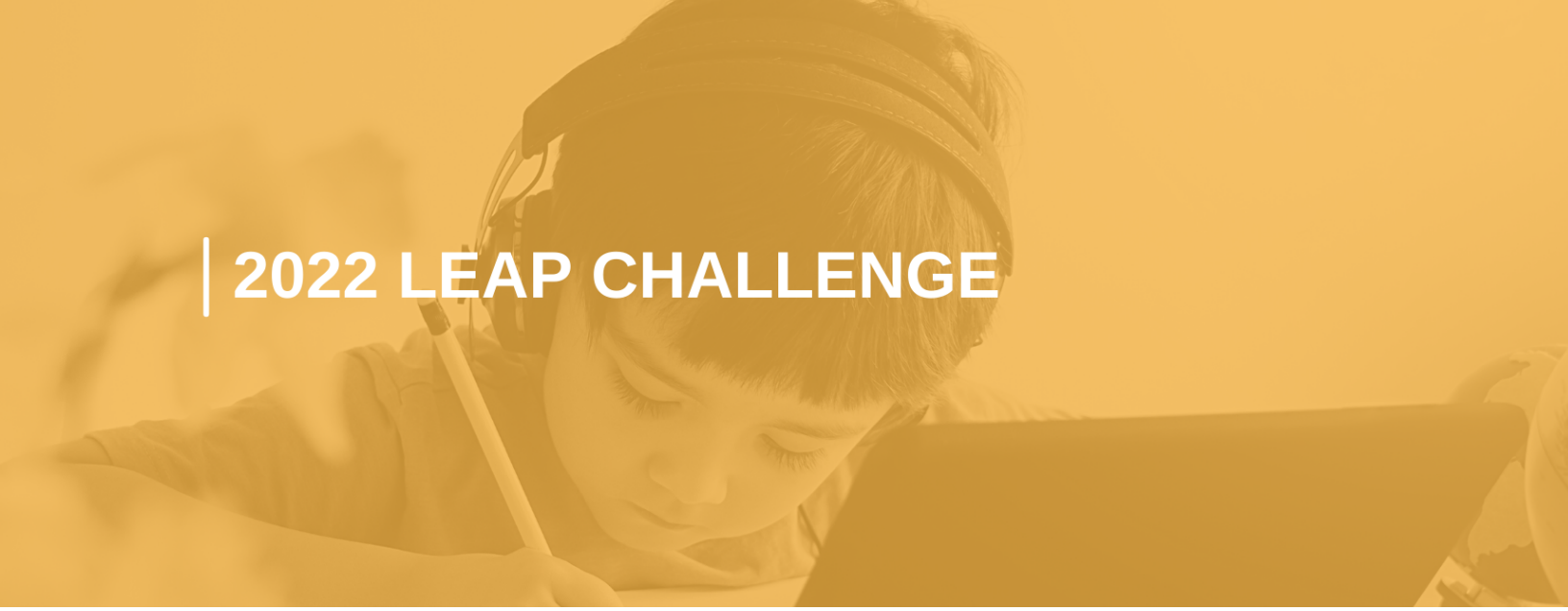

2022 LEAP CHALLENGE

LEAP Final Deliverable(s)

Project Host:

Thate Pan Hub

Fellows:

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Executive Summary

Introduction

Thate Pan Hub (TPH), a Myanmar-based social enterprise building computer science learning opportunities through a gamified platform, is on the outer curve of innovation. They are figuring out how to create easily accessible learning opportunities in an unstable political landscape, in a society shaped by decades of armed conflict, and in an educational system not fully supported by an ecosystem of institutions. These contextual factors place TPH in a humanitarian aid and international development category, yet, at the same time, they are able to draw upon leading educational approaches that we all hope might leapfrog them into a new category of greater impact. If TPH is successful in their work, they would be a model for how to deliver culturally-relevant educational opportunities for a difficult-to-reach group of learners, and their doing so would have great implications for delivering education in emergencies.

To delve deeper into how their work could positively impact students, TPH responded to a call for proposals for organizations looking to scale their operations in education and expand the evidence base of their impact. TPH was one of several organizations selected for the opportunity, which came with 12 weeks of support from a team of consultants working with them to address a challenge they face. The project is a collaboration between The Jacobs Foundation, MIT Solve, LEAP Fellows, and the organizations themselves.

TPH was paired with a team of four LEAP Fellows who have considerable experience and expertise in social entrepreneurship (having founded and/or operate social enterprises themselves), and research (many of whom hold academic positions at universities).

