incredibly supportive in all aspects and you have been a true friend.

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All of the people mentioned in name and in groups above have shown me that there was a reason why God placed you in my path.

May God bless you all!

LIST OF ACRONYMS

HIV:	Human Immune-deficiency Virus
HL:	Health Literacy
IHC:	Informed Healthcare Choices
RNEC:	Rwanda National Ethics Committee
US:	United States

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CHAPTER 1: INTRODUCTION

1.1 DEFINITION OF KEY CONCEPTS

Critical thinking: the objective analysis and evaluation of an issue in order to form a judgment.

A claim: a statement or assertion that something is the case, typically without providing evidence or proof.

Literacy: competence or knowledge in a specified area.

Health literacy: is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.

Informed Choices: is the process of choosing from options based on accurate information and knowledge.

Healthcare: the organized provision of medical care to individuals or a community.

1.2 CONTEXT

This pilot study lies in the scope of health literacy in the school environment. It was conducted in a public school from within the Niboye Sector. It is a 12 years basic education school located in Kicukiro District in Kigali City. The school started as a primary school, which later merged with a secondary school in one place and is commonly termed as "Twelve year basic education".

1.2.1 RWANDA PRIMARY EDUCATION SYSTEM AND LITERACY

The government of Rwanda has prioritized the education sector among major pillars for sustainable development.[1] This has been backed by Rwanda's constitution, which stresses that education is a right for everyone, and primary education (first 9 years) was made compulsory for all Rwandans. Rwanda's vision 2020 is in line with the above statement, as it values education as one of the pillars that would improve the country's economic growth. The Rwandan high-level strategy for development and poverty reduction - known as the "Economic Development for Poverty Reduction Strategy" - has more broadly considered education among other strategies to achieve sustainable economic growth and social development. One of the objectives to realize

this goal is the promotion of positive values, critical thinking, Rwandan culture, peace, unity and reconciliation.

In order to realize education for all as stipulated in global targets, the government of Rwanda has successfully developed and implemented a 9-year basic education system in all districts of the country.[2] This has increased the net enrolment rate of primary education (96.8%) where children are able to study in double shift program, meaning one group in the morning and another in the afternoon.[3] The central government, local leaders and parents have owned this program and have boosted the education level in Rwanda. It is mainly the government and private organizations (such as faith-based organizations) that own schools in Rwanda.[4] In Kigali there are 257 primary and secondary schools, of which 129 schools are privately affiliated and 128 schools are government affiliated. Among 257 schools in Kigali City, 191 schools are primary schools, whereas the rest are post-primary levels (*REB, 2016*).

Education strategies and approaches used in the past years have improved Rwanda's population's literacy for the last 25 years. In the adult population aged 15 and above, literacy has increased from 57.9% in 1990 to 71.1% in 2010. The 2015 target for literacy (82.4%) seems to have been achieved among men (84%) and women (80%) of above 15 years of age in Rwanda. In youth adults aged 15-24, the trends for literacy are not far different from that of adults over the past quarter of a century. In 1990, youth adult literacy was at 74.9% and 77.6% in 2000 for both sexes. In 2015, literacy for 15-24 youth was 88.9% for women and 87.7 for men.[5,6]

Despite these tremendous improvements, the primary education system is still faced with various challenges and problems within the system. This includes higher pupil-classroom ratio (80:1), school dropouts (28.3% in primary five), higher ratios of teacher to pupils (58:1), the recent shift of teaching system from French language to English language and health risks in the school age group and environment.[3]

1.2.2 RWANDA SCHOOL HEALTH POLICY

The Ministry of Education developed a school health policy to overcome health challenges in schools and improve health status among school pupils.[7] Children are expected to develop their potential through full participation in educational activities and acquire knowledge and skills to become productive citizens who will lead their country to wealth and prosperity. It is important to ensure that all children enjoy a healthy, safe and protected childhood especially during school

time.

Promoting health among school children can improve health outcomes for the children themselves, their families, their communities and the nation at large. Working towards this aim, the school health policy engages school staff, teachers, parents and community officials and all participants to improve health in the schools and community at large. The fact that children in schools, homes, and community use Kinyarwanda as the main language of communication in their daily lives, enables them to pass on health information easily among people they encounter within their daily lives. Therefore, the policy strives to "provide skills-based health education with a focus on promoting well-being, preventing health problems, promoting activities appropriate to children's intellectual and emotional abilities and helping children to make healthy choices and adopt healthy behaviors throughout their lives."[8]

1.3 BACKGROUND

Nearly everyone must make health care decisions that affect their health during their lifetime.[9] For example, parents may need to decide whether or not to give their daughter the Human Papilloma Virus vaccine for preventing cervical cancer; men may be asked to consider circumcision to help prevent the spreading of HIV and AIDS; whilst cancer patients may be considering using complementary and alternative medicines in order to improve their health status.

Not all treatments or interventions are beneficial, and most can have both benefits and harms. By 'treatments' we mean any health care intervention or action taken with the purpose of improving health or preventing bad health. In a clinical evidence report from 2013 on 3000 treatments, it was found that only 11% of treatments were beneficial. Half of treatments had no clear evidence, and others (7%) required judgment between benefits and harms. This report showed clearly that some treatments (5%) were unlikely to be beneficial and 3% likely to be ineffective or harmful.[10] Other evaluations of the proportions of common clinical decisions made by health professionals have found that 11 to 80% were evidence-based, depending on the specialty and definition of "evidence-based".[11]

Good decision making requires not only reliable information about the benefits and harms of treatments, but also the skill to understand and apply this knowledge: health literacy. One

definition of health literacy is the ability to read, understand, evaluate and use health information to make appropriate decisions about health and health care.[9]

1.4 PROBLEM STATEMENT

Low health literacy is a problem in many settings. For instance, in the United States more than one third of the population has inadequate health literacy.[12] In low-income settings, health literacy is very low.[13] Lack of health literacy skills can lead to poor health outcomes such as worse health status, hospitalization, lower adherence to medications, lower understanding and use of preventive services, and higher health costs.[12] Resources may be wasted due to the use of ineffective treatments or neglecting to use treatments that are known to be effective.

Low health literacy is not only a problem in adult populations. People start making health behavioral decisions and forming ideas and beliefs related to health already in adolescence.[14] Examples include initiation and use of unhealthy substances (e.g. alcohol and tobacco smoking), or engaging in sexual activity that pose risks to acquire sexual transmitted diseases or unwanted pregnancy. For instance, in the United States 47% of teenagers have sexual intercourse before 18 years and 34% become sexually active.[15] A population-based study done in Rwanda, showed that the age of onset of substance use was 11.4 years where 34% of youth use alcohol and 8.7% use tobacco.[16] Young people need information that can help them make better decisions, and the ability to assess the reliability of that information, so that they can distinguish reliable from unreliable claims.

Adolescents get their information about health, treatments, prevention and health-related consequences of behavioral choices from many different sources. In a study done in Canada to understand what forms health ideas in young adolescents, Valerie found that adolescents get ideas from the people they watch, the conversations they have and their experiences. When adolescents seek health related information they prefer asking parents and particularly mothers, their peers, the Internet, and less frequently doctors and health practitioners.[14] Information from these sources may not always be reliable. The strategy of equipping young people with knowledge and skills might be an effective path to addressing unproven claims about health from multiple sources.

1.5 SIGNIFCANCE OF THE STUDY

Many public health strategies involve trying to communicate reliable messages through mass media campaigns, for instance encouraging young people not to smoke and to abstain from sexual activity in young ages.[17] However, such messages compete with a vast number of other claims about treatments that are not based on reliable information, such as advertising, personal experience of peers or relatives, or traditional customs in the community. An alternative strategy to address this problem is to teach young people to assess and think critically about information concerning treatments and the effects of their decisions. The fact that students value learning science in the context of health and disease, and become more engaged when they see science behind real life experiences.[18]

As a first step towards teaching children and adults how to assess claims about the effects of treatments, the Informed Healthcare Choices (IHC) project developed a list of key concepts used to assess claims and make informed choices. The list includes 32 concepts grouped in 6 categories;[19]

- Recognizing the need for fair comparisons of treatments
- Judging whether a comparison of treatments is a fair comparison
- Understanding the role of chance
- Considering all the relevant fair comparisons
- Understanding the results of fair comparisons of treatments
- Judging whether fair comparisons of treatments are relevant

Many interventions have been developed to teach these concepts to various target groups, such as patients or health professionals.[20] However, a systematic review found that most interventions that have been developed only teach a handful of the concepts necessary to assess evidence about treatments.[19] There is a need for developing and testing teaching and learning tools that enable people to assess claims about the effects of treatments in order to make informed healthcare choices.

Some work has been done to test whether young people can learn these kinds of skills in the school context. In an experimental study done in the US to teach concepts about how to assess health claims, it was found that high school children who participated in an experimental class had increased knowledge and were better able to assess claims.[18] In an informal experiment

carried out in Norway, 11-year old children learned easily and understood key concepts needed to assess claims.[21] This might be attributed to their eagerness and curiosity to learn. Targeting 10-12 year age level might be an appropriate level to teach children how to assess claims. However, we have not found resources for young people developed and evaluated in the context of low-income settings.

The aim of the IHC project is to improve health literacy in low-income countries by developing and evaluating two strategies to improve people's ability to assess and use information about the effects of treatments:

- Teaching and learning resources for primary school children
- Mass media resources (a podcast) for parents of primary school children

The IHC team initially piloted and gathered feedback from Ugandan teachers and students.[22] Subsequent pilot testing and user testing was carried out in Rwanda, Kenya and Norway, as well as in Uganda, to ensure the transferability of the resources across settings. In Rwanda, we piloted and user tested the IHC school resources that were initially developed in Uganda. This research both informed the further development of the resources, which are being evaluated in a randomized trial in Uganda, and addressed the question of whether the resources can work in the Rwandan context. It is in this context we have sought to respond specifically to the following question, aim and objectives of the study.

Research question

Can the IHC primary school resources for assessing claims about the effects of treatments and making informed treatment choices work in the context of Rwanda?

Aim

The aim of this study is to pilot and test the usability of Version 2 of the IHC primary school resources among Primary Five children in the Rwandan context.

Specific objectives

1) To explore the user experience of the IHC primary school resources among children and the teacher of primary five in Rwanda
2) To elaborate on the barriers and facilitators for effective use of the IHC school resources in Rwandan context.
3) To identify from users the findings that can inform the next iteration of these resources in the next development cycle (Version 3).

CHAPTER 2: LITERATURE REVIEW

2.1 HEALTH LITERACY

Health literacy has been defined according to the World Health Organization as the characteristics and social resources needed for people to access, understand and use information to make decisions about health. In addition it can be understood as a way to reduce health disparities and a critical empowerment strategy to increase people's ability to seek information and use it to control their health.[23]

Another aspect of health literacy is to be able to evaluate health information for credibility and quality, interpret test results and analyze relative risks and benefits of issues about health and disease.[18] There is a need to improve health literacy through targeting a healthy population for effective health prevention.[24]

The prevalence of low levels of health literacy is growing in the United States with 36% of adults having limited health literacy.[18] In fact nearly half of the Americans have difficulty in understanding and acting on health information.[12] Similarly, in eight European countries inadequate health literacy is ranging between 29% to 62%, according to a health literacy survey in 2011.[25]

Health literacy is low especially in low-income countries. One study done in Nigeria on health literacy in a rural community concluded that it was unacceptably low.[26] Statistics about health literacy in Rwanda are unknown, but overall literacy may predict health literacy. In the 2014-2015 demographic and health survey conducted in Rwanda it showed that 19.6% of women and 17.3% of men couldn't read at all. Similarly 36.2% of women and 19.5% of men cannot access at least once a week any of the three media mediums (newspapers, television and radio), which are essential tools for health education and promotion. These figures might predict how health literacy among adults in Rwanda could be problematic; the scenario might be even worse for children. There is a need to develop and test strategies for health literacy in the Rwandan population and context.[6]

A number of strategies have been used to improve health literacy in order to achieve optimal health and development. These include initiatives for patients in health facilities and for people in communities. However, these have been targeted only at adults.

