

**MATHPOWER!
EXPLORER:
Interactive Voice
Response, Math
Games, and
Rwanda**

Stakeholder
Learning Session
November 3, 2022

Survey -Part 1

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MATHPOWER! EXPLORER LEARNING SESSION AGENDA

Introductions

The Challenge & Our Proposed
Solution (math game example)

Preliminary Results & Lessons
Learned

Next Steps + Discussion

Partners

mEducation Alliance accelerates EdTech investments and **scales promising interventions** and initiatives

Save the Children works every day to give children a healthy start in life, the opportunity to learn and protection from harm.

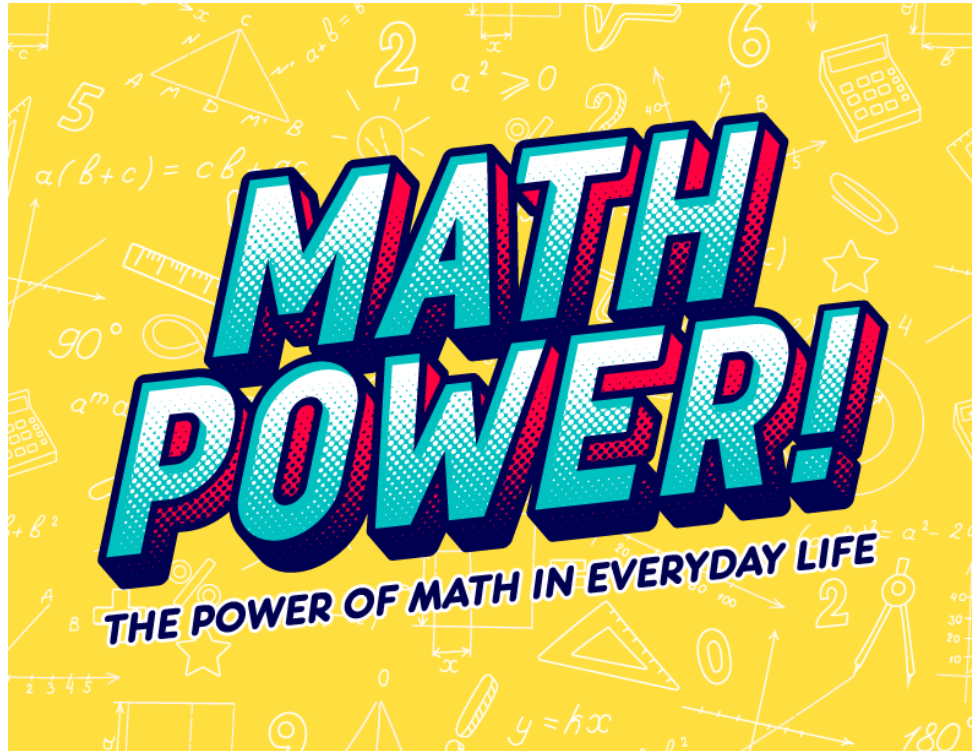
Viamo offers **a free, on-demand information service available on simple mobile phones, which uses Interactive Voice Response (IVR).**

Cisco Systems IT and **networking brand** that specializes in switches, routers, cybersecurity, and IoT and whose logo seems to be on every office telephone or conference hardware.



THE CHALLENGE

- Research indicates that children in developing countries are **not learning sufficient mathematic skills** for the rapidly evolving 21st century.
 - Without foundational math skills, students are unable to count cattle, measure wood and fabric, or chart rainfall trends. In turn, they will be **less likely to complete basic levels of education or vocational and technical skills training programs.**
 - According to an UNESCO report, fewer than 50 percent of grade 6 students have achieved a minimum level in mathematics in three-quarters of eastern and southern African countries (UNESCO 2014).
 - Many education advocates point to **mobile penetration as a potential way to revolutionize the way students learn around the world.**
 - Children need support for learning both **in and outside of schools** - a point which was driven home especially hard during COVID-19 related school closures.
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- MPE is innovative **Interactive Voice Response (IVR)** mobile phone delivery model for math game content aimed at improving math skills in primary-middle grade students in low resource countries.
 - Aims to support children and families to **spend more time in math activities at home**. The math games have been designed so that they can be played directly on the phone – either by children or their adult household members – to learn the game and motivate them to then continue playing the game on their own, without the phone.
 - Developed **4** simple math games.
 - The pilot was launched in Rwanda in late June 2022.
 - The vision is to **compile** a set of **open-source IVR learning/wellbeing games** that can be adapted for use around the globe.