Organization's role & strength

Coming into the project, TPH proposed working with the fellows to expand the menu of features for their computer-science-focused platform. Their proposal stood out because it signaled that they were motivated to build, get the app out there, and get it into the hands of Burmese students for the children's use and benefit.

Need summary

Settling into the project more, we realized that helping them build out product features would be useful, but, we also quickly realized that, given the short timeframe, it would be many times more impactful to spend the time helping them build the skills to approach product, organizational, and design challenges they will for certain face as they grow. This approach will set them up with a more comprehensive capability as a team long after this engagement ends.

Solution summary & next steps

The revised project was ultimately a program of workshops with a strong focus on experimentation. The experimental parameters were to identify a problem or challenge or pose a question, and then gather the research and evidence to develop a potential solution.

Over the course of these 12 weeks, we conducted six workshops in keeping with this theme. The focus of each is below:

- In *Pedagogy,* we focused on the relationship between user testing and the product's theory of change
- In *Design*, we focused on activity-based research methods
- In *Technology*, we focused on high scalability with under-resourced orgs
- In *Business Model*, we focused on rapid iteration to generate a bank of options
- In *Product Roadmap*, we focused on user testing to guide development and
- In *Strategy*, beyond the recommendations we made, we provided TPH with the resources for them to periodically check-in with themselves and draw upon various interviewing and research techniques, which will ultimately help them arrive at a more well-informed decision

The overarching question that TPH is trying to answer is: "How might we increase CS learning outcomes for children and youth in a post-conflict, emergency, humanitarian, and development context?" Undoubtedly, TPH will face many more product, organization, and expansion decisions in the future, and this framework of investigating and exploring is a tried and tested method to gather field-based information to better inform the decision-making process.

Over the course of this report, the various activities conducted with TPH are summarized and serve as a tangible example on how TPH can use experimentation methods to support organizational or product decisions in the future.

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A. Social Enterprise "Health" Check-Up

Targeting these six areas for development (Pedagogy, Design, Business Model, Product, Technology, and Strategy), our work was to identify an area of exploration, such as adopting a certain pedagogy, evaluating various tech platforms, or conducting user testing. Once an area was identified, we walked through the various methods and mechanisms TPH could rely upon to investigate deeper.

We dubbed this process a 'social enterprise health check-up,' which entails TPH (or any other social enterprise) taking stock of their current developmental stage and building a pathway to develop further. The health check-up mentality invites a continuous improvement loop that could be applied to any category.

These categories we created are very much typical to startups (either for-profit or not-for-profit), and this whole-organization approach includes conducting workshops on the start-up's business model, design activities, pedagogical approach, intendended technology stack, and, ultimately, their product roadmap.

Attending to all of these areas through workshops is much like a comprehensive approach to a health check-up, with the view that the various systems work together to contribute to the overall health of the system. Similarly, addressing TPH's organizational areas as a whole system would ultimately assist them in building a more impactful, more research-based, and more strategically built product. It will also build the skills they will need to support more robust product features, which aligns with their original project proposal.

This social enterprise health check-up model is one that any organization can rely on to assess their competitive position (as we did in the business model canvas workshop) or rework/update their theory of change (as we did in the pedagogical workshop), among other areas. By going through these structured workshops, any organization can trigger more information gathering, more research, and more strategy development in a way in which they take stock and fill in gaps.

In this check-up model, we developed mini-experiments to guide the workshops. In one example, in the design workshop, we first previewed the many Human-Centered design (HCD) activities that can be used to get to the core of the user experience and then asked TPH to go to the field and conduct an experiment. One experiment was to interview potential users (students) and bring that information back to the team of Fellows to discuss, understand, and interpret what came out of the interview, with the aim to (1) incorporate student insights into their product and program roadmap, and (2) build their organizational capacity to develop experiments on their own in the future and rely on these experiments to continuously improve.

In the following six sections below, we summarize the work, micro-experiments, and activities we ran through with TPH.

1. Pedagogy and Curriculum

TPH's original Theory of Change involved gains in coding and other computer science skills from student completion of their platform. The platform itself had been conceptualized and development had begun; however, specific theories of change for individual elements of the platform, such as games or levels, had yet to be established. To help TPH develop the rationale and content of the games, the LEAP fellows hosted a Curriculum and Pedagogy Workshop. The main goals of the workshop were: (1) to present an illustrated example of a game in a similar space (Computational Thinking/coding) and lead TPH through the creation of a theory of change for the game both informed by user feedback and that would inform further investigation into user experiences of the game, (2) to provide an example of the user testing process, (3) to guide TPH through user testing and the development of a game-specific theory of change.