There is a need for earlier interventions of health literacy that would improve health outcomes in children and children's families at large.[23] This might be a long term and sustainable approach to improve literacy, especially for literacy related to improving or maintaining good health.

2.2 STRATEGIES TO IMPROVE HEALTH LITERACY

One of the strategies for health literacy empowerment is teaching critical health literacy that develops abilities and skills that respond to the determinants of health in the community.[12] Decision tools can successfully support decision making about treatment options. For instance decision support tools for health treatments or screening have been shown to improve people's knowledge about health decisions compared to health care without this support.[10] Decision tools might help people assess available treatment options and close a gap of taking uninformed decisions or doubting decisions. However, in order to understand and use effectively these supporting tools, people need to understand some basic concepts.

The 32 concepts identified by Austvoll-Dahlgren et al. (see above)[27] might be used to teach people health literacy skills by helping them learn to assess treatment claims about health. One question related to teaching these concepts is determining what the appropriate age group of the target population to learn and use these concepts should be. Some studies pointed out that it is feasible for young people to learn these concepts especially in the school context. In one study from Uganda, primary school teachers confirmed that such concepts are relevant to be taught to children in primary school in low-income settings.[22] In an experimental study done in USA to teach concepts about how to assess health claims, Jacques et.al found that school adolescents who participated in an experimental class had increased their knowledge and were able to apply these concepts to assess claims.[18]

Some studies addressed key issues to consider and address in order to develop successful resources to teach claims to children in schools. For example, a pilot test was conducted by Gordon et.al on school resources to empower students to respond to alcohol advertisements. He highlighted five key feasibility and usability factors associated with use of such resources in a school context. These include the attainment of English, personal development, the program's usability, perceived complexity and achievability of the lesson, the program's engagement and relevance for the students.[17] Addressing these issues results in useful and valuable resources for young ones. Valerie et.al mentioned that adolescent populations prefer resources for attaining

relevant information for health problems they have, and acknowledged the need for didactic resources such as health curriculum that target this audience.[14]

Even if resources that are developed are relevant and important, there is still a need to test them during development for successful use by children. Hibbard et.al cited that even though people may have access to a lot of information, it has nothing to do with actually using it to make informed choices. In order for information to be usable in making informed decisions, it depends on how the information is presented (correct understanding) and targeted (relevant to users).[28] Even when people are willing to make informed choices, resources must be tested to ensure that they fulfill the purpose that they were designed for.[28]

Despite challenges to addressing health literacy, we have seen a number of strategies developed to respond to health issues for adults and children, patients and school children.[1718] We have not seen any resources developed and tested for use by children in primary schools in the context of low-income settings. A development process initiated by the IHC project first identified key concepts needed to teach children to assess treatment claims. Then primary school teachers in Uganda prioritized which concepts would be relevant for children and that could conceivably be taught in Ugandan primary schools.[22] This was the starting point of the design and development of IHC primary school resources.

2.3 USER EXPERIENCE FRAMEWORKS TO ASSESS HEALTH RESOURCES INFORMATION

There are a number of frameworks proposed by the literature that can be used to evaluate the design and development of resources.

Existing frameworks to conceptualize user experience and usability stem from human computer interaction, which measure effectiveness and efficiency of a product and personal satisfaction of a user to the product. [17] In their paper Venkatesh et.al described a theory for acceptance and use of technology, where they used a framework that identified categories of performance expectancy, effort expectancy, social influence and facilitation conditions as influenced by gender, age, experience, and voluntariness of use to determine usability of technologies.[17]

In another paper, Desmet and Hekkert described a framework explaining the product experience that they suggest would be viewed in human-product interaction.[29] This paper explained three different categories of product experience: aesthetic level (product capacity to delight sensory modalities), meaning level (ability to assign personality or other expressive characteristics and to

assess other personal or symbolic significance of the product), and emotional level which involves the experiences that are considered as emotional psychology like anger or laughter.

Another framework by Peter Morvile (honeycomb) has categorized the user experience in seven dimensions used to explore user experiences: findability, accessibility, usability, usefulness, credibility, desirability and value[30].

In her PhD work, Rosenbaum used honeycomb framework for exploring user experience of evidence from fair comparisons and systematic reviews. Two new categories emerged from her work: "Understandability" and "Identification". An adjusted honey comb framework is described below[30].

Figure 1: The adjusted honeycomb model of user experience

Ref: Rosenbaum SE. ***Improving the user experience of evidence. A design approach to evidence-informed health care****. PhD thesis, Oslo College of Architecture and Design. December 2010.*

Rosenbaum defined each facet of the honeycomb-adjusted framework as follows;

Accessibility: Are there physical barriers to actually gaining access, also for people with handicaps?

Findability: Can users locate what they are looking for?

Usefulness: Does this product have practical value for this user?

Usability: How easy and satisfying is this product to use?

Understandability: Does the user recognize what the product is and does she understand the content? (Own subjective experience of understanding)

Credibility: Is it trustworthy?

Desirability: Is it something the user wants or has a positive emotional response to?

Identification: Does the user feel the product is for "someone like me" or is it alienating/foreign-feeling?

For this type of work, we used the adjusted honeycomb framework for the development of interview guides and during the analysis in exploring the user experience of children and teachers in the use of IHC resources. We also used the barriers and facilitator's framework that was developed by the IHC project team. The aim was to adapt a framework to use for analyzing barriers and facilitators of teaching resources. We developed the framework iteratively by reviewing relevant literature, extracting barriers and facilitators, discussing these and modifying the framework. We searched for and reviewed existing frameworks for both educational and healthcare interventions, and studies of barriers and facilitators for educational interventions. We grouped the barriers and facilitators in four domains: teacher factors (e.g. skills and competencies, understanding of the content), pupil factors (e.g. literacy, motivation), teaching resources (e.g. compatibility, appropriateness), and the environment (e.g. school resources, governement policies and regulations). (Annex1; Barriers and facilitators framework)

CHAPTER 3: METHODS

3.1 STUDY DESIGN

We used an iterative development approach that is grounded in a user-centered design. We emphasized an exploration of users' experiences and perspectives; students and teachers.[31]

We used a qualitative mixed method approach. We used three different methods: non-participatory observations[32], user test interviews[33], and focus group discussions.[34]

3.2 INTERVENTION DESCRIPTION – THE SCHOOL RESOURCES

Our interventions were based on using the IHC school resources among primary school children at the pilot school. The school resources include a children's book and teacher's guide developed by a research team to teach children on how to make informed health care choices.

The children's book is organized in ten chapters to teach children concepts about health treatment and effects: claims; bad reasons for believing a claim; comparisons; fair comparisons; the role of chance; and advantages and disadvantages of using a treatment. The book ends with conclusions on how to use the concepts to make informed choices about using a treatment and a glossary. The children's book is organized in format as a comic story, followed by an activity and exercises designed to enhance the concepts learned in the chapter's lessons.

The teacher's guide is organized along similar lines to those in the children's book, but includes extra text about the concepts in each chapter, answers to the exercise questions, as well as detailed instructions on how to teach each lesson and organize the activities.

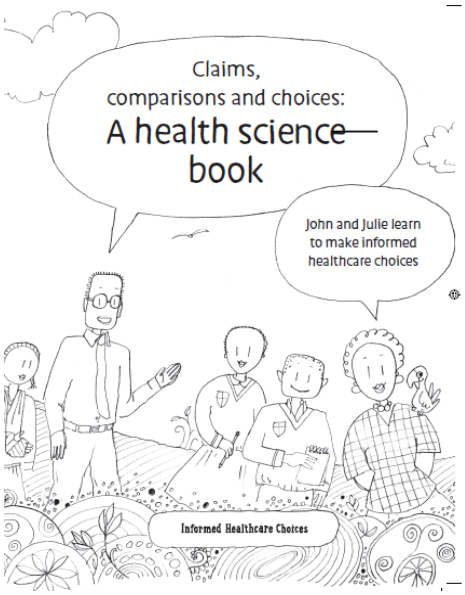
The school resources were based on a sub-set of the 32 key concepts. A teacher's network from Ugandan schools made this revised and prioritized sub-set of concepts based on their judgments that those concepts were relevant to teach in primary schools, and children could understand them.[22] The flow chart below shows how the development process took place up to the version of IHC resources that we are testing.

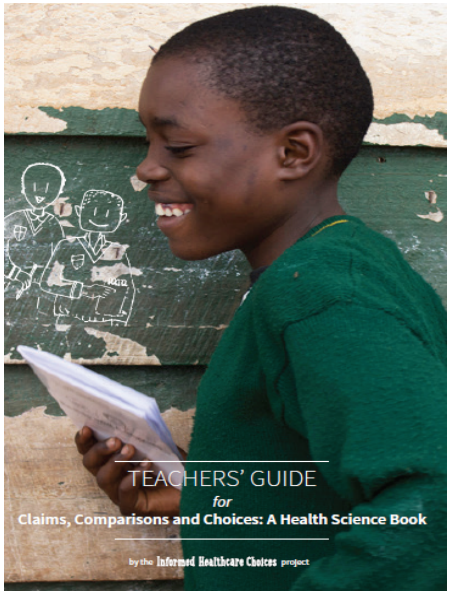
Figure 2: School resources development flow chart

• **2013** • Priotization of concepts • Priortization workshops with teachers network	• **2013-2014** • Idea generation in meetings and workshops • Prototyping workshop with teachers networks • Pilot testing game prototypes with 4 school children in Oslo • Analysis of findings • Idea generation forming the basis for Version 0	• **Spring-summer 2014** • Development of partial prototype (2 chapters) of school resources Version 0 • Pilot testing 2 schools Kampala • User test interview with teachers and students • Analysis of findings • Idea generation forming the basis for Version 1	• **Winter-spring 2015:** • Development of complete prototype of school resources Version 1 • Pilot testing 2 schools in Uganda • User test interviews withteachers and students • Analysis of findings • Idea generation forming the basis for Version 2	• **Summer 2015:** • Development of complete prototype of School resources Version 2 • **Uganda:** • Pilot 2 schools • User test interviews teachers and students • Parents Claim questionaire • **Kenya** • Pilot testing 1 school • User test interviews with teachers and students (& parents) • Claim questionaire • **Rwanda** • Pilot testing 1 school • User test interviews with teachers and students • Claim questionaire • **Norway** • Pilot testing 2classes in 1 school • User test interviews with teachers and students (& parents?) • Claim questionaire	• **Winter 2016:** • Development final set of school resources Version 3

Figure 3: Version 2 of IHC school resources.

(A) Cover of children's book (version 2.0) **(B) Cover of teacher's guide (version 2.0)**





3.3 SAMPLE DESCRIPTION

3.3.1 Target population

The pilot test targeted primary school pupils between 10-12 years (Primary Five class) and their science teacher in an urban school in Rwanda. We targeted children aged 10-12, because school resources were being developed for use by the same age group.