INTERACTIVE VOICE RESPONSE



- Viamo's platform allows users to call and listen to prerecorded audios, and select options to **navigate to content that is of interest to them.**
 - On **8-4-5** they can select the maths games, put their phones on speaker and play.
 - No internet connection required, only a simple (feature) phone.
 - Recorded in **Kinyarwanda**, suitable for any level of literacy.
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Try out Viamo's IVR system!

Country	Demo line number
Rwanda	+250788126009 / Dial 8-4-5 on MTN
US	+13122487294

To get a sense of how Viamo's IVR works - if you have a cell phone - take 2-4 minutes to try out the US number! Select the 3-2-1 service option. You can try out a agriculture/herd game if you press 4. (Note: This Demo line does not include our math games.)

Dial 845

HOW IT WORKS



MATH IVR GAMES

- Skip Count
- Jump Count
- Guess My Shape
- Guess My Number

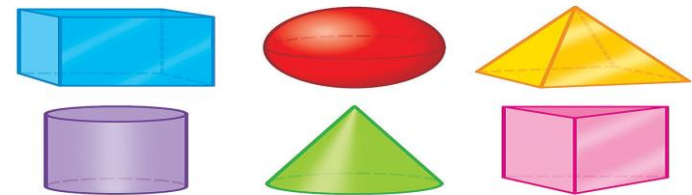


GUESS MY SHAPE



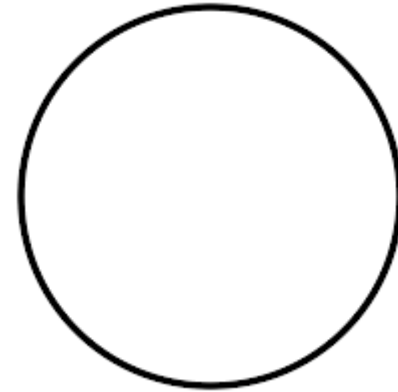
“Hello! Welcome to another one of our exciting math games. ”

“Not only are you going to have fun, you will also have the chance to practice your math skills!

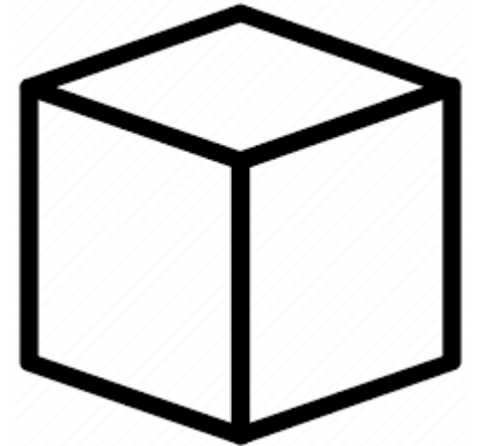


“There are many shapes in the world and you see shapes every day”

“Plates are circles.”



“Boxes are squares.”



“Let's see if you can guess a shape given a few clues and using the keys on the phone.”

“Can you guess the first shape?”

“I am the shape of a water tank”

“My top and bottom are round like a plate.”

“My body is curved on the sides”

“You can place me on top of similar shapes like me”

“If you think I am a circle, like a plate, **press 1.**”

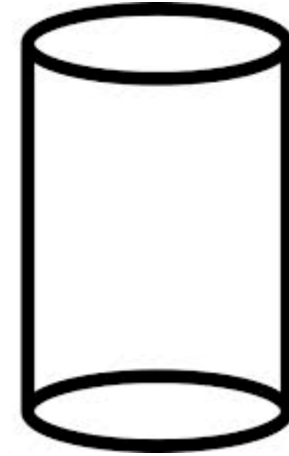
“If you think I am a square like a box, **press 2.**”

“If you think I am a sphere like a ball, **press 3.**”

“If you think I am a cylinder like a battery **press 4.**”



IF CORRECT ANSWER....



“Very good! I am a cylinder.”