The design of learning technologies, such as the coding games that TPH is creating, benefit from cycles of user testing and development (see generally Bernhaupt, 2015). User testing can both inform the creation of a product and illuminate links between elements of the product's theory of change, including the testing of assumptions, such as user access, ease of use, and appropriate leveling. The LEAP fellows presented an example game based around Computational Thinking (CT) as defined by the ISTE and CSTA definition (ISTE & CSTA, 2011). The LEAP Fellows first introduced a description of the game including screenshots from game levels (Figure 1). Within the game, players must use block-based codes to move a fox to an end-point, such as a house. The particular level shown draws on the CT skills of abstraction, automating solutions, creating efficient solutions, and exhibiting positive CT dispositions, such as persistence through challenge.

Figure 1. A screenshot of the game Fox & Field, used as an example of a game developed to teach and assess computational thinking.

Within the theory of change for Fox and Field (Figure 2), players engage with the game as part of their normal classroom activities, facilitated by teachers. Therefore, some of the assumptions in this theory of change are that teachers are able to support players and that the time and

resources to implement the games are available. In addition, the games must be appropriately leveled so that players can realize the benefits as they complete the activities within the games.

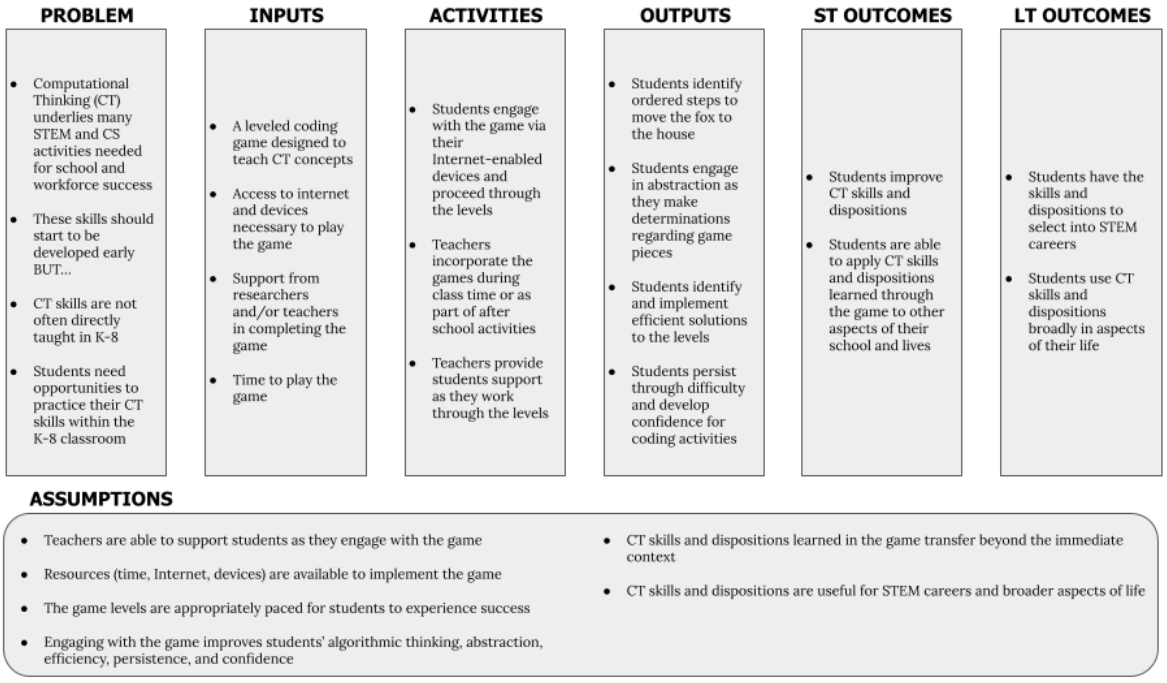


Figure 2. The sample theory of change for Fox and Field.

To test these assumptions and to better understand the user capabilities and needs, an example of a user interview for Fox and Field was presented. First, the goals of the user interview session were articulated: (1) To identify the user's starting state and familiarity with coding games, (2) To understand how the user typically interacts with coding games, (3) To establish the users needs and wants regarding coding games, (4) To gather feedback about the user's perception of Fox and Field.