We approached primary schools in the Kicukiro District where the School of Public Health of the College of Medicine and Health Sciences is located. As part of the school's mission to engage in community services, we contacted primary schools in two sectors of Kicukiro District, Niboye and Kanombe Sectors, which surround the premises of our school. Niboye Sector has 4 primary schools and Kanombe Sector has 10 primary schools. Two public schools accepted to give a pre-approval where they allowed to schedule lessons to pilot. One private school denied giving time to pilot school resources, due to too little time to cover normal lessons in the remaining time frame. One school among two that gave approval was contacted to schedule lessons in English. Another one will be scheduled to pilot translated resources at a future date yet to be determined.

3.3.2 Sampling method

We used a convenient sampling strategy to identify a school for piloting school resources. "Convenient sampling strategy" in this study means that participants were in a school that was easy for us to access and that was willing to set off time to participate. In the school, we used purposive sampling strategy to identify a teacher to facilitate ten lessons in the resources. We chose a teacher that taught science to 10-12 year olds.

We used a purposive sampling strategy (participants selected according to pre-selected criteria) to select primary five pupils from the selected school. We approached the teacher to identify a class in primary five streams for teaching the ten lessons. The teacher communicated verbally with all primary five streams and conveniently gathered a group of children who were interested in participating. Inclusion criteria for participating were that the pupil's parents or guardians consented and that the pupil also signed an assent form. Children were excluded from the pilot

test if their parents did not give consent. The 33 children who fulfilled these two criteria formed a class to pilot ten lessons. Initially it was planned to have a class.

After each lesson, we selected three children from the class to participate in a post-lesson focus group discussion, choosing different participants for ten post-lesson focus group discussions. We asked the teacher to help with our selection and mix participants in terms of gender and class performance in order to have heterogeneous groups. We asked the selected children to participate and those who made verbal assent formed the focus group.

3.4 CONSENT

We collected the teacher's consent by giving him a detailed consent form explaining his role in the project and pilot test in particular. The teacher was given time to ask any questions, which we answered. One research team contacted the teacher to explain in detail the teacher's role and hand out the children's book and teacher's guide. They also made all administrative arrangements including schedules for ten chapters.

In order to obtain the children's assent, we contacted a teacher and gave him parent and guardian consent forms. The teacher distributed parent and guardian forms to children that he identified, and asked them to take them home two days before the first lesson pilot. Parents or guardians read a detailed consent form and they were to accept or decline their children to be part of a pilot test. Researchers contacted the children whose parents accepted their participation in the pilot test on the first day of pilot to give assent. Children were given a detailed assent form explaining their role in the pilot test. In addition children were given more verbal explanation and had time to ask questions related to the pilot. Children who accepted to be part of the study signed an assent form in front of their teacher who was a witness.

3.5 DATA COLLECTION

3.5.1 Pilot testing

We carried out a pilot test of the ten lessons in the book. The teacher used the teacher's guide to teach each lesson, and the children followed the lesson using the children's book. Each lesson was scheduled for 45 minutes. Children were given pencils, sharpeners and rubbers to use in case they needed write answers or make notes. All lessons were scheduled for a period of 5 weeks, with two lessons per week. Lesson schedules were allowed to change in favor of prioritizing

normal academic programs. We were in constant communication with the teacher for the entire pilot testing to ensure a smooth execution.

3.5.2 Non-participatory observation

Two or three researchers observed all ten lessons and collected observation data. Researchers observed and recorded how each lesson was conducted using a pilot observation form along with a teachers guide to follow page by page.

The pilot test observation form was designed to note information about each page of the children's book and the teacher's guide as the lesson progressed. Researchers took notes on how the teacher used and understood instructions, what the children and teacher misunderstood (e.g. pictures, examples in the book, activities or exercises). They also noted some words the teacher and children struggled with, what examples and words a teacher and children used other than what is in the book, what the children or teacher seemed to like especially and anything else the researchers thought was important for the books' successful use and positive effect.

After each lesson, researchers noted more general observations, such as how much time the lesson took, how the teacher engaged the children, what seemed to interest children and the teacher, and details such as whom read aloud, number of children in the classroom and number of benches used, and how the black board was used (appendix 3; observation form). After each observation, researchers discussed and entered the findings in an Excel spreadsheet. Some of this information was recorded in order to be able to compare the Rwandan findings with findings from the pilots being conducted in other countries and types of school settings.

3.5.3 User testing with retrospective think-aloud

Children's focus group sessions and teacher's user test interviews (described below) were guided by the principles of user testing, and employed a retrospective think-aloud technique. User testing is a method used in formative evaluation of a product to gather user feedback based on actual use. This result in a deeper understanding of the user experience that can lead to improving the product.[35] In both user test interviews and focus group discussions we used retrospective think aloud technique. The think aloud technique is a way of thinking and doing at the same time, where participants articulate what they are doing, looking at, thinking and feeling about the use of a product.[36] Think aloud techniques can be performed in two ways; concurrent think aloud and retrospective think aloud. Concurrent think aloud is used in original task sessions

or use of the product. Retrospective think aloud technique may work better than concurrent think aloud because the tasks can be done in a natural way without interruptions.[37] In this study we found it impossible to conduct concurrent think aloud sessions without disrupting the lesson. Therefore the retrospective think aloud was also the most pragmatic choice for this type of work.

3.5.4 Focus group discussions with group think-aloud

A total of ten focus group discussions with think-aloud were conducted, with three children in each. We audio recorded the sessions.

In a focus group discussion, children were asked their profile, which included age, gender and stream. Next we guided the group through a retrospective think-aloud session. They were asked to go through the children's book page by page while reading and thinking aloud. During that process, the interviewers asked the children what they thought each part of the book was about, what was difficult to understand, what should be improved, what should there be more of and what should there be less of. Then children were asked more general questions related to user experience, such as usability, usefulness, desirability, understandability, credibility, identification and value. They were asked if they had any suggestions for improving the book or the project in general. At the end an observer was asked if he had any questions or if the interviewer had missed any questions (appendix4. Children's interview form). All focus group discussions lasted for less than one hour.

3.5.5 User test interviews with think-aloud

User test interviews were conducted with the teacher after each lesson delivery. Two researchers conducted the interview, one moderating and another observing and taking notes. We asked the teacher for permission to conduct the interview and to audio record each time.

We used an interview guide structured to collect information on a teacher about the use of resources. The first part was to collect information on the teacher's profile; age, gender, education level, and experience. Then we asked the teacher to go through the teacher's guide page by page while reading and thinking aloud. A researcher took notes based on what he observed in the interview and on what the teacher thought each part of the book was about, what was difficult to understand, what should be improved, what should there be more of and what should there be less of. Then we asked the teacher general questions related to user experience,

including understandability, desirability, identification, usability, usefulness, credibility and value of the resources. We also asked him for any suggestions to improve the book, guide or the project in general. At the end, the interviewer also asked the observer if he had any questions or if the interviewer had missed any questions (appendix 5. teacher's interview guide). All user test interviews lasted not more than one hour.

The interview guides (both for the teacher and children) were based on an adjusted Peter Morville framework (honeycomb) to explore some of the dimensions of user experience.[36] The interview form used adapted seven dimensions including understandability, identification, usability, usefulness, credibility, desirability, and value.

3.6 DATA ANALYSIS

We used thematic analysis for all data from pilot test observations, user test interviews and focus group discussions. We gathered all the findings in one file, and analyzed in three stages according to the objectives of this dissertation. All the three stages of analysis were conducted manually to categorize themes from data.

The first analysis was to explore the user experience of the teacher and children on the use of IHC school resources. These were framed in a more generalized way so that they could also be useful for informing other work outside this project: either future version of this work adapted more specifically for Rwandan context or similar types of educational resources for Rwanda.

We tagged all findings using the same adjusted honeycomb framework that we used to create the interview guides. After initial tagging of findings by researchers individually, two researchers re-tagged together, discussing each finding and arriving at a consensus. This led us to identify themes that described children and teacher's user experience of IHC resources.

We rated all the findings according to the seriousness categories described (Appendix 2).The aim of the rating was to categorize each finding as either a problem (in three different levels of seriousness) that could hinder effective use of resources; as praise of characteristics of the resources that should be kept unchanged; or as a suggestion of desired improvements or changes. This rating was done first by one researcher during initial data analysis, and was reviewed and rated again by two researchers.

The second analysis was to look at the findings in a broader perspective and identify barriers and facilitators to implementing the IHC resources in Rwanda. We analyzed the same set of findings in a more general way beyond the experiences of users with the resources, looking for barriers and facilitators of using IHC school resources in Rwanda.

We used a barrier and facilitator's framework adapted by the IHC project team. In addition to tagging domains and factors, all the findings were rated using an adjusted set of seriousness codes to inform the perceived seriousness of the barriers and facilitators (Appendix 2).

The third analysis was to explore the perceived users' suggestions that would be considered in the development a third version of IHC resources. (Our contribution consisted of findings from Rwanda pilot testing, but these were only part of a larger set of findings from concurrent pilot testing in Uganda, Kenya and Norway). We identified the corresponding solutions for the suggested changes of the IHC resources.

3.7 ETHICAL CONSIDERATIONS

Respect of persons: We asked all participants to sign an informed consent form approving their voluntary participation. If the participant did not give informed consent, he/she was not interviewed. We asked all interviewees for permission to be audio recorded. Interviewees were not recorded if they didn't accept. We asked parents or legal guardians of study participants below age of 21years to sign a consent form (appendix 6). If parents or legal guardians declined to sign the consent form, we excluded the participant from the study. We asked the teacher for consent to participate in the pilot (appendix 7). In addition to parent or guardian consent, we also asked participants below legal consent age in Rwanda to sign an assent form with an eyewitness present (appendix 8).

Vulnerable populations: This pilot test involved children who were considered to be a vulnerable population. All persons involved in data collection activities committed to protect children recruited for this pilot. What we considered to be harmful for children was to recruit them in the pilot class without their willingness. For example the teacher or parents may pass communication to children to be part of the study, and children may take it as a mandatory issue. We explained to the children that taking part in this pilot was by free will and failure to accept to be part of the study would not cause adverse affect to them. Since children's attention span may

be considered to be low, we assured them to quit the pilot test at any time they want without any repercussions.

Confidentiality: The information provided to research team were kept confidential in accordance to the ethical standards agreed upon by the local and international organizations governing the conduct of research involving human participants. Any information resulted from this study did not reveal any participant's identity.

Ethical clearance: We sought ethical clearance to conduct this pilot test from the Rwanda National Ethical Committee (RNEC). (Appendices 9)

CHAPTER 4: RESULTS

4.1 PARTICIPANTS' CHARACTERISTICS

We conducted ten cycles of non-participatory observations with at least two persons for each lesson, 10 test interviews for the teacher and 10 focus group discussions including 3 participants each. Characteristics of participants in observations, interviews and focus group discussions are presented in table 1 below.

Table1. Summary of participants in a pilot test

Characteristics		**Method of data collection**		
		Non participatory observation sessions (n=10)	*Teacher's interviews (n=10)*	*Focus group discussions (n=10)*
Average time (min.)		43	30	35
Gender	Male	Not recorded	1	15
	Female	Not recorded	0	15
Number of participants per session (average)		27.4	1*	3*
Venue	School	10	8	10
	Outside	0	2	0
Participant age-range (years)		09-15	30*	09-13

** This number is exact figure not a range or average*

4.2 USER EXPERIENCE OF CHILDREN AND THE TEACHER ON IHC SCHOOL RESOURCES

During analysis we categorized findings from observations, user test interview and focus group discussion. We identified both positive and negative user experience within six themes according to the adjusted honeycomb framework: usefulness, usability, understandability, credibility, desirability, and identification.

4.2.1 Negative user experience

The main negative findings of user experiences were related to identification and understandability. Home members and the teacher felt that IHC school resources are not for as young children as those in Primary Five classes. Below are the corresponding quotations from users.