“A cylinder like a barrel or battery has a circular flat top, a circular flat bottom, and curved body.”

IF GUESS IS INCORRECT....

“Good Guess, But Not Right Yet. Here Is Another Clue:”

“You Can Lay Me Down On My Side And Roll Me Like A Very Wide Tire.”

“Take A Guess! “

If You Think I Am A Circle Like A Plate, **Press 1.**

If You Think I Am A Square Like A Box, **Press 2.**

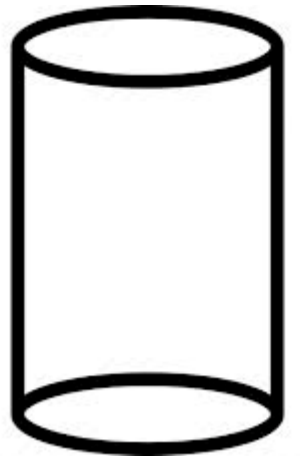
If You Think I Am A Sphere Like A Ball, **Press 3.**

If You Think I Am A Cylinder Like A Battery, **Press 4.**

IF SECOND GUESS IS CORRECT ANSWER...

“Very good! I am a cylinder.”

“A cylinder like a barrel or battery has a circular flat top, a circular flat bottom, and curved body.”



IF SECOND GUESS INCORRECT ANSWER

“No.... that's wrong, sigh, but you gave it a very good try. A radio battery is a cylinder because it has a circular flat top and bottom and curved body”

CONCLUSION – NEXT?

“That was fun, wasn't it? Do you know that you can also play this game at home and at school? You can even challenge your friends to see if they can identify the right shape.”

“Do you want to have a go at another shape? Press 1 to continue to a new shape Press 2 to try a different math game”

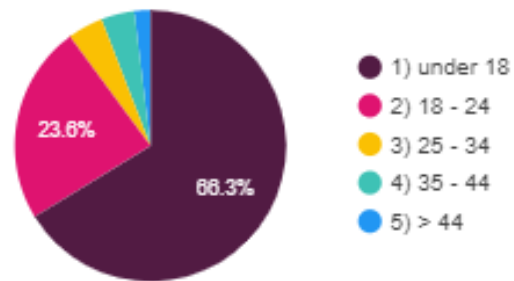
Initial Results: Who is calling in to play the math games?

Listeners per month

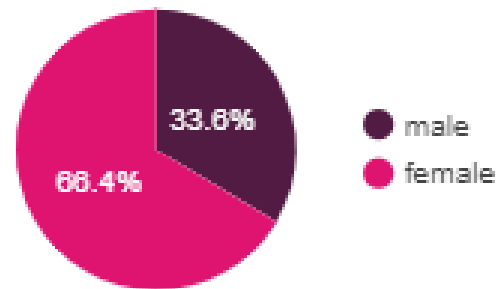
Jun 2022	721
Jul 2022	3,087
Aug 2022	2,199
Sep 2022	2,296
Oct 2022	1,863

Total unique listeners since June 1: 9,812

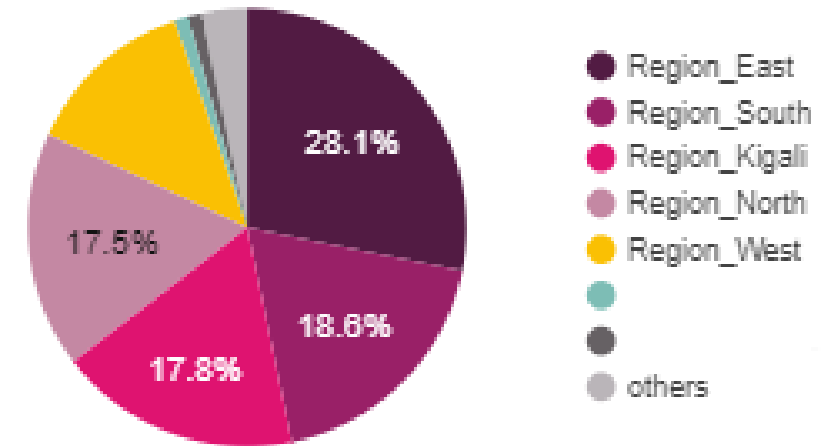
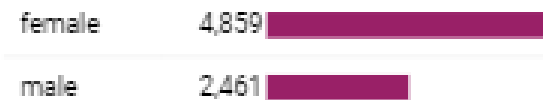
Geographical Distribution fairly even



Gender



Gender (#)



Young listeners - more than the 8-4-5 average.

