"*We dream of climbing the ladder; to get there, we have to do our job better*": Designing for Teacher Aspirations in rural Côte d'Ivoire

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ABSTRACT

As governments in developing countries race to solve the global learning crisis, a key focus is on novel teaching approaches as taught in pedagogical programs. To scale, these pedagogical programs rely on government teacher training infrastructure. However, these programs face challenges in rural parts of Africa where there is a lack of advisor support, teachers are isolated and technology infrastructure is still emerging. Conversational agents have addressed some of these challenges by scaling expert knowledge and providing personalized interactions, but it is unclear how this work can translate to rural African contexts. To explore the use of such technology in this design space, we conducted two related studies. The first was a qualitative study with 20 teachers and ministry officials in rural Côte d'Ivoire to understand opportunities and challenges in technology use for these stakeholders. Second, we shared a conversational agent probe over WhatsApp to 38 teachers for 14-weeks to better understand what we learned in the survey and to uncover realistic use cases from these stakeholders. Our findings were examined through a theoretical lens of aspirations to discover sustainable design directions for conversational agents to support teachers in low infrastructure settings.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; • **Applied computing** → *Education*.

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HCI; ICTD; Aspirations; HCI4D; Career; Teachers; Teacher Professional Development; Teacher Training; conversational agent ; Probe

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1 INTRODUCTION

Today school enrollments in low and middle-income countries are growing exponentially, but basic primary school educational outcomes have not yet caught up [7, 79] which impedes economic growth and equity [14]. Early simulations show that COVID-19 has aggravated this situation, and up to 91% of students will fall farther behind in Sub-Saharan Africa [13]. Governments are trying to address this crisis by investing heavily in new pedagogical programs that deliver targeted instruction to align with student learning levels [43]. Successfully implementing these pedagogical programs requires well-trained teachers, but programs for training teachers in low-income countries are challenging to deploy. As pedagogical programs scale, they rely on governments' teacher training [43][1] infrastructure to teach new approaches and provide support to teachers. However, implementing teacher training interventions in rural and isolated areas is challenging due to infrastructural [20, 44] and socio-cultural complexities [61, 90]. This gap is salient in sub-Saharan Africa, especially in rural areas with less economic infrastructure, such as roads and energy supply. [10].

[1] Also referred to as teacher professional development or professional learning.

Therefore, pedagogical programs are considering technology to scale and increase their impact [43].

Technology has shown promise in teacher training interventions in some contexts, but it is unclear how this body of work can support designing technology for rural African contexts. Prior projects have supported teacher training by providing resources digitally through tablets [62], videos [83] and audio contexts [6]. These interventions are often new to the context leading to overhead investments in setup, training, and monitoring costs [62]. Recent work has reduced the overhead of introducing new technology by capitalizing on teachers' own devices and using applications, such as WhatsApp, that are already familiar to users [41, 66, 77]. Teacher support groups on WhatsApp have allowed fostering of digital teacher communities in Indian [101] and African contexts [68], but connectivity issues prevent streamlined access and participation of rural teachers [68]. Additionally, there tend to be fewer administrators in rural Africa [20, 44], who are critical to facilitating and moderating these groups digitally [68].

Conversational agents, also known as chatbots, are one way to support scaling expert knowledge and have seen initial success on social media in rural African contexts [23]. Some conversational agent research has scaled expert knowledge by using innovative AI techniques in western settings [40, 86]. An exploratory deployment of a conversational agent on WhatsApp in rural Côte d'Ivoire by the authors [23] found initial evidence that such technology can provide personalized and context-specific support to teachers. However, AI research is often disconnected from low infrastructure contexts due to socio-cultural nuances [84]. Prior work has attempted to bridge this disconnect [23, 47, 64, 107] through qualitative design studies with stakeholders. We add to this body of work with a qualitative study and qualitative analysis of log data to support sustainable and realistic designs for rural African contexts.

We explore designing for teachers using the theoretical lens of aspirations and the design method of a technology probe. Firstly, to create sustainable systems, Toyama [99] urges researchers to extend traditional HCI approaches that understand user needs [72] and follow an *aspiration-based approach*, i.e., to channel user aspirations while designing technology. The objective is to shift researcher thinking from problem-solving for user needs to support users to achieve what they aspire for themselves with technology [99]. To explore this relatively new design space for technology for supporting teachers, we conducted a qualitative study through observations, surveys, and interviews of teachers and educators who were already receiving training to implement a novel pedagogical program in rural Côte d'Ivoire. While the pedagogical program itself (referred to anonymously as *newMethod*) is not the subject of this paper, understanding teachers' experiences while they learn new challenging skills from the program can offer insights into how aspirations intersect with professional obligations.

Secondly, interviewing participants in low infrastructure contexts often fails to derive realistic use cases for technology due to participants' inclination to please the researchers, i.e., response bias [30, 99]. HCI4D researchers have used technology probes [26, 42, 108] to circumvent this bias by having participants engage in real interactions with a technology prototype over time, which can help uncover design ideas for realistic use cases. Therefore, inspired by prior work on WhatsApp [68, 101] and our initial conversational agent deployment in Côte d'Ivoire [23], we deployed a technology probe on WhatsApp to 38 of these teachers over 14 weeks to understand teachers' engagement and learn use cases that could support designs. This probe took the form of a lightweight conversational agent that allowed them to ask questions that they might ask of an expert.

Through the data from our simultaneous interview and technology probe study, we critique how a traditional needs-based approach might inhibit sustainable interventions with an example design of a conversational agent. We also describe designs for agent-based systems that align interventions with the teachers' aspirations that can lead to sustainable technology in low infrastructure settings for teachers. In this paper, we address the following research questions:

RQ1a: Given prior findings on the limitations of connectivity and infrastructure, what are the opportunities and challenges for technology to support teachers' implementation of a new pedagogical program in low infrastructure contexts like Côte d'Ivoire?

RQ1b: Based on their use of a technology probe, how do teachers engage with a technology like a conversational agent?

Finally, to explore sustainable designs using a theoretical lens on aspirations, we investigate:

RQ2: How do teachers engage with the implementation of a new pedagogical approach in rural Côte d'Ivoire?

Our contributions to COMPASS and HCI4D community are:

(1) We expand on the existing body of work of conversational agents in low infrastructure contexts to support designing for teachers in pedagogical programs.

(2) Using a theoretical lens on aspirations, we describe how interventions can design sustainable ecosystems by shaping aspirations for intervention adoption, creating new aspirations to promote behavior change, and utilizing collective teacher agency through peer support structures.

2 RELATED WORK

2.1 Pedagogical Programs and Teacher Training

In recent years, developing countries have invested in novel pedagogical programs to address the learning needs of primary school students [43]. These programs teach students foundational skills tailored to their learning levels [97]. The level-appropriate teaching for students and tailored guidance from facilitators help the students improve at their pace [106]. Prior work has used community volunteers, learning camps, and teachers as facilitators to guide students to enhance their foundational skills [16, 17]. Teachers have shown to be ideal for sustaining these programs in sub-Saharan Africa [1, 2, 94]. African governments have operationalized these programs using their teacher professional development infrastructures [1, 2]. Pedagogical program deployment differs from typical teacher training programs because they have more resources (financial, operational) and rigorous evaluations to understand their impact [43]. However, they also receive many of the same benefits and challenges as teacher training programs.