"This project is a nice one, the world and people need it. However, it better to apply it on upper school levels especially in developing countries like in senior 4 or senior 5 in ways of debate. It may be easiest for private schools children because they are more advanced; they can feel more familiar to this project. Teaching these concepts using debates in upper levels could be more helpful than applying them to P5 kids." (The teacher)

"My sister told me that it is for university students…" (Child006)

"Some parts of the chapter do not concern our children especially Cochrane and software since children do not know how to use Internet; otherwise most of the information is fitting" (The teacher)

The issue of understandability was related to that of inability to understand lesson goals and understanding contents. Children and the teacher had understandability issues, thinking that lessons were teaching them how to use medicine, not how to assess treatment claims. The teacher was not able to explain some lesson contents to another person.

"We have seen that this book is related to research activities, therefore what will this book help us in research…. I thought that it involves something related to medicine… in a way which tells us that if someone is having a certain disease they will treat him like this and this, and maybe if you have a certain problem they will give you a certain injection or paracetamol. . So that you can be able to buy them without going to the hospital" (Child019)

"I think that the lesson goals apply to my life and children's because it helps us how to use mosquito nets" (The teacher)

"The question is so difficult ….I can tell them the key points to respect when doing research…To explain to a colleague about this chapter, I can tell him that it is about how you can make a research or do a project" (The teacher)

Another theme that showed up, as a negative experience was credibility. Children didn't trust resources because of not understanding the possibility of examples given.

"But for me I don't trust them; how can a juice made of fruits cause stomach pain" (Child019)

4.2.2 Positive user experiences

The main positive user experience findings were those related to desirability, usefulness, and usability. Children were happy with learning things that can be hard for adults.

"I am happy with this lesson because in the university they gave a question and students failed…… during that time John and Julie were able to do it." (Child 025)

The teacher also gained the courage to teach IHC resources, because he said he was also learning from teaching. *"I personally acquired new things with these chapters" (The teacher)*

Similarly the teacher expressed that the IHC resources had practical value for him, in that he was going to use concepts to take decisions at the hospital. Children also reported that home members were eager to learn and use lesson content in the books.

"Like now we used to go to the hospital and they just take your blood and give you medicines without you check and be sure about the treatment, but now we have to be sure" (The teacher)

"They would be happy with it and get curiosity to read the chapter because they also like to learn" (Child008)

Another positive user experience of IHC resources was related to usability theme. Children praised how unclear words were translated. Similarly the teacher praised how lesson chapters showed continuity and took little time to prepare for teaching. Even though understandability was an issue for many participants, we found that children were able to understand some lesson content especially those with good English.

"I like the way difficult words are translated below…" (Child018)

"It is helpful for the teacher because it makes a summary of what is going to happen" (The teacher)

"There is nothing complicated in this chapter, it took me little time to prepare for chapter 1" (The teacher)

4.3 BARRIERS AND FACILITATORS TO IMPLEMENTATION OF IHC RESOURCES.

4.3.1 Barriers related to using IHC resources in Rwanda

In addition to how users experienced the use of IHC resources, we further wanted to explore other factors that might have hindered the effective use of IHC school resources in Rwanda. We explored barriers that might have resulted from the users characteristics, features of the IHC school resources, or the environment.

The main barriers related to children and the teacher (those characterized by high seriousness ratings XXX) were literacy issues, beliefs, and understanding of the content being taught. Children struggled with reading and understanding of the contents even though there were translations of some key words in the native language. Also children believed that the IHC resources were teaching how to use and take medicines, which became a barrier to understanding lesson goals.

"The exercises are familiar but difficult to understand English. Is it possible to translate the questions without putting the answers?" (Child 009)

"The term substitution is difficult for the children to understand, Prattle is unfamiliar word" (The teacher)

"Yes. Because if you want to prevent malaria, you can buy the small machine and use a mosquito net, yes. Because the content is useful, it can help keep a good health" (Child024)

"I could explain to my friend that we learnt how to take medicines well, advantages of taking medications and disadvantages of not following the treatment" (Child 028)

"The chapter is interesting because it teaches us to avoid consequences of not following the treatment" (Child 027)

The teacher was also hindered with understanding of the content to be taught to children, because he was not able to understand lesson goals for some chapters of the book. The teacher also questioned some of the core concepts in the content, such as the presentation of lesson content in form of research questions.

"I think this lesson goals do not apply to him because the claims are totally wrong, I think that the importance of this chapter is to teach them to use a mosquito net" (The teacher)

"To explain to a colleague about this chapter, I can tell him that it is about how you can make a research or do a project" (The teacher)

"I don't think if this one is necessary, research questions because here we are dealing with claims.. I don't know if also knowing how research is…., it is doing their work I think this one is

not necessary" (The teacher)

For IHC school resources, some major barriers were those related to appropriateness of the material, especially the appropriateness of the resources language (English). Other challenging aspects were clarity of the material, as the resources relied heavily on games and activities that were not clear. Some instructions of games and activities were not clear to both children and the teacher.

"This is a nice activity which help to understand the topic but the problem is language,. Even also this one is on high level because our children's understanding in English is so low" (The teacher)

" We are not familiar to this activity, but also some children are afraid and felt shame to express themselves" (Child009)

"The teacher was confused about the team and the groups he had to make in class, also children were not able to listen attentively by hearing what another team was reading without seeing it." (Observation)

"It looks like an office but some items should not be included in the office like bananas, fruits, skeleton… When you realize the components of an office… maybe this looks like a laboratory" (The teacher)

Environmental barriers were those related to time constraints. There was too little time for the lesson, given that the material was new and required time to teach and learn. The other issue was about prioritization of school activities, such as exam preparation for both children and the teacher.

"Forty minutes are not enough, I needed like 3 periods of 45 minutes each" (The teacher)

"I think the exercises should be done with the help of the teacher, having a separate session for that" (The teacher)

"Children were prioritizing to revise during piloting instead of coming in the class" (observation)

4.3.2 Facilitators related to using IHC school resources in Rwanda

Similarly to barriers, we identified facilitators related to the use of IHC school resources in the context of Rwanda. We explored facilitators related to children and the teacher, IHC school resources and the environment.

The main facilitators (characterized by those rated as major facilitators OOO or Facilitators OO) related to children and the teacher were; motivation to learn, attitudes towards IHC resources, and self-efficacy. Children were motivated to learn the concepts in the book and positive to the idea that such resources could reach all children. The teacher also demonstrated confidence in teaching the material that would enhance the children's understanding. Children also expressed that family members showed interest in learning from these resources.

"The teacher skipped page 260, but children were able to remind the teacher and came back on the page" (Observation)

"Children were eager to solve exercise problems and generally eager and active throughout class" (Observation)

"For me the advice I can give is that you may reach to other children and learn the book because it can be helpful" (Child024)

"They would be happy with it and have curiosity to read the chapter because they also like to learn" (Child025)

"There is nothing that I lack to answer any question from children, everything is easy…." (The teacher)

For the IHC school resources, the main facilitators were appropriateness of the material, credibility, and value of resources. The teacher found that a comic story format was a facilitator for IHC school resources to be effective. Children and the teacher perceived the IHC resources as credible due to their content, applicability and source. Another major facilitator was how IHC school resources were valued by the teacher due to their applicability in normal life.

"I like drawings in children's book; I think they will interest children" (The teacher)

"It is helpful for the teacher because it makes a summary of what is going to happen" (The teacher)

"I trust what is in this chapter because people who wrote it could not make a mistake." "I trust what is in this chapter because the one who wrote it wanted our advantages in taking the treatment well." (Child 016)

"Yes I trust it because it is like an application that we use in many ways" (The teacher)

"The chapter is interesting especially for adults, I personally acquired new things with these chapters" (The teacher)

4.4 PERCEIVED USER SUGGESTIONS TO IMPROVE IHC RESOURCES

The main perceived user suggestions to improve the IHC resources during the development of version three were related to clarity of content, using common names, and details about typing, formatting and drawings. We have grouped the findings into seven thematic categories that emerged during the analysis. The findings are described in Table 2 below, and include the respective suggested solutions or changes made by our research team or proposed by the participants.

Table 2: A summary of perceived user's suggestions to improve the IHC resources

Category	Finding	Suggested solutions or changes
Using common names	"Prattle is not clear" The teacher	Change of names for kasuku
	"The names are difficult, better change and use familiar names like Alice" The teacher	Using common names for people
Unclear content	"Instructions for activities not clear" The teacher	Activities need to be explained well
	"The game is not understandable at all" Children	To simplify the game instructions for children and the teacher
	"Should add more homework, notes, improve the drawings of all the eyes and the hair of professor compare" Teacher	Adding homework and exercises
Definition of terms	"Difficult understand that tooth brushing is a treatment. They were wondering why it is put together with bandage and crutches" Observation	Treatment need to be explained more
	"Difficult understand that smoking is a treatment. They said it has bad effects" Observation	
Formatting texts	"Condensed pages for instruction are boring to the teacher" The teacher	Uncondensed page contents by putting short and bullet points
	"The abbreviation of the word "we've" is hard" Children.	Avoiding abbreviations
	"Some sentences are too long to read for the whole class" Observation	Revise sentences and reduce length of the sentence
Typing errors	"Some words are not spelled well" Observation	Spelling of some words
Lesson instructions	"The teacher reviewed the story before reading to make sure that children do understand everything before they read, but the teacher used a very long time about 30 minutes. After he asked the children to read altogether after him." observation	Detailing instructions and allotting time for each activity
Drawings	"This is not looking like an office, this is not usual…..for example like bananas and skeleton."The teacher	Remove some pictures that do not reflect the context
	"The cover is soft, not like other books. It would be good to color the images." Children	Print the book on good papers and put in colors for images.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1 DISCUSSION

Children need user-friendly resources to teach them to assess treatment claims. To our knowledge, testing of resources like these has not been done before in Rwanda. Our results were from pilot testing of IHC resources (version 2) where we analyzed data from ten cycles of non-participatory observations, ten cycles of user test interviews for the teacher, and ten cycles of focus group discussions for children. The aim was to address three objectives: to identify findings that can inform the next development of IHC school resources (version 3), to explore the user experience of IHC school resources among children and the teacher of primary five in Rwanda, and to explore the barriers and facilitators of using IHC school resources in the Rwandan context.

5.1.1 User experience of IHC school resources among children and the teacher

Regarding user experience of the IHC resources, children and the teacher experienced the use of IHC school resources in both positive and negative ways. The adjusted honeycomb framework helped to develop themes that explained user experience. We did not tag two facets of honeycomb framework "accessibility and findability". There are several reasons for this. The honeycomb framework was originally developed for evaluating human computer interactions. Since these resources were on paper, some aspects of these facets, such as findability, did not apply. Additionally, although assessing "accessibility" could be relevant to paper-based resources, user testing interviews would not be the best way to assess problems like color-blindness issues or access to people with extremely bad eye sight.