An interview (rather than an observational user testing session) was presented as an example because of the early stage of TPH game development. Even when an alpha version of a technology is not available, storyboards or screenshots can be used to generate feedback from potential users. The interview illustration used a combination of semi-structured interview (Brinkmann, 2014) and a procedure drawn from cognitive interviews (see Rutherford et al., 2021), which are often used to understand how individuals interpret survey questions. In this interview with a child (see excerpt in Figure 3), questions were first asked around what type of games the child liked to play and their experience with coding. Then, the child was presented with a screenshot of Fox and Field and asked questions about how they might approach the game and why they answered as they did. In this way, the game developer can identify user interest and game understandability and potential pinch-points without having a working version of the technology to test. In this example, the interview provided evidence that children of similar age and background to the interviewee may need some scaffolding to understand the units of movement within the game.

Researcher: My game is called Fox and Field. Here is how it starts. What do you think you have to do? (shows picture below)
Child: Get the fox to follow the path to the house?
Researcher: How do you think you do that?
Child: You probably use these blocks (points to picture of blocks) like in Scratch.
Researcher: What would I first tell the fox to do?
Child: Move forward.
Researcher: Just move forward? Or should we tell the fox an amount?
Child: An amount, five?
Researcher: How did you come up with five?
Child: I just guessed (shrugs).

Researcher: What if I told you the fox should start moving forward three?
Child: (thinks, looks at picture). Oh! These squares show three squares. You count the squares.

Figure 3. An excerpt from the example interview about Fox and Field.

Once an alpha of the technology game is developed, game developers can move on to more traditional usability testing and observation (e.g., Diah et al., 2010; Olsen et al., 2011) and can proceed to more sophisticated methods of user testing of educational games that involve think-alouds during observations and cataloging and categorizing events (Moreno-Ger et al., 2012).

Although user testing can become quite formal, with rigorous research procedures, the most important aspect of user testing is speaking to actual or potential users relevant to the particular product. With this in mind, TPH was urged to start engaging with children in their target age-group to understand their perceptions of learning games, coding, and the characters and situations TPH planned to use within their games. After the workshop, TPH set a goal to interview one user within the week. TPH also planned to work on their theory of change for the first game in their slate, the Chase Game.

TPH was able to interview one eight-year-old child and translate this interview for sharing with the LEAP Fellows during the course of their LEAP involvement. TPH drafted a list of questions to guide their interview, including “How do you want to learn coding?” and “What do you like about [coding] games?”

Researcher: As we can see, we can choose different sprites here. Out of these sprites, which ones would you use?
Child: Definitely an owl.

Researcher: Wonderful! What else do you want to change?
Child (looks at the picture): I think I would love to add a tree as a backdrop because I want the owl sleeping on the branch of a tree.

Researcher: So this is a Chase Game. Would you rather want children chasing the owl or the owl chasing the children
Child (laughs): Of course, the children are chasing the owl.

Researcher: You mentioned before that you have watched a ton of cartoons or movies. So, what kind of game would you make based on those cartoons or movies?
Child: I would love to make the "Impossible games".

Figure 4. An excerpt from a TPH-conducted interview about the Chase Game.

The child TPH interviewed had some exposure with coding games both in school and through their older sister, who served as scaffolding assistance when the child got stuck during the games. The child also noted that they had some exposure to Myanmar media, but largely watched non-Myanmar cartoons. Above (Figure 4) is an excerpt of the interview and the screenshot TPH showed to the child.

Within the interview, the child provided feedback about the setting and their preferences regarding some surface features of the gameplay. TPH could probe further within the interview to get the child’s feedback on specific game characters or sprites. For example, the child noted

a lack of familiarity with Myanmar cartoons and characters. TPH could garner specific ratings of familiarity with and liking for elements of their sprites' clothing and presentation. In addition, when the child said that "of course" the children should chase the owl, this presented another opportunity for follow-up to ask the child "why is that?" Further, when the child noted they would like to make the "Impossible Games," TPH might have used this opportunity to brainstorm with the child regarding what this could be. Lastly, in future interview sessions, TPH is encouraged to show the child screenshots or aspects of the game with the coding interface, such as block codes, to gain insight into how the child would approach them.

After participating in this workshop, TPH also drafted a Theory of Change for their first game, *The Chase Game*. TPH originally produced a theory of change that was not as specific as it could be to their local context, the unique features of the game, and their own specific targeted skills and theories of learning. After a round of feedback, TPH produced the revised Theory of Change below (Figure 5).