Significant research on teacher training tells us that ongoing and lifelong professional learning is an integral part of supporting teachers [34, 46, 50, 91]. Research has found that giving teachers *expert feedback* in person for their teaching sessions [19] through thoughtful reflection is an effective approach. Prior work on modeling teacher growth informs that teacher growth is non-linear; therefore, teacher training programs should consider building individual teacher capacity with *personalized* support [27]. Teacher training literature in the Global North has developed material to foster self-efficacy [15], self-reflection [87], and collaboration [28], some via interactive tools [35, 39]. However, it is unclear how this work transfers to developing contexts where experts are less readily available [20].

Although teacher training programs have been shown to improve children's education in developing countries [17, 31, 63, 78] it is challenging to implement them in rural contexts [31, 44, 69]. Teacher training interventions often require a cultural shift [61, 90] in which teachers are asked to change some of their long-held teaching beliefs and practices, making it difficult for teachers to implement the pedagogical approaches of a new program without frequent mentoring [10]. In developing contexts, teachers are mentored through regular visits by ministry officials [44]. Still, infrastructural challenges (i.e., poor roads, travel costs, etc.) and lack of mentors reduce the frequency of mentoring visits [20, 69] leading to challenges in teacher training implementation. Hence, it is helpful to support teachers in rural contexts who might need more mentoring and support in implementing these pedagogical programs.

2.2 Designing Technology for Teachers in Low-Infrastructure Contexts

Although technology has shown promise in education in developing contexts, a large portion of the research is focused on giving resources to children [56, 73, 100] or supporting school administration [5, 8, 81]. Prior projects that focus on teachers have helped them with *teaching resources* through video content [11, 62, 83], audio content [6], and text messaging [51], but it is not clear that simply providing teaching resources is sufficient to support teachers in implementing novel pedagogical programs [43]. Additionally, introducing new technology requires extra digital training and monitoring to promote engagement [62].

Prior work has mitigated training and monitoring costs by using popular social media applications, such as WhatsApp, which is a familiar tool for teachers [41, 66, 77]. In Indian contexts, NGOs have extended technology support beyond teaching resources by creating groups [9] to foster peer support and remote administrative help for teachers [71, 101–103]. In particular, these initiatives showed success in decreasing teacher absenteeism.

However, internet technology [23, 24, 66] in rural Africa is still lagging behind its Global South counterparts like India [3, 4]. In rural Côte d'Ivoire, a related project by Motteram et al. [68] found initial evidence that Whatsapp groups could foster support for language teachers, but rural teachers lagged on usage due to connectivity issues. [68]. In rural contexts, teachers use the internet infrequently or in specific locations due to low cell tower infrastructure [23, 68]. Therefore, to understand this design space, we extend the literature on WhatsApp based support for teachers, specifically for pedagogical programs in a rural context like Côte d'Ivoire where infrastructure is emerging [3, 4]

2.3 Designing for Aspirations

To build sustainable systems [74] for Information and Communication Technology and Development (ICTD) some researchers have shifted focus from user needs [72] to designing for users' aspirations [99]. Toyama describes aspiration as an individual's *long-term desire that is persistent and aiming for something higher than one's current situation* [99]. Learning user aspirations has shown to have practical benefits [36, 80] as well as theoretical roots [12] which improve research generalizability for the ICTD research [29]. Therefore, prior work in ICTD has explored aspirations in mental health [75], healthcare [45, 53], community networks [32], agriculture [38] and accessibility [55]. In education, prior work used aspirations to understand career paths for high school students [58], undergraduate students [52, 82] and vocational workers [95].

For African teachers, aspirations have been explored for pre-service undergraduate teachers' aspirations (i.e., teachers in training) in South Africa [22]. In prior work by the authors [24] on primary school teacher aspirations in Côte d'Ivoire we discovered teacher aspirations for (1) *Students' success*: teachers expressed that they wanted to see their students improve on the curriculum over the short term and improve professionally in the long term; (2) *Improving teaching skills*: Teachers expressed aspirations to improve their teaching skills to support their class better; (3) *Career progression*: Teachers aspired to progress in their career to become advisors and inspectors to have a broader impact on the community. However, we discovered aspirations for career progression conflict with their current teaching role, complicating the design space. Therefore, this paper explores how these aspirations intersect with the pedagogical program to design relevant technology for low infrastructure settings.

To design for aspirations, Kumar et al. [58] showed that aspirations are deeply intertwined with the community (*embedded*), aspirations are achieved after a time frame (i.e., have *temporal* boundaries) and can adapt with time (*mutable*). Additionally, Kano al. al [52] found the importance of role models in influencing the future aspirations of undergraduates in Bangladesh. In Côte d'Ivoire, we [24] found that teachers' professional aspirations conflict with their teaching responsibility. However, teachers' role models help them navigate this conflict between current aspirations (to support students) and future aspirations (to advance their careers). These insights, like Kumar et al. [58] and Kano et al. [52] have implications for designing systems that not only support interface design but also lead to developmental outcomes or better lives for marginalized users.

2.4 Conversational Agents in low infrastructure settings

Conversational agents or chatbots can scale up expert knowledge through artificial intelligence [37]. Chatbots have spread across the world and are being used on home assistants and social media platforms like Skype, Whatsapp, and Facebook [33, 89]. Chatbot research has expanded from rule-based algorithms to crowd work

to support dynamic learning [40]. An emerging area is combing human expert knowledge(hum-bots) with AI to allow for mutual benefit [37, 98]. Conversational agents have supported the improvement of educational outcomes of students in the classroom [86] or online settings [96]. However, a large section of this work is situated in western contexts.

Conversational agent research in western settings is disconnected from low infrastructure contexts due to culture and infrastructure variation nuances [85]. ICTD research has attempted to bridge this disconnect [23, 47, 64, 107] by uncovering design ideas through qualitative studies, but research on chatbots is still emerging. Prior work in chatbots explored perceptions of speech-based agents for low literate users [48, 65] or novice urban users' interactions with Facebook Messenger chatbots in India [49]. More such research is needed in Sub-Saharan counties like Côte d'Ivoire, where the language and low telephone infrastructure in rural contexts affect technology design [60]. Although phone-based conversational systems have been explored in Ivorian contexts for children [59], social media research for chatbots is still emerging. Our prior feasibility study in Côte d'Ivoire [23] found that such chatbots can collaborate with humans to support teachers on social media passively. Our prior log data analysis [23] showed that teachers could interact using French words, and used the agent intermittently during the week, i.e. with peak usage on weekends or outside school hours [23]. In this paper, we extend our insights [23] with a qualitative analysis of our data set of teachers' questions to uncover design directions to support rural teachers with pedagogical programs.

In sum, some pedagogical programs have been found to improve teaching practices successfully, but they must be adapted to support rural teachers in low infrastructure settings. Although prior work has used technology to support teachers, it is unclear if chat applications like WhatsApp–which many teachers worldwide use–can help teachers sustainably in rural Sub-Saharan Africa with low internet infrastructure. Prior work in ICTD has proposed an aspirations lens to design sustainable interventions, but it is unclear how teacher aspirations intersect with new implementations of pedagogical programs. Lastly, conversational agents have shown promise to support scalable interventions, but it is unclear how to translate such interventions for teachers in places like Côte d'Ivoire . Therefore, we explore this design space for pedagogical programs in developing rural contexts.

3 METHODS

This study is part of an ongoing research project to improve children's education in rural Côte d'Ivoire through poverty reduction and improved education for rural cocoa farming communities. An interdisciplinary team from Ivorian and North American universities conducted this study in partnership with the Ivorian Ministry of Education. We received approvals from all our institutional boards (Carnegie Mellon University protocol *STUDY2019_00000510*) and the Ivorian government to conduct the study.