Understandability and identification themes were viewed as major challenges, as children and the teacher could not understand lesson goals and lesson contents for some chapters. The reason for not understanding some chapters of the book might have been the difference in chapter contents. Some concepts were more complex than others; therefore these chapters would pose more difficulty for both teacher and children. Also the children and the teacher thought that IHC resources were teaching them to take medications properly instead of assessing treatment claims. The definition for treatment was defined in these resources as "Any health care intervention or action taken with the purpose of improving health or preventing bad health". It was just heard as plain treatments (for taking medication, only not like drinking water, brushing teeth etc.). When the children and teacher referred to treatment, as only about taking medication, the entire goal of

some lessons was lost. The identification theme described how the teacher and home members felt that IHC school resources were not for children especially at their age. This was contrary to children's perspectives where they actually felt that resources were for them. This difference in children and teacher's identification of resources may be attributed to the fact that children in primary level are curious and enthusiastic to learn, as confirmed by another study.[22] Similarly, teaching children how to critically analyze treatment claims is a new model and the teacher could not see it properly targeted to the right people. However the school health policy in Rwanda is supportive of promoting critical thinking among school children as quoted in the policy "To provide skills-based health education with a focus on promoting well-being, preventing health problems, promoting activities appropriate to children's intellectual and emotional abilities and helping children to make healthy choices and adopt healthy behaviors throughout their lives".[8]

On the other hand, children and the teacher experienced the use of IHC resources in a positive way. Findings related to desirability, usability, and usefulness showed that both children and the teacher acknowledged IHC resources as a kind of book that they needed. Valerie et.al described a similar finding - that adolescents prefer resources for attaining relevant information about health problem they have, and acknowledged the need for didactic resources such as health curriculum that target young children.[14] The teacher expressed interest in the resources because he was learning from teaching; the children were interested with comic story format of IHC resources. Children in primary school may be more interested by having information presented in a visual way and would be attracted by lessons designed in that format. The resources were useful to the teacher because he was going to use them in real life and children said that home members were interested in learning and use IHC resources in their daily life. The interest in these resources might be a gateway to engage school staff, teachers, parents and community officials and all actors to collectively improve health in the schools and community at large, as stipulated by the school health policy. In fact, teaching resources like these might help community members discuss topics like sexual and reproductive health with children, which are considerably hard to discuss with children, parents or teachers. Jacque et.al who said that students become much more engaged when seeing science behind real life[18] - this study may add weight to the argument that children appreciate learning science when it has practical value for them. Similarly the teacher and children found that IHC resources were easy to use because it would take little time for the teacher to prepare a lesson. Children appreciated the way some difficult words are translated and suggested to translate IHC resources in the language that home

members use. Since children at schools, homes, and community use Kinyarwanda as the main language of communication in daily lives, they might pass on health information more easily among people they encounter with in daily lives if they have resources in this language.

5.1.2 Barriers and facilitators of using IHC school resources in Rwanda

We explored the barriers and facilitators of using IHC resources in Rwanda for both children and the teacher. The study highlighted barriers related to users, such as literacy (especially the inability to read and understand contents in English), beliefs, and understanding of content. For IHC resources the barriers were appropriateness of the materials (especially language of resources which was English), clarity of the material (especially games and activities) and time constraints (especially lesson time and other competing priorities).

Facilitators for using IHC resources were: motivation for children to learn, attitudes towards IHC resources (the children think resources would reach all people) and teacher's self-efficacy. Facilitators related to resources were appropriateness of the material (especially the comic story format), credibility of the material due to contents, applicability and trusted source, and the value of the material since it is used in normal life. This is consistent with findings from studies in other settings, such as those from Gordon et.al. a pilot study of a program to improve health literacy in response to an alcohol advertisement in an Australian school to children in upper primary.[17] They found that the program was affected by factors such as school context, attainment of English at different levels, usability of the intervention, perceived complexity of the intervention, achievability of the lesson, children's engagement with the program, and relevance for students.[17] Our study shows that other factors beyond resources and users can positively or negatively affect the use of IHC resources in school settings.

User factors like literacy (inability to read and understand the content) for children might be associated with early use of English in class lessons. In the Rwandan education system, children start using English as a medium of instruction in upper primary (from primary four to primary six). This could be considered as an early stage of accommodating new resources out of curriculum that teach in English language. Even though the teacher's understanding of the content might be linked with recent change of using English as a medium of instruction, other current challenges of Rwanda education system may be contributing, such as the teacher' heavy work load. To illustrate workload, the teacher who piloted for school resources was responsible

for teaching Science in 9 streams of Primary Five at the pilot school. This led to the teacher not having enough time for preparing lessons, marking exercises and activities for children in our pilot. This workload is closer to that of national level (pupil-teacher ratio currently at 58:1 and pupil-class ratio at 80:1). Such high numbers on a national level have been as a result of increase of primary school net enrollment currently at 96.8%, which have not been growing proportionately to the percentage of trained teachers. During our pilot, competing priorities had a large negative effect on the availability of sufficient resources, as children had exams and in-class exercises that stole time from IHC lessons. Some children dropped out of the pilot class in order to prepare for the exams. However, the main issue was that IHC lessons were outside curriculum and therefore not relevant for exams.

5.1.3 Perceived user suggestions to improve IHC resources

Some of the perceived suggestions that users shared were related to clarifying their sources, content, key terms and lesson instructions. Other issues concerned changing some text formats, correcting typing errors, using common names and improving some drawings.

These resources aim to empower decision making among children. This study helps illustrate the importance of the role of the end user in providing feedback that can help the research team to develop resources that are relevant to actual users. As another study confirmed, it is important to understand how to present information that target people in an informative and user friendly manner for decision-making.[28] Similarly, Chadia Abras et.al mentioned that it is important to involve primary users of the design so that their first inputs could give a sense of directions on areas to improve and even new directions to consider for the next development.[38]Another study that aimed to develop renal replacement therapy decision aids received suggestions similar to those from our pilot study: concerning a therapy handbook guide for decision-making, users suggested clarifying complex contents and complained about the scientific terms. Similarly, much feedback from our pilot test was about clarification of contents and improving the way key scientific terms were explained, as well as improvement of design and texts format (e.g. Shortening sentences) of the books.[39] This shows that even though content may seem to be simple and understandable to the resource developers, it might not be easy or comprehensible from the perspective of the primary users due to their different background and prior knowledge.

This pilot test has re-emphasized the need to have user's feedback for effective development of resources.

5.1.4 Strengths and limitations

The strength of this study was the use of different data collection approaches in order to capture the perspectives of multiple end users, and the triangulation of our findings from these different data collection methods. We not only recorded feedback in interviews, but also were able to directly observe use of the resources in actual classrooms and assess the coherence and reliability of the self-reported experiences from the participants. The second strength was the analysis of the findings through different frameworks and lenses, both for the purpose of improving a specific set of resources, for a more general understanding of both teacher and children user experience of IHC resources, and a preliminary exploration of barriers and facilitators of using IHC resources in Rwanda. Finally another strength was that I piloted these resources as an outside investigator in that I was not previously involved in the development process and my interest was seeing resources being successful. This should have caused the findings to be less biased than if I was part of the development team.

However, the study was limited by collecting data from only one school and from one teacher. This limits the transferability of our results, as we cannot be sure we captured an exhaustive set of suggestions from the teachers' perspective. Similarly, since the initial purpose of pilot was to understand the user experience of IHC school resources for improving the design, we were mostly only seeking feedback on factors that were directly affecting the design and use of IHC resources. Because of this, we may have missed some other factors that could have informed the use of IHC resources. For example, we did not thoroughly explore school and family factors, as our data collection tool was not designed to capture a comprehensive set of barriers and facilitators. The study also did not explicitly collect parents' views on the use of resources. In addition, one limitation was that some parents stopped their children from attending the pilot classes because they could not easily read and interpret consent form on their own without research team explaining face to face. Consent forms were given to the children to be taken at home for parents. Even though they were detailing information needed to take a decision, some parents were hesitant in giving consent. This could have been due to reading only without a

second person to explain, or distrust of information without meeting the person working on the study face to face.

Furthermore, some schools refusing to participate in the testing of IHC resources limited this pilot testing. The schools were avoided interfering with class calendar since the testing period was planned towards the end of school year.

5.1.5 Reflexivity

Our own perspective when starting this work was that children were not going to understand the lesson contents of the book. My standpoint was due to the fact that I have not experienced any kind of work that taught children to critically analyze health information, and therefore I perceived lesson contents as those above the targeted age group. Not being in the development group at the beginning, I could not imagine how children in primary school could be taught critical skills to assess treatment claims. I also initially thought that children would not be interested in the resources. As time went on with the work on this research, I understood the purpose of the project and the approach used. Our engagements and familiarization with children and the teacher was changing over time. In the beginning (first two pilot tests), we anticipated that children and the teacher would modify their behavior because we were observing them (Hawthorne effect). As time went on, children and the teacher seemed to act as they normally would. In my position as the Research Assistant to this work, I initially had an extreme feeling that the pilot resulted in only negative findings, and if I could make an early analysis, I would report only barriers to the use of IHC resources. When I decided to write my dissertation using this data, I read different literature and have found the data I collected would have more than just barriers to the use of IHC resources. During the analysis of the data, I found that I had collected information that was rich enough to explain comprehensively user feedback, user experience, barriers and facilitators of IHC resources.

5.1.6 Quality of the study

Qualitative studies face various forms of criticisms about the quality of findings especially criticizing on objectivity, internal validity, external validity, and reliability of findings. We have discussed below how our study responded to credibility (in preference of internal validity), transferability (in preference of external validity), dependability (in preference of reliability), and confirmability (in preference of objectivity) as four criteria for effective qualitative studies.

Credibility (Internal validity)

Credibility is how correct are the data and their analysis respond to the question of interest. The main factors of considerations to ensuring credibility are the adoption of well research methods, the early familiarity of participants or participating organization, sampling of key informants, triangulation, tactics to help ensure honesty in informants, and iterative questioning or probing.

This study responded to the above factors in that, we have opted to use a formative user testing design for the pilot testing because the development process was still ongoing. The testing was done on the actual end users of the school teaching resources (primary five students and their teacher). The study investigators were familiar with the school where we collected data. This was due to their prior work on the same school and the children of the same age. Similarly sampling strategy was convenience and all participants were given equal chance to participate in the study based on their consent from parents and children's assent. Also the study considered collecting data using various methods of data collection and data analysis. In this study we used non-participatory observation, teacher's interviews and children's focus group discussions in order to be able to capture true aspects of user experience of the IHC teaching resources. Credibility also considers about honesty in the selection of participants. We have given opportunity for all children in Primary Five to participate in the study where by a teacher gave communication to all classes and those who were interested were given consent form for their parents. During the collection of data, study investigators probed for all questions in order to have comprehensive data on the question of interest. Also during analysis, data were analyzed in three phases using different frameworks (adjusted honeycomb framework and barriers facilitators framework).[40, 41]

Transferability (external validity)

Transferability (external validity) "is concerned with the extent to which the findings of one study can be applied to other situations" Readers must determine how far they can be confident in transferring to other situations the results and conclusions presented. When conducting this pilot testing in Rwanda, it could be reminded that it was part of other pilot testing done in Uganda, Kenya and Norway. We have used the same methods and procedures for the pilots in the respective countries and collective results can ensure transferability. This testing was done in a ten-week period while conducting ten class observation sessions, ten focus group discussion, and ten user test interviews.

Dependability (reliability)

In order to address the dependability issue more directly, the processes within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results. Thus, we have detailed the study process in the methods section, which can be used by anyone else to replicate the pilot test.

Confirmability (objectivity)

Confirmability is dealing with investigators concern to objectivity of the study in question. This aims to ensure that results are reflecting the views and ideas of informants not those of researchers. To ensure the objectivity of the study, we coded all the data using two investigators, where each one was coding independently. After independent coding, two investigators sat together and identified the differences in coding, and discussed it while arriving on a consensus. This improved the study findings to be objectively analyzed. In addition, I have highlighted my reflexivity in the process of analyzing the data in order to be able to justify my point of view.