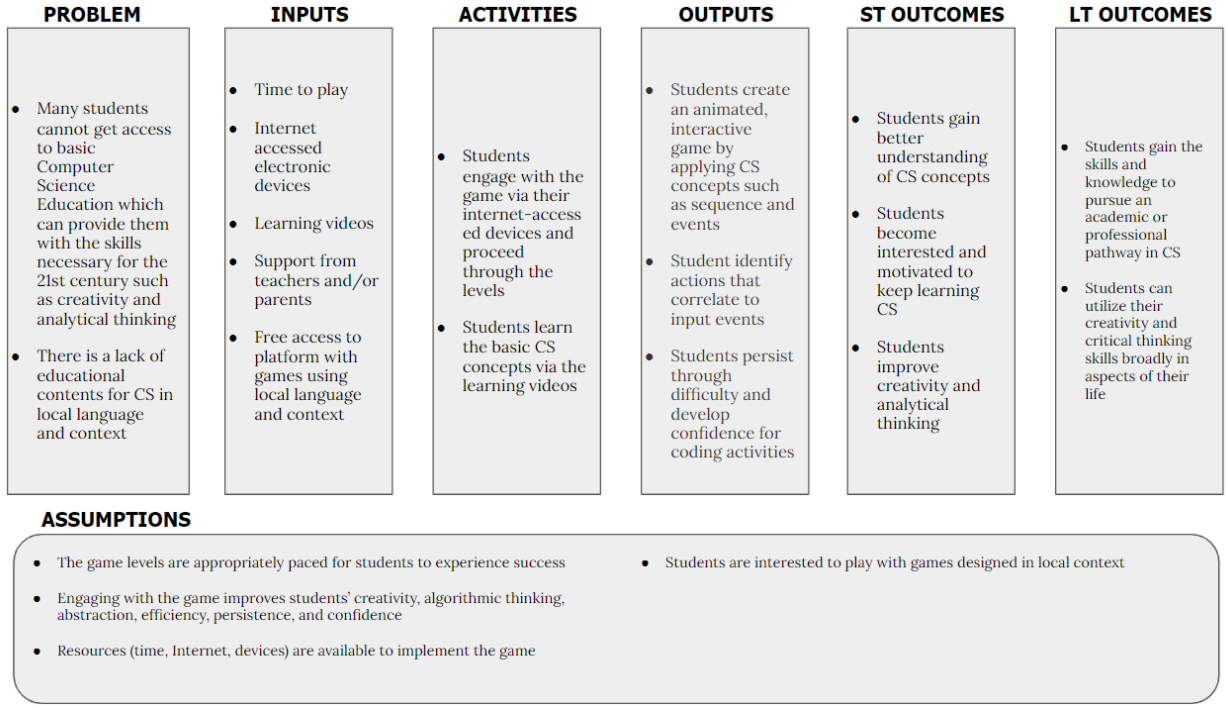


Figure 5. TPH Theory of Change for The Chase Game.

The assumptions specified within the Theory of Change (e.g., The game levels are appropriately paced for students to experience success) present testable hypotheses for TPH to explore through further user testing and interview sessions. Pathways from activities to outputs can also be tested in these small user testing sessions. For example, students who engage with the game during a user testing session should identify actions that correlate to input events (a listed output). TPH can gather evidence during user testing regarding whether these outputs are present. Pathways from outputs to short-term outcomes will likely not be able to be tested until a more fully-formed product is complete and TPH engages in a full pilot. Pathways from

short-term to long term outcomes can be tested with scaled studies that likely require substantial funding support.

2. Impact Business Model Canvas

The social entrepreneurship field first came about with the realization that social impact organizations could greatly benefit from borrowing principles from business, in particular, a data- and research-driven approach to developing a business model (Martin & Osberg, 2007).

Leadership at Stanford University Graduate School of Business (GSB) created a modified "Impact Business Model Canvas" (BMC) that, in addition to being critical to business activities, such as assessing various market dynamics, customer segments, and revenue structure, are also core to social impact organizations. In addition to customary business model elements, social impact orgs have the added complexity of modifying their Value Proposition (what economic or social positive value would be created were their product to scale) and Intended Impact (the metrics of who would be impacted and how) from a business context to a social impact context.