Caller to Listener - 98% or higher!

Initial Results: Are people playing the games more than once?

YES!

- Guess my Shape: has been reached by 4,727 callers with 4,667 listeners who played 48,946 times
 - Guess my Number: has been reached by 3,719 callers with 3,624 listeners who played 30,625 times
 - Skip Jump: has been reached by 5,988 callers with 5,844 listeners who played 71,237 times
 - Skip Count: has been reached by 7,572 callers with 7,421 listeners who played 82,104 times
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Initial Results: Qualitative Survey Methodology

Methodology - light touch qualitative research:

- Household Survey with ~50 caregivers and their child
- Phone Survey with MTN users who had played at least one game and consented to be called (<50 caregivers and <20 children)

Study Questions:

1. To what extent do families [caregivers and/or their children] play the math games on the Viamo system?
 2. What do families [caregivers and/or their children] like about the games? Dislike about the games?
 3. To what extent do families [caregivers and/or their children] play the math games on their own – i.e. without the phone?
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Initial Results: Qualitative Survey

Preliminary Results:

1. Lots of enthusiasm around the **importance of math for children**, even from those who hadn't played the game (proxy for baseline level of support for math)
 - a. Some existing support for math activities at home - mostly counting activities, math songs, exercises
 - b. A good number of respondents indicated siblings support younger children's math learning at home

 1. Barriers to using the system and/or playing the game afterwards are similar to issues we had observed for literacy activities and include:
 - a. **Not enough time**
 - b. No phone / afraid the child will break the phone
 - c. Not having anyone to play with
 - d. **Not being aware that these math games were available** (need to disseminate more, need to make the games easier to find on the platform)
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Initial Results: Qualitative Survey

Preliminary Results:

3. People liked different games best – so the variety of options seems to be good.
 - a. It doesn't seem like many people played all the games ; it may be partly to do with the limited number of times they can call in for free to 845
 - b. Many respondents like the ways the games pushed them to think deeper OR for children, some liked how it helped them to remember/review what they had previously learned
 - c. Many children wanted to be able to call in more times (i.e. play for free more!) – there is some demand for this from the children's perspective

4. Some of the respondents indicate that they played the games after without the phone

Overall takeaway from preliminary findings: Math IVR games are **appreciated** by parents/children & *seem* to nudge them to play math games at home, BUT it doesn't work universally for all families, so it should be planned for as part of a more comprehensive education package and it needs to be accompanied by more comprehensive awareness raising.

Lessons Learned on IVR FLN game development

- Develop & revise script drafts with pedagogical experts, those who are experts in the local curriculum, and those who can speak both/all relevant languages
 - Consider what language(s) children learn key math vocabulary in that you will use in the game (pay attention to what ages children's LoI for math may change, depending on the target age for your IVR math game)
- Keep it simple & “Paper” test the script to notice things that need to be changed before recording
- Identify the ideal talking speed for the recordings
- Ensure block labels are unique/clearly linked to each game to ease analysis