5.2 CONCLUSION

Overall use of the IHC resources appears to be feasible in the Rwanda context. We have learned that it is worthwhile collecting suggestions and ideas from participants in order to conceptualize and use resources in the Rwandan context. In particular, the Ministry of Education could use the above approach during the development or adapting primary school resources in Rwanda. Children and teachers can be instrumental in analyzing and modifying primary school resources, and they can significantly contribute to the improvement of educational resources.

On user experience perspectives, there are still issues with understanding of the content being taught in the IHC resources and elder people not identifying resources as for young ones may be due to their novel approach of targeting children to assess treatment claims. However, positive user experience of wanting such resources and how easy they are to use, especially when translated, would be a stepping-stone to build on for improving health literacy among children. This should be coupled with other facilitators like the credibility and value of IHC resources. In addition, literacy of children should be considered as an important barrier to effective use of IHC, resources among others.

This pilot study has illustrated how the same method can be applied in other pilots that aim to develop and test primary school resources for Rwanda.

5.3 RECOMMENDATIONS

The following recommendations are for different institutions and stakeholders who would be engaged in the development of IHC school resources, or who would be involved in the use and development of other health related primary school resources in Rwanda. Therefore these recommendations are directed to the IHC project, Ministry of Education and stakeholders, Ministry of Health and stakeholders and finally to researchers of this and similar projects.

The IHC project team should consider revising the concepts used to develop resources to see if there might be a need more explanation for users to understand these. They need to explain clearly the key terms used in the study and orient the resources in a more general way that people can understand. They should also clarify drawings because children valued and showed particular interest in the pictures. They should consider translating the IHC school resources in

Kinyarwanda so that children in the upper primary can be able to understand the contents, since their level of English is still low at that age in Rwanda.

The Ministry of Education should consider developing strategies for improving health among school children, modeling on the kind of approach from this project for developing school resources to teach and communicate health issues to young ones. The school health policy aiming to improve health for school children should make use of the existing science curriculum to develop and evaluate health education resources like these, addressing topics of high importance and relevance for this age group, such as control of drug use, improving food and nutrition in the community and education about sexual and reproductive health. These health education resources should be implemented through the science curriculum for upper primary school.

With the aim of fulfilling the school health policy recommendations in Rwanda, the Ministry of Health in collaboration with the Ministry of Education and partners like local and international NGOs and researchers should develop and test health education and communication resources for school children. These resources might be a way of promoting communication among teachers, children and parents to discuss and critically analyze challenging topics such as adolescent and sexual reproductive health in general. This approach can help parents and teachers to guide children on the decisions they take about their health. Informed health care decision tools might also be used to support the school health policy recommendations to prevent diseases through increasing uptake of HPV and other vaccines among young populations in schools.

The next research step would be to pilot such resources on a larger scale, using a version that is improved and translated into Kinyarwanda. Feedback should be collected from several schools, in both urban and rural settings. Similarly the barriers and facilitators related to the implementation of health literacy school resources should be thoroughly analyzed by exploring a broader range of factors, such as teachers, parents and children, school factors, home factors, in addition to those related more directly to the resources themselves.

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APPENDICES

ANNEX 1.A BARRIER AND FACILITATOR FRAMEWORK FOR TEACHING RESOURCES

Domain	**Factors** (and sources)	**Explanation**
Teachers	**Skills and competencies** (Tweed A (2009) (1), Kligner J et al (2003)(2)	Teacher's education and experience in relation to the class being taught
	Postive learning environment (Tweed A, 2009)(1), Pilot and User Testing	Teacher's ability to create a positive learning environment; e.g. encourage discussion, respond positively to questions, engage pupils
	Understanding of the content being taught (Tweed A (2009)(1)	Teacher's understanding the content
	Sufficient training and assistance (Forman 2009) (Pilot and User Testing) (Flottorp 2013)	The extent to which the teachers received sufficient training on how to use the materials and assistance
	Self-efficacy	Teacher's confidence in teaching the material
	Fit to the teacher's teaching style and context (e.g. class size) (User Testing and Pilot)	Teachers' comfort with the instructions or ability to adapt the instructions to their style and context
	Attitudes (Pilot and User Testing), (Klingner J et al 2001) (3), (Ryan P, 2009)(4)	Teachers' attitude towards new material (change), science, critical thinking and independent thinking by pupils (or their role as authorities in the classroom)
	Beliefs (Forman 2009)	Teachers' beliefs about the teaching methods or content (e.g. what treatments work or the concepts)
	Expected outcome (Flottorp 2013)	The extent to which teachers expect the pupils to be able to learn the material
	Emotions (Pilot and User testing), Klingner J et al 2003)(2) (Flottorp 2013)	Teachers' emotions, such as lack of satisfaction, frustration, empathy or a lack of empathy, stress or burnout, cognitive overload or tiredness, anticipated regret or fear, anxiety
	Motivation (Tweed 2009)	Teacher's motivation to teach the material
	Self-monitoring or feedback (Flottorp 2013)	The extent to which the teacher has the capacity for self-monitoring or feedback to help ensure effective teaching of the material
Pupils	**Literacy** (Pilot and User Testing)	Pupils' ablity to read and understand the material
	Attendance (Flottorp SA, et al 2013)(5), (Pilot and User Testing)	Pupils' attendance or reasons for poor attance (e.g. need to travel a long distance to school or inability to pay school fees)
	Motivation to learn (Pilot and User Testing), (Klingner J et al 2001)(3), (Ryan P, 2009)(4) (Tweed 2009)	Pupils' motivation to learn the new material
	Attitudes (Pilot and User Testing), (Klingner J et al 2001)(3), (Ryan P, 2009)(4)	Pupils' attitudes towards learning, towards authorities, towards science, towards critical thinking; or their personal views about what treatments work
	Beliefs	Pupils' beliefs about the content (e.g. what treatments work or the concepts)
	Home environment (User Testing and Pilot)	The extent to which the pupil's home environment encourages or discourages learning the lessons

	Differentiated instruction (Tweed 2009)	The extent to which pupils different learning needs are met
	Peer influence	Positive or negative attitudes of other pupils towards the material
Teaching resources	**Clarity of the material** (Flottorp 2013)	The extent to which the key messages in the material are clear
	Value of the material (Rosenbaum)	The extent to which the material is valued by the teachers and pupils
	Compatability with the curriculum (Pilot and User Testing) (Forman 2009) (Flottorp 2013)	The extent to which the material fits with the rest of the curriculum and how it is taught (and consistancy of the key messages with what is being taught in the curriculum)
	Effort (Flottorp 2013)	The amount of effort required to introduce, teach or learn the material
	Appropriateness of the material (Rosenbaum)	The extent to which the material is appropriate for the targeted pupils and relevant to them, challenges them, and engages them
	Credibility of the material (Rosenbaum)	The textent to which the teachers and pupils perceive the material as credible
Environment	**Time constraints** (Pilot and User Testing), (Flottorp SA, et al 2013)(5), (Kligner J et al 2003) (2), Ayres BJ et al (1994) (6), (Forman 2009)	The extent to which there is sufficient time to accommodate introducing the new material
	Competing priorities (Forman 2009)	The extent to which other priorities for the school, teachers or pupils limit introducing the material (e.g. preparing for exams)
	School organisation and management (Pilot and User Testing), (Flottorp SA, et al 2013)(5), Ayres BJ et al (1994) (6) (forman 2009)	The extent to which the school provides an environment that supports adoption of new subjects, material and teaching methods
	School resources, particularly- human resource (Pilot and User Testing), (Flottorp SA, et al 2013)(5), (Kligner J et al 2001)(3) (Forman 2009)	The extent to which the school has adequate resources to introduce the new materials (e.g. human resources, student/teacher ratio, teacher workload, classroom space and classroom resources, such as blackboards and accoustics)
	Attitudes and beliefs of others (Flottorp 2013)	Attitudes or beliefs of the head teacher, colleagues, authorities or others that influence the teacher's interest in and ability to teach the material
	Parent and community involvement (User Testing)	Parents' attitudes towards the new material or how things are done at the school
	Regulations (Flottorp SA, et al 2013)(5)	Regulations (e.g. Ministry of Education policies and regulations) that affect introducing the new material
	Political enviroment (Flottorp SA, et al 2013)(5) (User Testing and Pilot)	Elements of the political environment that affect introducing the new material; e.g. authoritarianism or school or teacher strikes
	Beuracracy (Flottorp SA, et al 2013)(5), (Oakley ASV et al 2006)(7)	Beuracratic arrangements that delay or limit introduction of the new materials, or facilitate introducing them
	Incentives and disincentives (Flottorp SA, et al 2013)(5) (User Testing and Pilot)	Incentives or disincentives to introduce the new materials for teachers or head teachers

ANNEX 2.RATING OF FINDINGS FOR USER EXPERIENCE, BARRIERS AND FACILITATORS

Adjusted set of seriousness codes for rating barriers and facilitators findings

Category	Description	Code
Major barrier	A barrier that will prevent effective use or implementation in schools in Rwanda	xxx
Barrier	A barrier that will probably prevent effective use or implementation in schools in Rwanda	xx
Minor barrier	A barrier that might prevent effective use or implementation in schools in Rwanda	x
Major facilitator	A facilitator that will promote effective use or implementation in schools in Rwanda	ooo
Facilitator	A facilitator that will probably promote effective use or implementation in schools in Rwanda	oo
Minor facilitator	A facilitator that might help promote effective use or implementation in schools in Rwanda	o

Seriousness rating of the user experience findings

CATEGORY OF FINDING	DESCRIPTION OF CATEGORY	CODE
Highly important negative finding	A problem with the guide that we should address for the school resources to be effective	xxx
Important negative finding	A problem with the guide that we should probably address for part of the school resources to be effective	xx
Negative finding	A problem with the guide that we can easily address and probably will not prevent the school resources from being effective.	x
Highly important positive finding	Praise that probably should inspire changes to the guide	ooo
Important positive finding	Praise that maybe should inspire changes to the guide	oo
Positive finding	Praise that probably should not inspire changes to the guide	o
Highly important constructive finding	An idea that probably should inspire changes to the guide	iii
Important constructive finding	An idea that maybe should inspire changes to the guide	ii
Constructive finding	An idea that probably should not inspire changes to the guide	i

Annex 3. Observation form

IHC
PILOT OBSERVATION FORM
SCHOOL RESOURCES
CHPT. X

The goal of all testing is to be as sure as possible that the final version of the resources will be effective--that people will understand what we want to teach them--when used in the trial, next year.

SECTION A: Pre-lesson
Observer:
Date:
School:
Scheduled start time of lesson:
Scheduled end time of lesson:
Number of children:
Age range of children:
From youngest to oldest child.
Number of benches:
This is so we know about how much space each child had.

Number of teachers in the room:

SECTION B: Start of lesson

Actual start time of lesson:
Do not let teacher or children know you are timing lesson.
What did the teacher do before the class started reading the chapter? For how long?
E.g. make jokes, ask questions or answer questions.

SECTION C: Reading

Follow along in the guide, so you can note how the teacher uses and understands instructions, e.g. whether the teacher misunderstands or skips any.

Note things like:

- *What the children and teacher misunderstand, e.g. a picture, an example or an exercise*
- *What words the teacher and children struggle with*
- *What examples the children and teacher use, other than those in the book*
- *What that the children and teacher seem to like especially*
- *Anything else that you think is important for the book's effect*

Remember to note things like:

- *How the teacher uses and understands instructions*
- *What the children and teacher misunderstand, e.g. a picture, an example or an exercise*
- *What words the teacher and children struggle to pronounce*
- *What examples the children and teacher use, other than those in the book*
- *What the children and teacher seem to like especially*
- *Anything else that you think is important for the book's effect*

Page X--[Part of guide]

[Extra question]

SECTION D: Activity

SECTION E: Exercises

If the they do not spend time on exercises during the lesson, skip this section.