3.1 Site Description

We conducted the study in a southwest region in Côte d'Ivoire. French is the official language of Côte d'Ivoire, but there are nearly 70 local languages [88]. This site primarily has an agricultural economy based on cocoa and coffee, which have been residents' primary source of income for decades [54].

The study site is a rural farming town in the Soubré region. It has a few urban schools inside the city, while the remaining rural schools are distributed in communities away from the city. Communities situated away from the city have lower infrastructure: i.e., they lack adequate water, electricity, and telephone signal. Remote communities have poor road conditions, which further impedes travel and increases their isolation. Students in these rural communities have low literacy rates, influenced by the rural context and low infrastructure [59, 60] [2].

A year before the study (2018-2019), the site hosted a new pedagogical program (*newMethod*) to improve students' foundational math and French skills. The program found successful improvements in students' skills in initial pilots. These initial successes inspired the NGO to scale the program to many schools in the region.

3.2 Background on *newMethod* and Teacher Training

The *newMethod* program is a teacher training program implemented by an international NGO. This program aims to improve foundational math and French of 3rd, 4th, and 5th-grade students. Teachers first perform a baseline test to split the students into three groups by their learning proficiency. Throughout the year, teachers conduct activities with these groups of children in dedicated 45 mins slots every day for French and mathematics skills. These activities are child-centered and playful to deliver instructions at a skill-appropriate level. Teachers test the students again during the middle and the end of the year to evaluate the student's progress.

The *newMethod* program is embedded in the Ivorian education system and utilizes the stakeholders in the ministry to implement and monitor the intervention.

Figure 1: A typical *newMethod* activity in a rural setting. Students are split into levels based on proficiency in French and math. At each level, they participate in participatory activities for 45 mins a day for each subject led by their teacher.

[2]**Note**: More details about typical school setting and teaching can be found in our prior work [24] in section 3.3.1

Teachers form the main stakeholders. *newMethod* uses 3rd, 4th, and 5th-grade teachers to implement the activities. The *newMethod* program encourages teachers to play the role of facilitators. *newMethod* activities use hands-on games to teach foundational skills to children.

Directors are senior school teachers appointed by the inspector to manage the school. Directors act as the first line of support for the teachers for *newMethod* ; they receive special mentorship training and coordinate the *newMethod* activities in the school.

Pedagogical advisor is a remote mentor who visits schools and provides teachers with professional development support. For *newMethod* , pedagogical advisors visit schools to observe teachers perform *newMethod* activities and guide them to implement the method correctly.

Inspectors serve as administrative and pedagogical supervisors for the region. Inspectors visited schools to observe teachers implement *newMethod* and motivated them.

Master trainers are high-ranking ministry officials specializing in pedagogy. Master trainers supported the teacher training and visited schools to observe the teachers.

Teachers receive training for *newMethod* in week-long workshops before implementation. These workshops are held at a school near the city; most rural teachers temporarily stay in the city to participate in workshops. Our research team started the research project during the *newMethod* training workshop at the study site in February 2020.

3.3 Data Collection

Our data collection team consisted of a US-based HCI researcher and a linguistics graduate student from Côte d'Ivoire. The data collection was conducted in French by an Ivorian researcher with help from a US-based researcher with moderate French proficiency. We described the study and the purpose of our visit during the welcome keynote session. The Ivorian researcher verbally explained the research and the protocol risks to each participant before collecting data. The Ivorian researcher obtained individual participants' oral consent as appropriate in the context. Study participation was voluntary, and participants were not compensated for any method.

We collected data for three weeks through observations, surveys, and interviews. We also deployed a conversational agent probe to 38 teachers to learn technology use cases to support teachers. Table 1summarizes the data collected from these various methods.

3.3.1 Field Observations. *newMethod* training involved about 60 teachers from selected schools in the region. The teacher training had a tight schedule from morning to evening, with a few short breaks and a lunch break in the afternoon. Directors and pedagogical advisors led the program and frequently selected a teacher from the group to guide the activity. A selected individual role played as a teacher implementing the activity, and the rest role-played as students. After a few mock sessions, there was a question-answer session where the teachers answered questions raised by their peers. Often when a question was challenging, they would ask the directors or master trainers. To support inexperienced teachers, directors assigned tasks such as note-taking or leading activities to increase their involvement. Although the training was rigorous and formal, directors lightened the mood by occasionally introducing informal activities like singing and dancing.

The research team observed and participated in the activities throughout the week. These observations helped us understand the *newMethod* program and the various classroom activities implemented by the teachers. We were able to glimpse the situated struggles (sitting on the floor for long-duration, heat) and bonding experiences (singing, dancing) during this challenging week. We recorded our field notes and discussions in our research journal and used these lessons to refine our questions for our surveys and interviews. *newMethod* observation data is used for RQ2 4.3.

3.3.2 Surveys. We used a Google form in French on a tablet to conduct surveys. The surveys had questions to understand participants' technology and social media usage, demographic questions, and questions related to *newMethod* to get initial perceptions of teachers. Responses helped us structure our interview protocol. Fig 2 depicts a survey session in a school where the interviewer is helping the teachers. Survey data is used for RQ1a 4.1.

Participants were given the tablet device and encouraged to complete the survey independently. Participants often requested help navigating the sections of the Google form and requested clarification for specific questions. The surveys took approximately 30 mins. Thirty-eight participants responded to the surveys (29 teachers, 6 school directors, and 3 advisors). Most survey responses were recorded during breaks or after the teacher training sessions. We also collected additional responses from participants during interview sessions if they hadn't attempted it before.

3.3.3 Interviews. The week after the training, the research team observed baseline tests and the first week of the *newMethod* activities. We collected photos, videos, and a diary of events and had various discussions offline to understand the training teachers' perspectives. We also interviewed teachers during these observations to get contextual information about the program.

We chose four schools (one urban school and three rural) after discussions with the pedagogical advisors and master trainers. Schools were chosen to observe *newMethod* in different locations and interview the stakeholders to get a holistic understanding of *newMethod* at the study site. We interviewed the director and 2-3 teachers for every school based on their availability. The interviews were conducted with voluntary verbal consent from the participants, and they were offered no compensation for participating. Individual interviews of between 1-1.5 hours were performed, with our field team conversing personally with ten teachers, four directors, two advisors, and one inspector. We also report data from our discussions with three master trainers from 2019. Interview data is used for RQ1a 4.1 and RQ2 4.3.