Prior to this workshop, TPH reviewed the accompanying videos Stanford released to guide organizations through each element of the BMC and offer examples of responses from a wide variety of ventures. Of the nine or ten elements of the BMC, TPH identified Value Proposition and Intended Impact as two areas they commonly struggle with developing. To respond to their stated areas of need, and in keeping with an experimentation approach, after conducting the overview workshop, we sent them out to delve deeper into each area by talking with their stakeholders.

TPH shared their Value Proposition that was descriptive of the value created when a student engaged with their platform. We encouraged them to create multiple Value Propositions on several distinct axes. We asked them to rely on the HCD method of idea-generation and idea-refinement to develop at least 10 different Value Propositions for teacher, student, parent, and funders—and then, true to the method, whittle those down to the most compelling Value Proposition statements. Once TPH did that, they had a bank of Value Propositions they could use in grant proposal product descriptions and one that they could test when they progress to a more advanced stage.

What became clear through the guidance was that the Value Proposition is more in line with their Theory of Change (the conceptual underpinnings of what change will occur when students engage with their platform) and that Intended Impact was more in line with market size and targeted market. With this distinction, we had TPH use HCD principles, such as Rapid Prototyping, Journey Mapping, and Interviews, to develop another bank of impact statements they could draw upon to focus their work. Intended impact involved defining the size of their customer base, the upper and lower ages; defining the rural / urban split and the private / public school splits. With this, TPH was able to much more clearly define their customer profile and lay the groundwork to build out their Intended Impact statements.

3. Design

In the spirit of equipping TPH with the tools they need to build a better product, we developed a workshop that provided a rapid overview of the multitude of human-centered design techniques a team could use.

In all, there are more than 60 individual methods described by Ideo.org in their much-regarded Design Kit. Not every organization will use all 60 methods, but the intent is for there to be enough options to choose from when trying to answer a design challenge.

Several design questions for TPH are:

- How might we build a more descriptive Theory of Change?
- What form might a novel CS-informed game take?
- How might we tap into existing formal and informal partnership opportunities?
- How might we raise awareness of our game in areas with a lack of devices?

The framing of these questions are, in and of themselves, a design technique. Framing a question in this way allows for the widest net to be cast and doesn't place any upper or lower limits of what might be possible.

With any given framed questions in hand, TPH was encouraged to decide on one question to explore and to choose two to three design methods to further their understanding. Together, we decided to focus on User Journey Mapping to draw out how a student might first learn of TPH, how they engage with the platform, and what they might learn after completing a game or two.

On the surface, this exercise might seem overly simplistic, but a User Journey Map (or User-Experience Map) defines several inflection points in how a student interacts with TPH and what happens along the way. The process of creating a Journey Map, in an iterative fashion where the creator continuously hones the story, also helps define these inflection points:

- Customer Acquisition / How does a student first find out about TPH?
- Customer Engagement (stickiness) / How does the platform keep students' interest?
- Learning Journey / How does the platform change how students think?
- Transformation / How do students' learning outcomes impact their lives impact their lives?

The Journey Map serves many purposes, and, at its core, it is a method that allows ventures to succinctly describe what they do and how it works and what happens after students engage. Embedded in the Journey Map are key components of the business model and theory of change, in story and graphical form.

We invited TPH to develop their Journey Map, drawing upon selection of those 60 design methods, to investigate the change they are hoping to create. As TPH grows and is faced with

new challenges, they will be able to frame the challenge and pull from design methods to conduct micro-experiments in any given area.

4. Resources and Organizational Strategy

In creating this organizational strategy workshop for Thate Pan Hub (TPH), LEAP Fellows needed to bring TPH's overarching priorities, as an organization, to the forefront for consideration while also drawing out their available talent pool and resources to execute on their plans.

The placement of this workshop in the workshop cycle meant that we were able to reflect upon the discussions from the Activity, Business Model Canvas, and Design workshops that had already taken place to frame the discussion and understand the priorities and challenges that had been identified within them. This would then inform the Technology and Roadmap workshops, which deliver more concrete outcomes for the TPH team to pursue in the future.

It is normal in a strategy workshop such as this to consider something such as a '*Blue Ocean*' approach to frame and guide the discussion (Kim & Mauborgne, 2009). However, given the nascent stage of the project and experience of the TPH team involved, it was considered easier and clearer to follow Jim Collins's '*Hedgehog Concept'* as a means to identify the intersection between the passions of the team, the key drivers of their "resource engine," and to understand what TPH can be best at (Collins, 2001). The presence of intersecting aspects of these three "spheres of influence" within an organization or initiative have been seen by Collins to be demonstrative of strong execution and accumulated progress based on a core understanding of potential and priority.