Sample Script Format

Block Label	Script - English (EN)	Script - Kinyarwanda	Effects	Block Type	Skip Logic	
Welcome/Intro	Hello! Welcome to another one of our exciting math games. We are going to play a game called Jump Counting. Jump Counting is similar to our other game, Skip Counting, when you count but only using numbers like `2` - 2,4,6,8, 10 or `3` - 3, 6, 9. In Jump Counting, you count all numbers but you "jump" when the number fits your pattern. For example, Jump Count 2 You say 1, then you jump and say "2, then you say 3, then you jump and say 4, then you say 5, then you jump and say 6. Are you following the counting "pattern?" The game can be played with many different number patterns, and it builds math skills in a fun way.	Mwaramutse! urakaza neza mu tundi dukino twacu tw'imibare dushimishije. Tugiye gukina akandi gakino kitwa " Gusimbuka ubara". Gusimbuka ubara ni umukino usa nundi mukino tugira, wo Kubara usimbuka imibare , iyo ubara ariko ukoresheje imibare nka `2` - 2,4,6,8, 10 cyangwa `3` - 3, 6, 9. Mu "Gusimbuka ubara" ho rero, ubara imibare yose ariko "ugasimbuka" mugihe umubare ugezeho ubara uhuye na gahunda wihaye . Urugero, Gusimbuka ubara mu buryo bwa "2"(Aha ni imibare igabanyika na 2) Uravuga 1, hanyuma nugera kuri "2 " usimbuke ubundi uvuge 2, ukomeze uvuge 3, nugera kuri 4 usimbuke uvuge 4 uyivuge usimbuka , hanyuma uvuge 5, hanyuma usimbuke(Jump) cuvuga 6. Wakurikiye uburyo bikorwa? "Uyu mukino urashobora gukinwa ukoresheje imibare igiye itandukanye, kandi byungura ubumenyi mu mibare muburyo			MSG	
Selection of	Which pattern would you like to try?	Ni ubuhe buryo wifuza kugerageza?		Multiple choice	Skip to row 5	
Instructions for number 2	You've selected to jump count by 2s! That means we count aloud and we will jump on every second number. So if we count 1, 2, 3, 4, 5, 6, we jump on 2 and again on 4, and again on 6, and so on. Are you ready? Let's begin.	Wahisemo gusimbuka kubara mu buryo bwa "2"! Ibyo bivuze ko tubara mu ijwi riranguruye kandi tuzasimbuka kuri buri mubare ugabanyika na 2. Niba rero tubara 1, 2, 3, 4, 5, 6, dusimbuka kuri 2 na none kuri 4, na none kuri 6, gutyo gutyo. Uriteguye? Reka dutangire.	Fanfare	MSG	Skip to row 10	
Instructions for	You've selected to jump count by 5s! That means we	Wahisemo gusimbuka kubara mu buryo bwa "5"! Ibyo bivuze ko	Fanfare	MSG	Skip to row 25	
Instructions for	You've selected to jump count by 10s! That means	Wahisemo gusimbuka kubara mu buryo bwa "10"! Ibyo bivuze ko	Fanfare	MSG	Skip to row 36	
Number 2						
Count 1-2	Okay. Count loudly with me. 1, 2 [sound effect of jumping as the two is said]	Yego. Ngaho dufatanye kubara mu ijwi riranguruye. 1, 2 [Humvikana ijwi/urusaku ryo gusimbuka mu gihe tuvuze umubare 2]	Slow counting to get started, short pause	MSG		
Number 2	Did you remember to jump on 2? We should jump because 2 is the second number we said.	Wibutse gusimbuka kuri 2? Tugomba gusimbuka kuko 2 numubare wa kabiri twavuze.		MSG		
Count 3-4	Let's continue counting: 3, 4 [sound effect: jump].	Reka dukomeze kubara: 3, 4 [ijwi/urusaku ryo gusimbuka].	Pause before 4,	MSG		
Q1	Did you jump on 4?	Wasimbutse kuri 4?		MC_Q	1 -> Correct	
Correct Q1	Excellent. We have to jump on 4 because 4 is the	Byiza cyane. Tugomba gusimbuka kuri 4 kuko 4 numubare wa		MSG	Skip to row 16	
Incorrect Q1	Dont worry - you will quickly learn. We have to jump	Ntugahangayike - urahita ubifata rwose. Tugomba gusimbuka		MSG		

NEXT STEPS + DISCUSSION

1. Pilot in Rwanda: Content enhancement and expansion + Expanded roll out, with more targeted dissemination strategies + Rigorous evaluation

2. Sharing value proposition with broader field (mEd Alliance Symposium, CIES)

- **What are the obstacles and opportunities to adding this tool to your implementation work? Interest in partnering?**
- Who else would be interested in contributing to a bank of math games?
- Could we do this with literacy or other subject areas?
- What other applications of this would be useful - for ex. with volunteers?
- If so, what content would work best?
- Other ideas of partnership around these ideas moving forward?
- How is this different from IVR for teacher training?
- How would you use this in a multiple modality approach?
- What other questions would we like to have answered in the future?



Thank you!

For questions or collaboration, contact:

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