3.3.4 Conversational Agent Probe. We then piloted a conversational agent *technology probe* [26, 42, 108] during the *newMethod* training workshop (Fig 5) January 2020. Probes, as per Hutchinson et al [42], are a design method used to co-design technology with users to learn their needs and desires in real-world settings. Using technology probes also helps researchers learn from the usage data to inspire new design directions. The probe was designed using prior work [23], and was intended to support teachers during *newMethod* implementation. Our conversational agent employed

Table 1: Summarizes our data sources collected by the team

Observations	
Participants	~70
Duration	6 days (9AM - 5PM)
Stakeholders	Teachers ~60, Directors: 4, Master trainers 2, Advisor: 1
Timeline	(Week 1) - during *newMethod* training
Surveys	
Participants	37
Gender	Female: 9 Male: 28
Stakeholders (4)	Teacher: 28, Directors: 6 Advisors: 2, Inspector 1
Timeline	(Week 1-3) - mostly during training
Interviews	
Participants	20
Gender	Female: 3 Male: 17
Stakeholders (5)	Teachers: 10, Directors: 4, Advisors: 2, Inspector: 1, Master trainers: 3
Schools (4)	Urban: 1, Rural 3
newMethod Observations	10 hrs
Subjects	CP1-CM2 (3rd-6th grade)
Timeline	(Week 1-3) - after training
Conversational Agent Probe	
Participants	38
Duration	14 weeks
Timeline	(Week 1-14) - after training, till the end of the academic year

Figure 2: The researcher helps a teacher with a survey (left) and the researcher conducts an interview in a school (right).

a *humbot* architecture, with a database [23] of frequently asked questions about *newMethod* which were answered automatically (Fig 3 B). When questions fell outside this database, teachers could ask for help (Fig 3 A). If teachers requested help with a particular question, it would be flagged in the database, and teachers would receive the answer in a few days (Fig 3 C).

We instructed teachers to ask questions to seek help during implementation, i.e., after the training workshop. We also told the teachers that the conversational agent would prioritize answering questions about *newMethod* and teaching but they were free to ask any questions outside *newMethod* . Teachers were free to ask questions at any time and were not given any incentive to interact with the conversational agent . Researchers responded to questions referring to the *newMethod* manual on the teaching method [94] and Google search for complex queries. We found that teachers used the system outside school hours intermittently during the week, i.e., with peak usage on weekends or during evenings on weekdays (refer to our prior work [23] for more information on usage insights). The log data from teachers' questions are used to answer RQ1b 4.2.

3.4 Data Analysis

We used qualitative analysis to analyze the (1) observations and interviews and the (2) conversational agent log data.

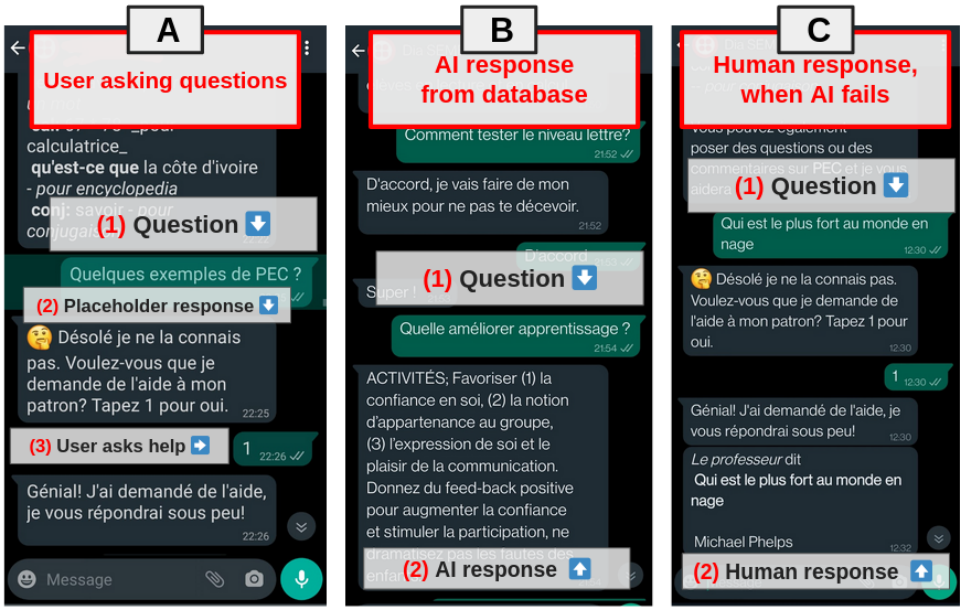


Figure 3: A representative screenshot of our conversational agent probe [23]: (A) the agent asked the user to type "1" to request human support if the question was outside the database. (B) the probe had some questions related to *newMethod* and returned responses immediately. (C) When the team answered the question, the agent returned the answer with the user's question.

(1) We combined observation notes and interview data from our field into a single data set. We transcribed and translated the interview data into English and formed the low-level themes using thematic analysis [21, 25, 70, 93] to synthesize the themes for our research questions.

We use the *aspirations-avenues-agency* framework [57, 58] to annotate our themes. *Aspirations* translate to longer-term desires [99], *Avenues* are pathways both traditional and non-traditional that users take towards fulfilling their aspirations [80] and *Agency* is the capacity that people build to create these avenues [57]. We also use this framework to situate our findings with our prior work on teacher aspirations [24] and extend this analysis to a pedagogical program.

(2) We transferred the questions from the teachers (110) to a spreadsheet after an initial data cleaning. We translated the questions from French to English and then annotated them into codes, e.g. (Grammar questions, History quotes). These codes were categorized based on the type, i.e., Math; History was classified into "Subject." Finally, these categories were grouped into seven higher-level themes. Table 2 summarizes our codebook.

3.5 Self-disclosure

Our team consists of HCI researchers, economists, and linguists. We are based in North America and Côte d'Ivoire and have conducted research in various developing regions. The first author and the second author are from developing countries, and they formed the protocols and analyzed the data after discussions with the Ivorian team and faculty. We picked conversational agent as a design direction based on our conversations with our partner NGO's team members. Our goal with the subsequent studies is to deploy and evaluate this intervention at scale. The long-term goal of our project is to support teachers with low-cost technology to implement the pedagogical program..

4 FINDINGS

We now discuss key themes from our interviews with the teachers around their (1) *newMethod* and technology, and (2) *newMethod* and aspirations. We then use these findings to discuss the importance of designing for aspirations.

4.1 RQ1a: Technology Opportunities and Challenges

This section describes existing smartphone use by teachers, initial perceptions of new technology, and cultural themes relevant to technology design.

4.1.1 Opportunity: High smartphone adoption, demand-driven internet access. Smartphone access was pervasive among teachers at the study site, and they used it more during the weekends. 33/37 had access to smartphones, and they often had multiple SIM cards from different service providers (MOOV, MTN, and Orange). 21/37 had more than one SIM, 8/37 had all three operators and the rest had one SIM. All had at least one Orange SIM. Teachers switched SIMs for better phone networks, internet, and phone call rates. Teachers mentioned they used their smartphones often to make phone calls and send messages. Teachers said that they used technology after school or during breaks in the context of teaching.

I use it once a day, but it depends. Since I work from Monday to Friday, I use my smartphone on weekends than during school hours on working days. In short, it's more during my days off because I have

time and I don't have the pressure of preparing for lessons, correcting a notebook - T3

Teachers said that internet access was a luxury and network access varied by location. Most teachers mentioned that they would connect to the internet only if they needed something, i.e., such as searching for something on the internet or accessing social media. Teachers used internet passes, which temporarily gave them a quota of data to access the internet. Our survey data showed that teachers spent ~1000 CFA (~$2) per week on the internet. Internet access was also dependent on the presence of a phone network in their schools and homes. Teachers who lived in urban areas had access at home, but teachers in remote areas connected if they traveled to the city on weekends. Among social media, teachers said Facebook Messenger and WhatsApp are prominent tools for one-on-one interaction due to their convenience and privacy.

4.1.2 Opportunity: Technology usage for professional development and peer support. Teachers used their smartphones for learning new terms on Google and French vocabulary. They used offline applications to look up the meaning of new words in dictionaries and find verb conjugations. According to our survey data, 26/32 teachers used technology to support their classrooms.