SECTION F: Post-lesson

Who read aloud?

Was it all the children together, one child at a time, the teacher or some combination?

Actual end time of class:

When did the teacher leave the children to work on their own or do other things?

About how long did the class spend reading the story?

About how long did the class spend doing the activity?

About how long did the class spend doing exercises with the teacher in the room?

About how long did the children break for?

Did the children seem interested or disinterested in the lesson? How so?

How did the teacher engage the children?

How did the teacher use the blackboard?

What did the children do with the books at the end of class?

Did they take them home or hand them in?

Discuss and enter findings ASAP.

Annex 4. Children's interview guide

IHC

INTERVIEW FORM

CHILDREN'S BOOK

CHPT. X

The goal of all testing is to be as sure as possible that the final version of the resources will be effective--that people will understand what we want to teach them--when used in the trial, next year.

SECTION A: Pre-interview

Interviewer:

Observer:

Date:

School:

Interview subject(s):

Write their code--e.g. child001--not their name.

If they have been interviewed before, use the same code as last time.

Gender:

Was interview after a pilot lesson?

SECTION B: Introduction

Start time:

Briefly introduce yourself.

Tell them that we want to help people making choices that matter to their health.

Tell them that:

- *They are testing what we have made.*
- *We are not testing them.*
- *We think the resources can be better.*
- *The resources are for someone like them.*
- *Their thoughts can help us make the resources better.*

- *There are no wrong answers to our questions.*

Tell them that the interview will last less than an hour.

Remind them that they are free to leave at any time.

Tell them that:

- *We want to record the interview so we can be sure of what they said.*
- *We will not attach their names to the notes or recording.*

Ask if they have any questions.

Make sure they have understood and signed all necessary consent forms

Start recording if they approve.

SECTION C: Profile

If you have interviewed the same person before, skip this section.

How old are you?

What year of school are you in?

SECTION D: Think-aloud

They should only read aloud if they want.

For each part of the book, ask how they think it could be easier to use and understand.

Use questions like:

- *What do you think this part is about?*
- *What is difficult to understand? Why?*
- *What should be improved? How?*
- *What should there be more of? Why?*

Remember: ask how they think the book could be easier to use and understand;

- *What do you think this part is about?*
- *What is difficult to understand? Why?*
- *What should be improved? How?*
- *What should there be more of? Why?*

Page X--[Part of book]

[Extra question about this part]

Page X--Activity

Page X--Exercise X

Is it a familiar type of exercise?

SECTION E: General

What questions do you have about what John and Julie learn in this chapter?

Do you trust what is in this chapter? Why?

After reading this chapter, do you think the book is for a class like yours? Why?

How would you explain to a friend what John and Julie learn in this chapter?

How do you think what John and Julie learn fits in your life?

Do you think the chapter is interesting and important? Why?

Do you think the people at your home would be interested in the book? Why?

Do you have anything more you want to say to us about the book or project?

SECTION F: CLAIM question(s)

Hand them the separate page(s) with the CLAIM question(s), attached to the back of this form.

Tell them:

- *This is for an exam that we are making.*

Remind them:

- *They are testing what we have made, so we can make it better.*
- *We are not testing them.*
- *We will not attach their names to their answers.*

Tell them they can keep the page(s) when they have answered the question(s), if they want.

Ask them to:

- *Think aloud as they read and answer.*
- *Circle any words that are unfamiliar.*

Note their answer and what they say:

SECTION G: Observer's questions

The observer asks whatever questions they have.

SECTION H: Interview experience

Is there anything we could have done to make the interview a better experience for you?

Stop recording and thank them.

SECTION I: Post-interview discussion

What were the most important findings?

What do the findings suggest we should do for the resources to be effective.

Enter findings and transcribe the interview recording as soon as possible.

CLAIM question(s)

Annex 5. Teacher's interview guide

IHC

INTERVIEW FORM

TEACHERS' GUIDE

CHPT. X

The goal of all testing is to be as sure as possible that the final version of the resources will be effective--that people will understand what we want to teach them--when used in the trial, next year.

SECTION A: Pre-interview

Interviewer:

Observer:

Date:

School:

Interview subject(s):

Write their code--e.g. teacher001--not their name.

If they have been interviewed before, use the same code as last time.

Gender:

Was interview after a pilot lesson?

SECTION B: Introduction

Start time:

Briefly introduce yourself.

Tell them that we want to help people making choices that matter to their health.

Tell them that:

- *They are testing what we have made.*

- *We are not testing them.*
- *We think the resources can be better.*
- *The resources are for someone like them.*
- *Their thoughts can help us make the resources better.*
- *There are no wrong answers to our questions.*

Tell them that the interview will last less than an hour.

Remind them that they are free to leave at any time.

Tell them that:

- *We want to record the interview so we can be sure of what they said.*
- *We will not attach their names to the notes or recording.*

Ask if they have any questions.

Make sure they have understood and signed all necessary consent forms

Start recording if they approve.

SECTION C: Profile

If you have interviewed the same person before, skip this section.

Tell them:

- *We want the resources to be used and understood by people with different backgrounds.*
- *For example, we want them to be easy to use for people of different ages.*

Remind them that their names will not be attached to anything they say.

How old are you?

What is your level of education?

How long have you taught?

What subjects have you taught?

E.g. science.

What years have you taught?

E.g. year five, primary school.

SECTION D: Think-aloud

Ask them to:

- *Put the guide on the table.*
- *Think aloud as they read it page by page.*
- *Circle any unfamiliar words or words that they think would be unfamiliar to the children.*

They should only read aloud if they want.

For each part of the resources, ask how they think it could be easier to use and understand.

Use questions like:

- *What do you think this part is about?*
- *What is difficult to understand? Why?*
- *What should be improved? How?*
- *What should there be more of? Why?*

Remember: ask how they think the book could be easier to use and understand;

- *What do you think this part is about?*
- *What is difficult to understand? Why?*
- *What should be improved? How?*
- *What should there be more of? Why?*

Page X--[Part of guide]

[Extra question about this part]

Page X--Activity

Page X--Exercise X

Is it a familiar type of exercise?

SECTION E: General

What is missing to help you answer any questions from the children?
E.g. details or examples.

Do you trust what is in this chapter? Why?

After reading this chapter, do you think book is for a class like yours? Why?

How would you explain the lesson goals to a colleague in your own words?
What examples of your own would you use?

How do you think the lesson goals apply to your own life and the children's lives?

Do you think the chapter is interesting and important? Why?

Do you have anything more you want to say to us about the book, guide or project?

SECTION F: CLAIM question(s)

Hand them the separate page(s) with the CLAIM question(s), attached to the back of this form.

Tell them:

- *This is for an exam that we are making.*

Remind them:

- *They are testing what we have made, so we can make it better.*
- *We are not testing them.*
- *We will not attach their names to their answers.*

Tell them they can keep the page(s) when they have answered the question(s), if they want.

Ask them to:

- *Think aloud as they read and answer.*

- *Circle any words that are unfamiliar or they think would be unfamiliar to the children.*

Note their answer and what they say:

SECTION G: Observer's questions
The observer asks whatever questions they have.

SECTION H: Interview experience

Is there anything we could have done to make the interview a better experience for you?

Stop recording and thank them.

SECTION I: Post-interview discussion

What were the most important findings?
What do the findings suggest we should do for the resources to be effective.

Enter findings and transcribe the interview recording as soon as possible.

CLAIM question(s)

Annex 6. Consent form for parents or guardians

Supporting Informed Healthcare Choices in Low-Income Countries

Research participant informed consent form in English (parent/guardian

- **INTRODUCTION.**

The Supporting Informed Healthcare Choices in Low-Income Countries (SIHCLIC) Project is a research collaboration that seeks to improve health literacy by developing and testing of resources that can be used by the public to appraise health information.
In Rwanda, the study is being conducted by researchers from University of Rwanda College of Medicine and Health Sciences and will involve continuous interaction with journalists, teachers and children.

Your child has been identified as one of the children that can participate in this study however; he/she alone cannot decide by themselves since he/she has not yet reached the legal age of consent for Rwanda. We are therefore seeking permission for your child to participate in this study.
The information in this document is meant to help you decide whether or not your child should take part in this study but first there a few things to note.

- In addition to your acceptance, your child will also be required to provide assent (agreement) for participation in this study.
- We anticipate that once you agree your child will be in the study for a period of 2-3 years.
- You will be offered a copy of this form and your child's assent form for your future reference.
- Please feel free to ask if you have any questions or concerns at any time before the start or during the conduct of the research.

- **WHY IS THIS RESEARCH BEING CONDUCTED?**

The aim of this collaborative research project is to improve population health outcomes by improving health literacy in low-income countries. We will do this by developing and evaluating two strategies for improving health literacy: development and evaluation of mass media resources for the general public and the development and evaluation of teaching resources for school children.

- **HOW WILL THE STUDY BE CONDUCTED?**

This project will be implemented using two strategies for improving health literacy:
i) The development of mass media resources to improve the ability of the general public to understand and appraise information about the effects of health care.
ii) The development of teaching resources for school children to improve their ability to appraise and use information about the effects of health care services/ interventions made available to them.

The Research project will be conducted under 3 different phases, one following on the other.

- Phase one will include: **Priority setting and stakeholder involvement**.
- The second phase will focus on **Resource development and user testing**.
- Phase three will concentrate on **Evaluation of the resources** developed.

These strategies will be evaluated in two community trials testing the effectiveness of the developed resources in improving health literacy among the target audiences for teachers and mass media practitioners/ journalists.

- **POSSIBLE RISKS TO YOUR CHILD:**

We anticipate that your child's participation in the study/research presents no risk to him/her as an individual. Your child's participation in the study will not affect his/her performance at school.

- **POSSIBLE BENEFITS TO YOUR CHILD.**

There will be no direct benefit to your child or you from participating in this study and there is no promise of gaining any material or financial benefit from the project currently or in the future.
Your child's participation in the study could contribute to gaining new knowledge that will be used to design resources aimed at improving population health outcomes by improving health literacy in low-income countries. Your child may be equipped with skills to enable him/her obtain, process and understand health information that he/she might need to make appropriate healthcare decisions. Your child will benefit from free health information.

- **COST TO THE PARTICIPANT.**

You will incur no cost whatsoever as a result of your child taking part in the study.

- **COMPENSATION.**

Your child or you will not gain any form of compensation, monetary or otherwise for participating in the study but appropriate daily expenses in form of lunch and transport will be reimbursed if your child is required to attend any special study sessions outside school hours.

- **CONFIDENTIALITY**

The information your child may give during the conduct of this research will be kept confidential in accordance to the ethical standards agreed upon by the local and internationalorganizations governing the conduct of research involving human participants.

Any information resulting from this study, if published in scientific journals or presented at scientific meetings, will not reveal your child's identity.

- **RIGHT TO REFUSE/ WITHDRAW YOUR CHILD'S PARTICIPATION**

Your child's participation in this research is purely voluntary and you are free to decline to take part, or withdraw your child's participation at anytime without any repercussions.

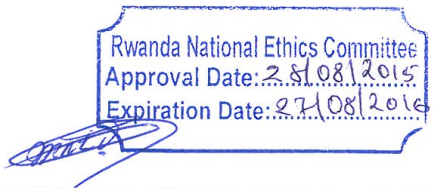
- **QUESTIONS ABOUT THE RESEARCH**

In case of any further questions, please contact **Dr. Laetitia NYIRAZINYOYE**, the Principal Investigator at University of Rwanda, College of Medicine and Health Sciences, School of Public Health, Kigali Rwanda Tel: **0788683209 or Michael MUGISHA, on 0788596947**.