I may use the phone at school when I need to know the meaning of a word. I research on the internet to get the answers. It's fast on the internet. Some verbs are difficult to conjugate, so I download applications that allow me to work easily. -T3

Teachers used phone calls to interact with their peers about their professional development. They would call other teachers to discuss a teaching practice or a problem in the classroom. They chose to perform these activities outside class hours. Teachers said they had both requested and helped others through these phone calls. Here, D1 tells us how she calls her friends in the morning.

Classes start at 7:30 a.m. and already at 7:10 a.m., I'm here so I have time to call [a teacher] to ask them: this is such a lesson, or this is such a difficulty that I encounter and how can you help? - D1

4.1.3 Challenge: Smartphone adoption by advisors was limited. Unlike teachers, advisors and trainers did not use smartphones regularly. We observed that trainers did not have smartphones or were still learning to use their devices to access the internet. Master trainer (MT2) had a tablet but accessing the internet drained his battery considerably. Maintaining phone batteries was important because trainers traveled regularly, and they needed their devices to make phone calls to plan their school visits. Advisor (A2) had a smartphone at home, but it did not have internet access as it didn't have a SIM card. He mentioned that his grandkids used the device to play games, and he used the basic phone to make calls. Their prior phone usage patterns, busy travel schedules, and nature of work inhibited them from using the internet on their smartphones.

4.1.4 Opportunity: Initial social media and smartphone usage for the pedagogical program. Teachers also mentioned that they use informal teacher support groups on social media, but social media support for *newMethod* was still surfacing and limited to directors. Directors mentioned informal social media groups about *newMethod* where they could post questions related to the training activity. Our surveys found that 10/38 participants were members of the unofficial Facebook group for *newMethod* directors, and 5/38 knew about it but were not members. D2 mentioned that they would get support for their problems after class. These informal groups were piloted for selected directors, and *newMethod* team wanted to extend this support to teachers.

Yes, we created a newMethod Facebook group, when we had difficulties at the beginning, you could express your problem in the group, and the other members of the group bring solutions, but it is in the evenings that this is happening. There is also a WhatsApp group where we expressed our difficulties. - D2

Lastly, teachers mentioned that multimedia could be helpful in learning activities. We found that directors shared photos and videos of themselves performing the activity on the Facebook group. These posts received better engagement and created a sense of camaraderie—D4 echos the utility of multimedia to explain a method to a teacher: *I had images and a video of the session with them (newMethod team) that I showed him. I lifted [the stick], I present when it goes in the other hand and say 'ONE!'. He looked at the video and saw that it matched what I did.* - D4

4.1.5 Challenge: In-person visits had a socio-cultural benefit that could not be substituted by technology. Advisors, inspectors, and the NGO explained the importance of visits they believed technology could not substitute. A2 explains that meeting teachers and the students provides a human connection that is not into technology. He mentions how he encourages teachers and reinforces their influence on their students.

Advisor: When I visit teachers, I tell them that what they are doing is good. For example, when I observe children who can write, I tell them that they [their teachers] are doing a good job and the reward is not far. We must help teachers, encourage them, and tell them that they are good and can still do better.

Interpreter: can you do it on the phone?

Advisor: We can do it over the phone, but it is not enough, we have to go to the field, and the phone alone is not enough.

Inspector explained the importance of visits which went beyond monitoring but to forming a social connection. The inspector said that teachers feel isolated and need additional social support to help them overcome their struggles. The awareness that their superiors cared enough about their work to visit them improved teachers' motivation to work harder. I1 expresses the benefits of in-person visits:

There is a psychological effect, the fact that the teacher knows that we will come to see him puts him more to work, then on the other side the advantage is that he feels he is not alone. By coaching him, he is also more motivated, and he sees that it is not a solitary adventure.

Despite this perceived value of presence, teachers suggested that they are open to using technology for the pedagogical program if a tool helped them reduce dependence on the advisor. They were mindful of internet access challenges but were willing to spend money if it benefited them. Here T6 expresses his feedback on a storyboard (Fig. 6,7):

We can work with the tech if there is an application available with certain information that can help us simplify and improve our work while allowing us not always to call on the advisor for certain things.

4.2 RQ1b: Conversational Agent probe usage

Teachers used the probe for 14 weeks, without incentives. The system was deployed in the context of COVID-19, which was at its peak during weeks 8-12 in the country, and schools were closed during the lockdown. Although schools reopened in 4 weeks there were attendance restrictions due to social distancing, *newMethod* implementation was halted after the lockdown for the safety of the students.

Teachers asked a total of 110 questions to the probe[3] Our analysis revealed six higher-level themes as shown in Fig 8.

4.2.1 Training (24%): high to low level understanding of the program. Pedagogical training questions progressed from questions about goals and motivation, to operational questions, and finally to activity implementation. Initially, teachers asked for general information related to *newMethod* , e.g., teachers were interested in the objective of the pedagogical program: *What is the purpose of newMethod ?*. Later questions were related to *newMethod* operations. For instance, teachers were curious about why lower grade students (primary students in the first two grades) were not exposed to the program: *Why is newMethod not implemented in CP2?*. Finally, we saw activity-level implementation questions during implementation: *How to carry out a newMethod activity on the image description*, and meta-level questions: *How to arrange activities for better learning?*. These categories and trends hint at different levels of needed support, i.e., general to specific implementation for pedagogical programs.

4.2.2 Subject (27%): short questions about classroom knowledge. We observed that teachers frequently asked questions related to disciplinary subjects from their classroom teaching; in fact, this was the most prominent theme seen consistently across weeks, see Fig 4a). Teachers asked questions related to Geography, History, Maths, Science, and Grammar, i.e., subjects that they taught at school. These questions were short answer questions, such as geographical facts *What is the smallest state in the world?* or quotes from history *What are the citations of Kant?*. We also saw similar questions asked by more than one teacher, hinting that these questions were related to ongoing classroom topics. Teachers stopped asking questions related to teaching during the lockdown and then restarted asking them once schools reopened.

4.2.3 Non-teaching themes (10%): News, Sports, and COVID-19 information. We also observed that teachers asked miscellaneous questions related to news, sports, and entertainment. Teachers asked about trending news in Côte d'Ivoire and across the world. Some were specifically Ivorian: we received a question when a former Ivorian president was trending - *I want to have the news about the trial of former Ivorian President Laurent Gbagbo.* Others related to world affairs: *I want to know the name of the NBA player who died and the circumstances of his death*, related to Kobe Bryant, a US basketball player's sudden death due to a helicopter crash. Sports questions were about the English premier league or soccer transfers. Teachers mentioned that soccer was their passion in interviews and played tournaments among teacher groups regularly. Importantly, when the COVID-19 pandemic started and schools locked down, questions were dominated by COVID-19 symptoms, news, and vaccines. While answering these questions, we acknowledged that we were not experts and sent them links from Google.

4.2.4 Social (22%): Conversational messages and greetings. Lastly, we observed that the teachers often greeted the conversational agent informally during interactions. Teachers used smileys: **:) :) :)** or short forms: *Bsr* (short for *Bonsoir* or Good evening) to greet the chatbot. Our formal French language model did not classify these messages as greetings and misinterpreted them as questions. Additionally, teachers wished good thoughts to the conversational agent on occasion about the pandemic or for local festivals (*We pray that this pandemic ends.*; *Happy Easter to all! https://images.app.goo.gl/cha8w34c21bqe7zka"*).

4.3 RQ2: How do teachers engage with the implementation of a new pedagogical approach in rural Côte d'Ivoire ?

This section explains how teachers engage with the newMethod using a lens of aspirations (Section 2.3). We present how teachers' aspirations [24]., i.e., students' success, improving teaching skills, and career progression interset with the *newMethod* . Our goal is to use these intersections and translate them into design recommendations in the discussion. *newMethod* is not the subject of this paper but provides a ripe opportunity to observe these teacher aspirations in practice.

4.3.1 Alignment with teachers' aspirations to improve adoption. *newMethod* is centered on students' success. Supporting the attainment of student success was a short-term teacher aspiration that we described in prior work [24]. Teachers mentioned that they could directly observe the benefits of the new pedagogical program through students' increased enthusiasm, participation, and learning. As T10 mentions:

Children love to play and where there is play, children get involved and since the activities are conducted as a game, the children are interested and they play, letters and numbers are like a game, but by playing, they learn.

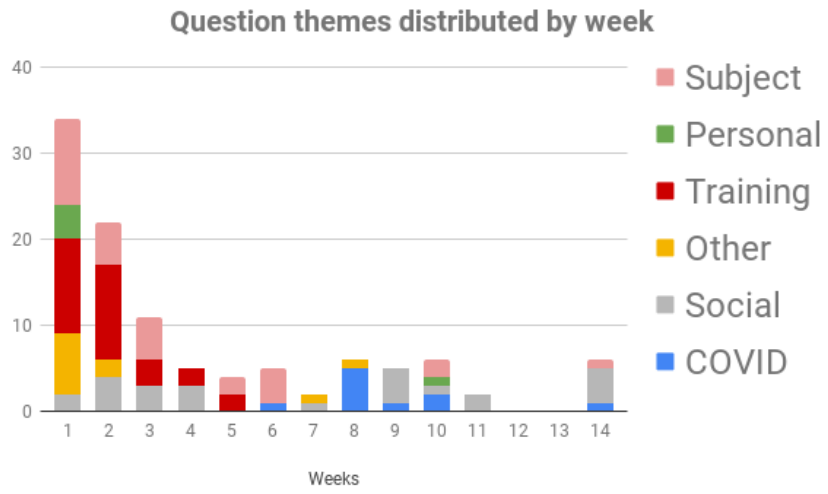
Teachers explained that they observed a positive impact on their students after only a few weeks of implementation. Teachers also observed improved participation during program slots which later transferred to regular classroom activities, thus leading teachers to believe that *newMethod* would play an integral part in students' success. Observing improvements and centering the program on their existing aspirations shaped teacher aspirations towards program adoption. Here, a school director (D1) expresses the program's positive role in students' education in the next few years [4].

My greatest wish is that most children can read and calculate as required by the newMethod . Because if most children can read, I believe they will do well in composition subjects or the exam. During the various assessments, [..] reading and mathematics are the problems. So if the next three years, if they improve in them, I think the Ivorian school would have won.- D1

Lastly, the program uses teacher role models in the community to inspire the teachers about *newMethod* . Ministry officials such

[3]This number was likely affected by the sudden COVID disruption, beyond challenges of internet access in the context.

[4] We asked teachers what change they would like to see in their student's education (i.e., aspirations for their students) inspired by Toyama [99]



(a) Question themes distributed by week

Figure 4: Summarizes key themes and their distribution over the duration of the study

as advisors, inspectors, and master trainers regularly visited the teachers in their schools to support and encourage program implementation. These officials also perform these activities with the students, which encouraged teachers to implement these activities well. Senior members(master trainers) mentioned regular interaction with the teachers was the program's strength.

4.3.2 Creating new intermediate aspirations through achievable roles. Our prior work found that teachers aspired to progress in their careers to have a broader impact (as advisors or inspectors) on the community but were impeded by the difficult civil service exams required to obtain those roles. The program created new alternative roles that were achievable for teachers to attain simply through program participation. For instance, teachers are called as "facilitators" whose new role is to guide the children towards their learning. All teachers become facilitators after the training. The teacher's role as the facilitator is to build a good relationship with the student, ultimately breaking the authoritative barrier between the teacher and the student. The teachers could play this role by implementing student-centric activities.

The program also offered new leadership positions to create new intermediate aspirations for teachers. Teachers were actively given leadership positions termed as mentors (see Fig 5) based on their performance in the program. Mentors were offered a superior social status, additional training, and frequent interactions with superiors. Teachers were chosen as mentors based on their performance and participation in the program over the year. As T9 explains, how active program implementation helped his colleagues achieve mentorship positions:

And after the training that took place [..] among all those who took part in these training, I saw some who became mentors because they took seriously what they did. In life, when you do something, you have to take it seriously. Even if we put everything at our disposal, if we work negligently, we will not evolve. -T9

4.3.3 Allowing teacher's collective agency to scale and sustain the program. newMethod creates pathways that allow teachers to realize their potential, whose collective work benefits teachers themselves and the program. As described above, teachers' career progression was impeded by difficult exams. The program's mentor role created an alternative pathway for teachers to exercise their agency for intermediate career progression. The mentor role required training and supporting fellow teachers providing mutual benefit to the program and the teacher. Here D2 explains how his aspirations to improve in his career led him to utilize these pathways to rise in the program's ranks.

In everything, we dream of climbing the ladder; to get there, we must do our job better [...] I want to become an inspector or educational advisor [...] This is why when there is a new pedagogy. I appropriate it with all my heart and one hundred percent. I go through all means to master it to be able to dispense it well. Here we are four who have been listed as mentors not because the others are bad, but you have to know how to be noticed positively. - D2

Teachers rising to mentor positions also paved the way for scaling and sustaining the program. The mentor roles were structured to fill in for the limited pedagogical advisors when the program scaled to more schools. Mentors also acted as the first support system to their fellow school teachers and teachers in the vicinity, reducing their dependency on the advisor, who would usually be remote. Ministry officials also recognized teachers' potential and welcomed their support. Here, Advisor(A2) explains that he will retire soon but believes teachers are the future.

Logically, I am going to retire in July 2021 so I have 1 year left. [..] but they (teachers) are still young and we need someone to do the training if the newMethod is to be popularized on a national scale. There are more than 17,000 schools in the Ivory Coast, if all the schools have to implement newMethod then we need people to train them

Figure 5: A Director takes the role of a mentor to teach an activity to the teachers during training

because there will not be many national trainers(superiors) to do all this work. -A2

5 DISCUSSION

This section connects our findings from the technology probe and teacher aspirations toward designing sustainable systems. Our probe's goal was to learn the scope for remote mentoring for teacher training in *newMethod* (see storyboard Figs. 6 and 7). Teachers were able to engage with a new technology over many weeks, demonstrating the usability of the tool in a new context. Our qualitative analysis of teacher questions identifies themes in teaching, teacher training, and non-teaching scenarios expanding the scope of support such a tool could provide in remote mentoring. In the first section, we use findings from RQ1a (Section 4.1) and RQ1b (Section 4.2) to demonstrate sustainability challenges by situating technology purely on teachers' needs and then, suggest ways to overcome these limitations using data from RQ2 (Section 4.3) and theoretical connections to aspirations.