In case of questions in regards to research ethics, you may contact **Dr Jean Baptiste MAZARATI** on tel: **0788 309 807**, Chairperson, Rwanda National Ethics Committee. Or Valentine INGABIRE a parmenent staff on tel: **0788 592 004**.

- **DECLARATION OF CONSENT**

The information about this study has been availed and explained to me and all my questions have been answered. I have read this form and I feel that I have had enough information and time to consider my decision to allow my child participate in the study. I fully understand that by signing this form, I do not waive any of my legal rights, nor does it relieve the study investigators their duty (liability), but merely indicates that I have been



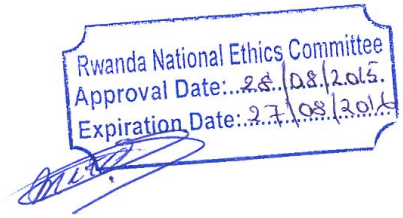
informed about the research study in which I am voluntarily agreeing my child to take part. A copy of this form will be availed to me.

Having understood all the information pertaining to this study I therefore agree to my child's participation in this study by appending my signature and name below.

Research Participant's Parent/Guardian	
Name: _____	Signature: _____
Date: _____	Tel. number: _____

"I agree to the use of voice and video recordings collected as part of the Informed Healthcare Choices project to be used for nonprofit, educational purposes in versions of the resources that the researchers are developing as part of the project and presentations by researchers about the project. I understand that I can ask for any recording of my child to be removed from resources or presentations at any time."

Signature of the Parent/guardian: _____



Annex 7. Consent form for Teacher

Supporting Informed Healthcare Choices in Low-Income Countries

Research participant informed consent form in English

- **INTRODUCTION.**

The Supporting Informed Healthcare Choices in Low-Income Countries (SIHCLIC) Project is a research collaboration that seeks to improve health literacy by developing and testing of resources that can be used by the public to appraise health information.

In Rwanda, the study is being conducted by researchers from University of Rwanda College of Medicine and Health Sciences and will involve continuous interaction with journalists, teachers and children.

The information in this document is meant to help you decide whether or not to take part in this study but first there a few things to note.

- You are being asked to participate in this research because you are a journalist/media practitioner or teacher or a potential recipient of information from journalists/media practitioners or teachers; and an adult of legal consenting age.
- We anticipate that once you agree to participate you will be in the study for a period of 5 years or less.
- You will be offered a copy of this form for your future reference.
- Please feel free to ask if you have any questions or concerns at any time before the start or during the conduct of the research.

- **WHY IS THIS RESEARCH BEING CONDUCTED?**

The aim of this collaborative research project is to improve population health outcomes by improving health literacy in low-income countries. We will do this by developing and evaluating two strategies for improving health literacy: development and evaluation of mass media resources for the general public and the development and evaluation of teaching resources for school children.

- **HOW WILL THE STUDY BE CONDUCTED?**

This project will be implemented using two strategies for improving health literacy:
i) The development of mass media resources to improve the ability of the general public to understand and appraise information about the effects of health care.
ii) The development of teaching resources for school children to improve their ability to appraise and use information about the effects of health care services/interventions made available to them.

These strategies will be evaluated in two community trials testing the effectiveness of the developed resources in improving health literacy among the target audiences for teachers and mass media practitioners/journalists.

The Research project will be conducted under 3 different phases, one following the other.

- Phase one will include: **Priority setting and stakeholder involvement**.
- The second phase will focus on **Resource development and user testing**.
- Phase three will concentrate on **Evaluation of the resources** developed.

- **POSSIBLE RISKS TO YOU:**

Rwanda National Ethics Committee
Approval Date: 28.10.2015
Expiration Date: 27.10.2016

We anticipate that your participation in the study/research presents no risk to you as an individual. However, participation in this study might in some way interfere with your work if you are required to participate in study activities during work hours.

- **POSSIBLE BENEFITS TO YOU.**

There will be no direct benefit to you from participating in this study and there isno promise of gaining any material or financial benefit from the project currently or in the future.

Your participation in the study could contribute to gaining new knowledge that will be used to design resources aimed at improving population health outcomes by improving health literacy in low-income countries. You will be equipped with skills to enable you obtain, process and understand health information that you need to make appropriate healthcare decisions.
You will benefit from free health information.

- **COST TO THE PARTICIPANT.**

You will incur no cost whatsoever other than time as a result of taking part in the study.

- **COMPENSATION.**

You will not gain any form of compensation, monetary or otherwise for participating in the study but appropriate daily expenses in form of lunch and transport will be reimbursed if you attend any study-related meetings or workshops.

- **CONFIDENTIALITY.**

The information you give during the conduct of this research will be kept confidential in accordance to the ethical standards agreed upon by the local and international organizations governing the conduct of research involving human participants.

Any information resulting from this study, if published in scientific journals or presented at scientific meetings, will not reveal your identity.

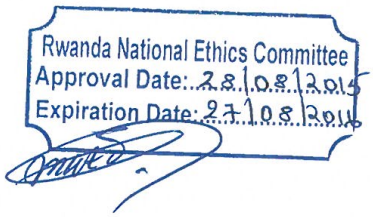
- **RIGHT TO REFUSE/WITHDRAW.**

Your participation in this research is purely voluntary and you are free to decline to take part or withdraw at anytime without any repercussions.

- **QUESTIONS ABOUT THE RESEARCH**

In case of any further questions, please contact **Dr. Laetitia NYIRAZINYOYE**, the Principal Investigator at University of Rwanda College of Medicine and Health Sciences, Kigali Rwanda: **Tel: 0788683209** or **Mr. Michael MUGISHA, on 0788596947.**

In case of questions in regards to research ethics, you may contact **Dr Jean Baptiste MAZARATI** on tel: **0788 309 807**, Chairperson, Rwanda National Ethics Committee. Or **Valentine INGABIRE** the RNEC Adminstrator on tel: **0788 592 004**.



- **DECLARATION OF CONSENT TO PARTICIPATE**

The information about this study has been availed and explained to me and all my questions have been answered. I have read this form and I feel that I have had enough information and time to consider my decision to join the study. I fully understand that by signing this form, I do not waive any of my legal rights, nor does it relieve the study investigators their duty (liability), but merely indicates that I have been informed about the research study in which I am voluntarily agreeing to take part. A copy of this form will be availed to me.

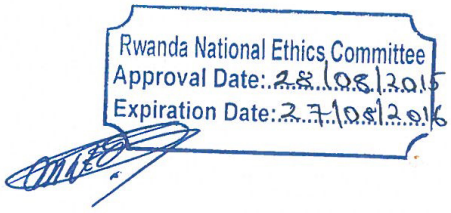
Having understood all the information pertaining to this study I therefore agree to my participation in this study by appending my signature and name below.

Research Participant Name:	Signature:
Date:	Tel number:

- **DECLARATION OF CONSENT TO BE RECORDED**

"I agree to the use of voice and video recordings collected as part of the Informed Healthcare Choices project to be used for nonprofit, educational purposes in versions of the resources that the researchers are developing as part of the project and presentations by researchers about the project. I understand that I can ask for any recording of me to be removed from resources or presentations at any time."

Your signature to be recorded: _____



Annex 8. Assent form for Children

Supporting Informed Healthcare Choices in Low-Income Countries

Research participant informed assent form in English

Introduction.
We are doing a research study about how people can be helped to understand and assess information that concerns their health. A research study is a way to learn more about people, how they live their lives and how they make decisions about their lives and what happens to them when they make decisions.

We are asking you to participate in this study because we think that your contribution will help us develop materials that can help children like you understand and assess information about their health.

First of all, there are some things about this study you should know.
Participation in this study is purely voluntary and you may feel free not to join or to stop participating if you feel uncomfortable with the study activities at any time after joining. Your parents/guardians know about this study. If you do not want to be in this research study, you will not be penalized.

If you decide that you want to be part of this study, we may follow you up for about 2-3 years. During this time we may give you or your teacher some of the materials we shall develop and then ask you some questions at different time points to find out if the materials helped you understand and assess health information or not.
Benefits to you.
There will be no direct benefits to you but we think that by participating in this study but you will receive free health information.

Possible risks to you.
We do not anticipate the study to cause you any harm, risks or dangers. We do not think that your school performance will be affected by participating in this research.

Confidentiality.
If you choose to participate all the information you give us will be kept as a secret and it will not bear your name or your parent/guardian's name.

When we are finished with this study we will write a report about what was learned. This report will not include your name or that you were in the study.

If you have understood everything about the study and all your questions have been answered, and you decide you want to be in this study, please sign your name below. But if you don't want to be in the study it is still ok, don't sign this paper. Signing below means that you have understood, and you are willing to join the study.

Study Participant's consent to participate in the research
Your signature: _____ Date_____

Your name: _____ Date _____

Rwanda National Ethics Committee
Approval Date: 28/08/2015
Expiration Date: 27/08/2016

Study participant's consent to be recorded

"I agree to the use of voice and video recordings collected as part of the Informed Healthcare Choices project to be used for nonprofit, educational purposes in versions of the resources that the researchers are developing as part of the project and presentations by researchers about the project. I understand that I can ask for any recording of me to be removed from resources or presentations at any time."

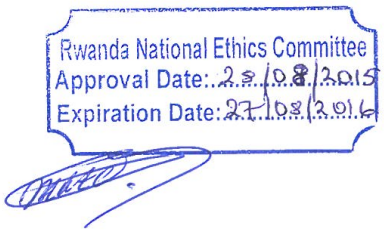
Your signature for being recorded: _____

Staff obtaining assent
Signature of person obtaining assent: _____ Date _____

Printed name of person obtaining assent: _____ Date _____

Witness
Signature of Witness: _____ Date _____

Printed name of Witness: _____ Date _____



Annex 9. Ethical clearance from RNEC

REPUBLIC OF RWANDA/REPUBLIQUE DU RWANDA

NATIONAL ETHICS COMMITTEE / COMITE NATIONAL D'ETHIQUE

Telephone: (250)2 55 10 78 84

E-mail: info@rnecrwanda.org

Web site: www.rnecrwanda.org

Ministry of Health
P.O. Box. 84
Kigali, Rwanda.

FWA Assurance No. 00001973
IRB 00001497 of IORG0001100

August 28, 2015

Dr. Laetitia NYIRAZINYOYE
Principal Investigator

Approval Notice: No. 220/ RNEC/ 2015

RE: Your research Project entitled **"SUPPORTING INFORMED HEALTHCARE CHOICES IN LOW INCOME COUNTRIES"**

After reviewing your protocol by expedited review procedure of 22 August 2015 and revisions made on the advice of the RNEC submitted on 28 August 2015, **we are please to inform you that your research protocol has been approved by the Rwanda National Ethics Committee.**

Please note that approval of the protocol and consent form is valid for **12 months**.
You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrolment of participants
3. All consent forms signed by subjects should be retained on file. The RNEC may conduct audits of all study records, and consent documentation may be part of such audits.

4. A continuing review application must be submitted to the RNEC in a timely fashion and before expiry of this approval.
5. Failure to submit a continuing review application will result in termination of the study.
6. Notify the Rwanda National Ethics committee once the study is finished

Sincerely,

Date of Approval: August 28, 2015
Expiration date: August 27, 2016

Dr Jean-Baptiste MAZARATI
Chairperson, Rwanda National Ethics Committee.

C.C.
- Hon. Minister of Health.
- The Permanent Secretary, Ministry of Health.