Critiquing designs on needs-based approach. Our data from RQ1a (Section 4.1) and RQ1b (Section 4.2) discovered that teacher needs could not be addressed solely digitally by advisors, as there was a cultural significance to in-person visits. We expected a tool like this to amplify the relationship between stakeholders digitally, i.e., teachers could seek help from their supervisors (advisors) using a tool like a conversational agent in the future. However, our data suggest that such a tool is not practical for this scenario because advisors could not transfer all their work digitally. Firstly, we expected the advisors to answer teachers' questions, but we learned that the advisors did not have smartphones or were already overloaded to take on this additional responsibility. Instead, advisors and trainers continued to spend their time on in-person visits, which they believed played a significant role in supporting the teachers. Secondly, all stakeholders mentioned the cultural significance of in-person visits, which technology could not substitute. Advisors said that meeting the teachers in person positively affected teachers as they saw a respected person take an active role in their lives. Approaching the problem with a needs-based approach creates an external imposition [74, 99] which fails to allow for practical use cases. Needs, as Toyama mentioned [99] are centered on negative feelings, thus leading to designs that are externally imposed or aim to support fleeting problems.

We also learned that teacher needs were transient [74, 99]. We noticed that question topics gradually changed over time; some went outside the scope of teaching or teacher training. Teachers asked questions about COVID-19 symptoms or very context-specific, e.g., (*How to start cattle business?*). This question trend confirms that teacher needs are transient [74, 99]. Hence it is hard for future designs to support such scenarios in the long term.

5.1 Towards Designing for Teacher Aspirations

We now describe alternative approaches to address the limitations of needs identified in the previous section using data from RQ2 (Section 4.3) and theoretical connections to aspirations. For each subsection, we first explain our finding, then provide an example in the context of our conversational agent scenario and then connect it to the broader literature.

Designing for Teacher Agency. Our finding on utilizing collective teacher agency can be translated into technology design through improved structures that enhance their capacity to engage in peer support in rural communities. While in-person support from experts was seen as vital, our data also supports peer-based learning; for instance, D1 describes how she comes to school early to seek help from peers for her lessons *I'm here (early), so I have time to call someone (teacher) to ask them: this is such a lesson, or this is such a difficulty that I encounter and how can you help?*. However, rural teachers' existing collegial networks for relevant professional development support was limited, as regions tend to be small. Technology can

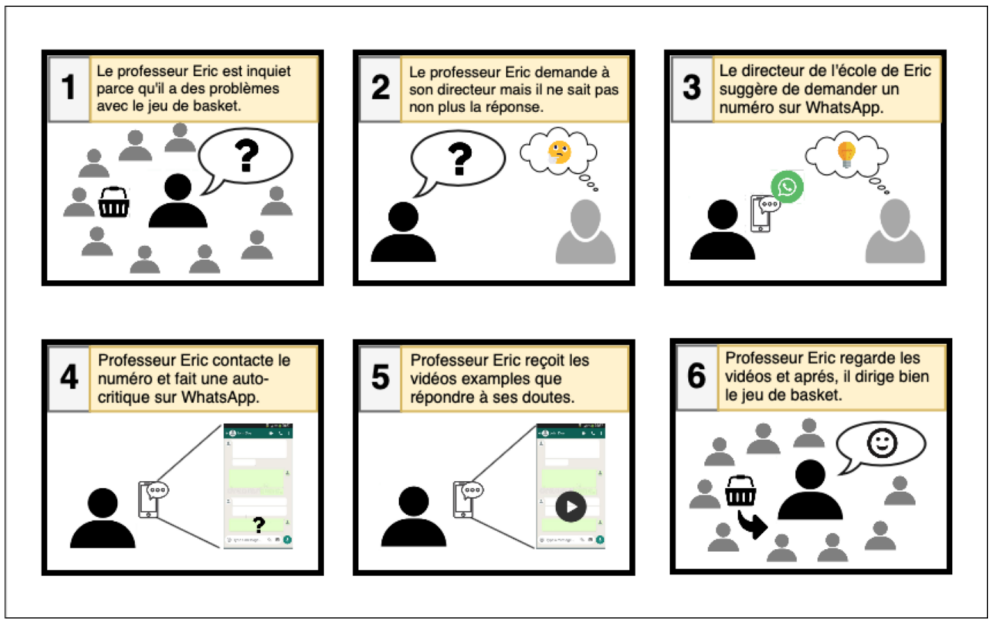


Figure 6: Storyboard 1: Here the chatbot is helping Teacher Eric with an activity to implement a pedagogical program.

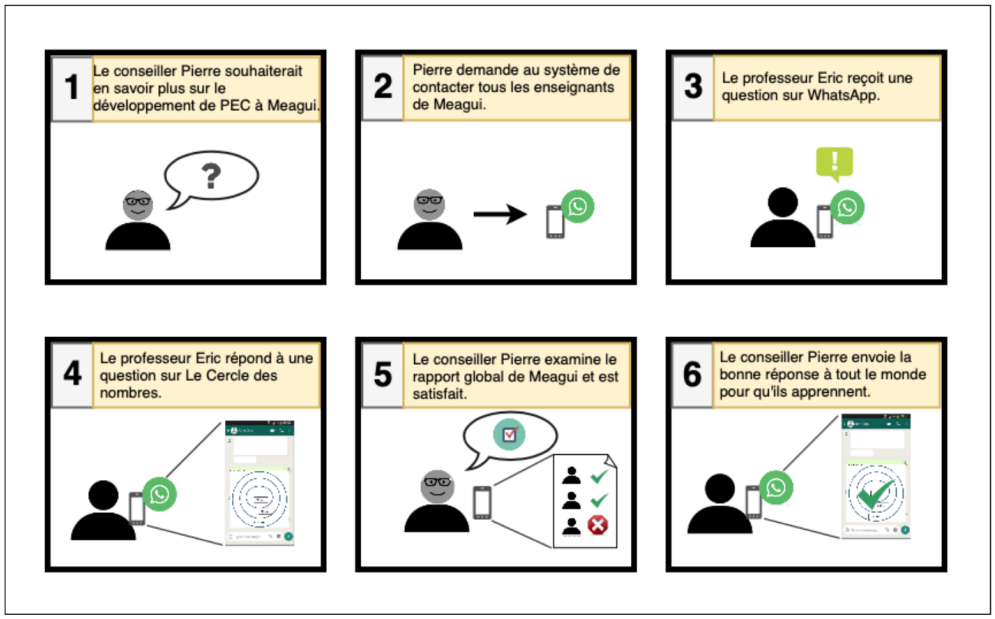
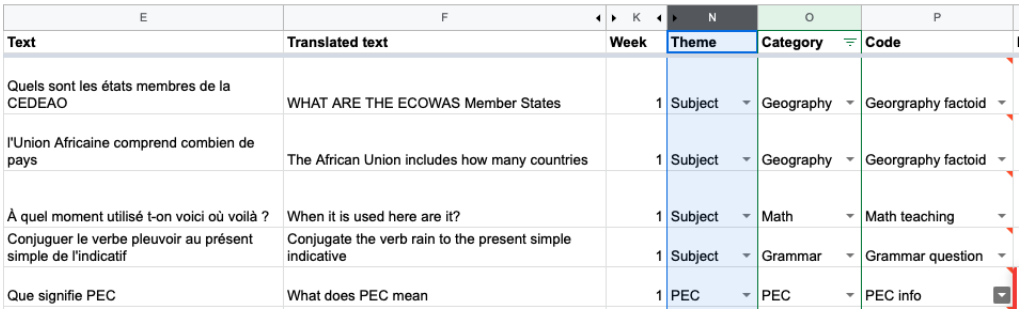


Figure 7: Storyboard 2: Here, the chatbot supports an advisor to monitor the teachers in the region using a quiz.

expand a rural teacher's limited collegial network by providing connections outside their social circle to teachers in different regions with different perspectives on professional development support. Beyond simply greater access to peers, conversational agents could have a role in better facilitating these support conversations. Prior work by Toxtli et al. [98] allowed expert users to provide asynchronous answers to novices' questions through a conversational agent. We can extend Toxteli et al.'s [98] designs to focus on teacher peer support (instead of limited experts) by allowing teachers to answer each others' questions within a conversational agent. For instance, agent designs could facilitate appropriate conversations by making



E	F	K	N	O	P
Text	**Translated text**	**Week**	**Theme**	**Category**	**Code**
Quels sont les états membres de la CEDEAO	WHAT ARE THE ECOWAS Member States	1	Subject	Geography	Georgraphy factoid
l'Union Africaine comprend combien de pays	The African Union includes how many countries	1	Subject	Geography	Georgraphy factoid
À quel moment utilisé t-on voici où voilà ?	When it is used here are it?	1	Subject	Math	Math teaching
Conjuguer le verbe pleuvoir au présent simple de l'indicatif	Conjugate the verb rain to the present simple indicative	1	Subject	Grammar	Grammar question
Que signifie PEC	What does PEC mean	1	PEC	PEC	PEC info

Figure 8: Analysis of questions

Table 2: Table summarizing our code book from questions

Subject/Classroom Teaching 31 (28%)
Geography 11
History 6
Math 4
Ivorian Administration 4
Grammar 3
Science 2
Teaching method 1
***newMethod* 25 (23%)**
newMethod info 11
newMethod implementation 11
newMethod resource 3
Feedback 24 (22%)
Clarification 17
Greetings 5
Feedback 2
COVID 10 (9%)
Covid news 7
Covid treatment 1
Covid symptoms 1
Covid forward 1
Other 9 (8%)
Sport 5
News 4
Personal 6 (6%)
Business advice 4
Sexual Health 2
***newMethod* logistics 4 (4%)**
newMethod logistics 3
newMethod implementation 1

connections to the most relevant peers based on expertise, location, or usage. Drawing on A2's assertion that teachers themselves are needed to scale and sustain the program, a conversational agent design could also learn from teachers' answers to their peers and answer future similar questions, reducing reliance on limited experts in low-infrastructure contexts while drawing on teachers' own expertise [37, 98]. Therefore, there are opportunities to extend peer support to rural teachers in chat-based scenarios that rely on collective teacher support to enhance in-person support provided by advisors.

Shaping Aspirations for Technology Adoption. Our findings for role model champions and aligning interventions towards existing aspirations could be translated towards improved technology adoption. In our context, ministry officials championing the program and centering the program's messaging on students' success led to organic program adoption among the teachers. For our chat-based

scenario, role models could be integrated into intervention deployment as community champions [67] i.e., inspectors and advisors could advocate and use the technology during school visits to explain the intervention's valuable role towards student success. ICTD literature has emphasized the importance of role models and mentors [52, 58, 99]. Prior literature in economics has demonstrated how villages with female leaders showed improvements in parents' investments in their daughter's education [18]. In these villages, parents' and children's educational aspirations increased when they observed these female leaders taking a more ambitious role in society. In the ICTD literature, Pérez et al. used role models in *Tika Vani* to choose characters of marginal groups (lower caste) as protagonists in their designs to inspire inclusive m-health technology adoption [76]. Such interaction techniques allow for positive social proof [105] by observing the success of people similar to them, therefore helping them become more ambitious about their aspirations. Designers could use this construct to shape aspirations by using role models in their technology designs.

Creating New Aspirations for Behaviour Change. We learned from our findings that interventions could create new aspirations to allow positive behavior change. Our data reveals that *newMethod* created leadership roles (mentors) aligned with teachers' aspirations to increase their impact on their community through career progression [24]. These roles acted as an achievable intermediate aspiration towards impacting the community allowing for a positive behavior change, i.e., convincing teachers to implement the program. For our chat-based scenario, digital and non-digital leadership roles could be designed for teachers to support community members. For digital roles, teachers could be given a superior status based on their technology usage, such as community moderation roles given to active users in *Sangeeth Swara* [104]. Alternatively, voluntary positions (technology mentors) could be created outside technology to allow mentoring on technology-related issues. In ICTD literature, creating aspirations can be linked with Kumar's perspective [57] on how aspirations can be modeled as sequential milestones, i.e., achieving one aspiration improves agency to achieve future aspirations. Therefore creating the apt intermediate milestone can change behavior by utilizing user aspiration. Prior work has demonstrated this at scale: *no toilet no bride* campaign [92] used the aspirations of youth to find eligible brides to convince them to build a toilet in their homes. In rural India, the campaign improved ownership of latrines by 21% in homes with the youth of marriageable age. These examples show that creating new aspirations that align with broader users' aspirations can change behavior. Designers can use these opportunities to model new aspirations inside or outside technology to help promote behavior change.

5.2 Reflections on applying Aspirations

Providing agency, creating and shaping aspirations align with Appadurai's [12] suggestion to raise the user's capacity to aspire. Users in low resource contexts often lag in their aspirations, are unable to harness capabilities, or lack the relevant information to convert their desires from *wishful thinking to thoughtful wishing*. Our findings demonstrate a positive role that can be played in supporting users in their aspirations by using interventions to shape existing and create new aspirations. We are excited for ICTD researchers, practitioners, and theorists to extend our work.

Our research taught us that it is essential to convince partners on *Why aspirations?*. During our research, we discovered that our NGO partner was more interested in their organizational goals to deliver improved educational outcomes than prioritizing teachers' long term career aspirations. The NGO deeply cared about teachers and was doing its best to support them, but teachers career aspirations fell outside their scope. We believe more work is needed to demonstrate the impact of aligning long term aspirations to practitioners and policymakers outside academia.

Our research also induces the question: *Which aspirations? Who prioritizes them?*. We chose career aspirations to align with our expertise and funder goals. However, teachers also had personal aspirations related to their families' well-being or financial outcomes, which we could not support through this project. Kumar et al. [58] highlight this question in their research when they mention the role of the researcher in uncovering aspirations in their work.

6 CONCLUSION

Governments in low and middle-income countries aim to improve primary school outcomes by relying on teachers to implement new pedagogical programs. However, these programs face challenges in training teachers in low resource contexts due to limited expert support, teacher isolation, and limited technology infrastructure. Conversational agents have addressed some of these challenges by scaling expert knowledge and providing personalized interactions, but it is unclear how this work can translate to rural African contexts. To explore the use of such technology in this design space, we conducted two related studies. The first was a qualitative study with 20 teachers and ministry officials in rural Côte d'Ivoire to understand opportunities and challenges in technology use for these stakeholders. Second, we shared a conversational agent probe over WhatsApp with 38 teachers for 14-weeks to uncover realistic use cases from these stakeholders. Our data suggest that designing for teacher needs alone is not sustainable as teachers' needs varied over time, and advisor visits had a cultural significance. Therefore, using a theoretical lens on aspirations, we suggest alternative design directions to address these sustainability challenges. These directions include shaping aspirations for intervention adoption, creating new aspirations to promote behavior change, and utilizing collective teacher agency through peer support structures. We reflect on the importance of communicating *why aspirations?* to practitioners, to reflect on *which aspirations*, and *who* prioritizes them. Our contributions present initial design ideas toward developing sustainable technology to support teachers in low infrastructure settings in implementing pedagogical programs.

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