Passion—Computer Science Education for all Burmese Students

It became clear within the Strategy workshop discussion that within all the options of computer science education, an introduction to the basic concepts would be the key priority. Students would be the first priority user and it would be likely that the students would learn about TPH through parent or teacher recommendations. The student user would need to be able to self motivate and to use the TPH platform by themselves unsupervised. Considering a self-sufficient user, learning the basic principles of computer science and of an age to be subject to parent or teacher influence, it was discussed that the optimal audience would be children between nine and 14 years old and the content would be a coding game.

The prior experience of the TPH team has been delivering taught lessons using the code.org product(s); therefore, some discovery will be necessary to fully understand the level of comprehension and critical user and learner experience components of students to deliver a successful game. Short-term goals to understand these factors should be treated with priority.

Be the best—A Localized solution for Myanmar

TPH has a clear vision to be the first localized coding game in Burmese language and graphics, characters, and storyline. This in itself would make the TPH game potentially uniquely successful in delivering basic computer science education to children and teenagers in Myanmar whilst also engaging their repeat and ongoing participation.

It will be further necessary to understand student motivations, feedback, and completion rates to understand how to deliver a successful coding game for Myanmar children.

Resource engine—Unlocking the People and Funds that will make it happen

The current TPH team is made up of technologists, educational content creators, and business people. Of this team, currently only the business people are full-time while the technologists and educators are volunteers.

The TPH project does not yet have dedicated funding that would be necessary to recruit full time employees.

Strategic Priorities

For the TPH project to progress, the priorities must align within the three spheres of influence of passion, being the best, and the resource engine.

In the case of TPH, it is of primary importance to consider their dedicated team and their capabilities. TPH needs to advocate its product to parents, teachers, and students. It needs users to produce data to learn what will make the best and most successful coding game localized to Myanmar youth.

A dedicated business team can advocate, collect user data, and engage with potential investors. However, a primarily business-capable team might be better served to prioritize immediate product activity on a low-code or no-code solution to enable them to have a product in hand to drive short-term growth, user discovery, and the pathway to funding. Funding will enable a full-time technology and education team to be hired and therefore fulfill the resource engine of the project.

A low-code or no-code solution might be sought that allows testing of localization strategies to identify the optimal coding game formula for success that enables and empowers young people aged nine to 14 in Myanmar to independently learn the basics of computer science from the best solution.

5. Technology

TPH has some experience fulfilling its mission of teaching coding to children and youth in Myanmar through providing live lessons and using third-party content and tools like those from code.org. Their original LEAP project idea of creating a locally contextualized video game in

Burmese aims for rapid and efficient scaling. However, the team of LEAP Fellows decided to give them a broader perspective of technology options, taking into consideration that the organization seems to be at an earlier stage than initially thought, that their game development relies mainly on volunteers with limited time and/or experience, and that they have not yet secured funding for development, operation, and implementation of the game. Moreover, the team of LEAP Fellows believes that, in the short term, enhancing TPH's current work with formats that are easier to implement will allow them to continue getting traction while they develop the game. The experience and additional impact could eventually strengthen their possibilities to raise funds for a more robust game.

The Technology workshop covered several considerations when defining an educational format. These considerations are based on the LEAP Fellows' field and academic experience, including running their own programs and advising others in similar spaces. Key considerations for each format include: ideal age group; basic technology needs like hardware, software, connectivity, data management, and security among others; options to use third party solutions; and best practices for implementation. The formats discussed were face-to-face sessions, online lessons, and videogames or gamified apps.

FACE-TO-FACE SESSIONS

TPH already has some experience with this format, but has not been able to scale with its current form of organization given the operational intensity and logistics complexity required. Nevertheless, the LEAP Fellows pointed some basic elements showing that this can be an effective model even relying on volunteers:

- Group size of 5-15 for children 6-12 and 15-30 for 13-18.
- We recommend two instructors per group to provide personal support when needed
- Pedagogical skills and children affinity are more important for instructors than an engineering or tech background. Regular teachers, college students and other people can be trained to provide coding as volunteers or with a small stipend
- We recommend 2 instructors per group specially when the course includes online activities
- Important to have some degree of supervision and follow-up specially with new instructors
- Good to have partners to recruit the kids (schools, NGOs, churches, other forms of community-based organizations, etc.). Online campaigns and community sign-up efforts are also an option
- Can be only with unplugged activities, only connected or both
- Ideal to have one computer for every 3 kids maximum. Tablets or phones 2 maximum. However, the group can be split so while some do unplugged other can be online
- Internet access is ideal, but content can be loaded to devices.
- Can have different formats and lengths
    - Workshops: 1-8 hours
    - Courses: 10-40 hours split over several sessions (1-4 hours each)
    - Hackathons: 1-6 days than can be split over a couple of weeks
- For hackathon (competition) format the overall group may be larger but requires at least one instructor for every 10 participants considering kids do not have coding skills yet
- Prework and/or homework can include online videos, activities or videogame use
- F2F can be combined with online lessons for a hybrid program (students together and instructor online, some sessions F2F and some online, etc.)

- Code.org, Cuantrix.mx and several other sites offer a good list of unplugged activities. For online content hour of code, code.org, Scratch Jr. (for tablets), Scratch, Lightbot, MIT app inventor and many other area available for free and translated to many languages

ONLINE LESSONS

TPH has also tried this format and faced similar scaling challenges with face-to-face sessions, given the need for recruiting, group management, and reliable trainer availability. We briefly explored the opportunity for TPH to translate and promote third-party content; however, we recognize that existing solutions may not be ideal for younger children who may have limited or unstable connectivity, little to no previous experience with online courses, and who may lack support from families and/or teachers. Nevertheless, again we discussed basic considerations and best practices on how it may be possible to scale including appropriate age groups and existing resources.

- Not recommended for children under 9. Can be done but less effective
- Group size of 10-20 for children 9-12 and 15-30 for ages 13-18.
- We recommend two instructors per group to provide personal support when needed
- Pedagogical skills and children affinity are more important for instructors than engineering or tech background. Regular teachers, college students and others can be trained as volunteers or with a small stipend. For pre-recorded videos use a great communicator rather than an experienced teacher.
- Important to have some degree of supervision and follow-up specially with new instructors
- Good to have partners to recruit the kids (schools, NGOs, churches, other forms of community-based organizations, etc.). Online campaigns and community sign-up efforts are also an option
- Consider that most students will use a phone (not even a tablet) unless there is some partnership that provides computers and internet access or that the targeted segment has one at home/close to home.
- Can have different formats and lengths
    - Workshops: 1-2 hours
    - Courses: 10-40 hours split over several sessions (1-2 hours each)
    - Hackathons: 1-6 days than can be split over a couple of weeks
- Can use synchronous, asynchronous or combined. However, videos should not last more than 5 minutes (maybe 10 for older kids)
- Prework and/or homework can include online videos and activities, videogames and also offline activities
- Online lessons can be combined with F2F sessions for a hybrid program (students together and instructor online, some sessions F2F and some online, etc.)
- Videoconferencing like meet and zoom are very affordable. Learning management systems like Brightspace or Moodle are very good but may be costly (need sponsorship). However, their dashboards are very good for follow-up, higher completion rates and continuous learning. There are many free and paid options to build online academies. For hackathons there is also Slack and Discord.
- Khan academy has good examples of online lessons. Cuantrix also has over 100 videos in Spanish and English easily translatable, dubbed or replicable

VIDEOGAMES OR GAMIFIED APPS

This is the primary idea for a scalable solution from TPH. We therefore dedicated most of the time exploring the multiple considerations necessary to make it happen. The TPH team decided

to focus on the nine-14 age group and aim for a basic computer science learning level as the initial goal of the game.

With this narrower focus in mind, LEAP Fellows explored the main elements to consider for TPH creating and running the game themselves. This can be even more resource consuming than software platform development, as it may imply hosting, bug fixing, content and version upgrades, data analysis, and overall game improvements. We also explored some third-party free and open source models that could inspire and serve as a pedagogical guide to TPH's own game, thus exploring simpler options to TPH´s original plan. We highlighted the value of a minimum viable product (MVP), as well as the fundamental parameters that constitute an MVP, to get traction and experience from users that can strengthen their fundraising chances.

- Suitable for all ages though the 9-12 target seems to be more receptive
- Development time can be 3 months to a year based on complexity though additional levels can be added later. Basic costs can go from USD 30K-50K based on developing countries typical salaries
- Critical to test it to ensure that it is engaging and that each level difficulty is adequate and include a dashboard for user follow-up and analysis
- Keep in mind ongoing costs beyond original coding including hosting, maintenance (bugs, server, etc.), user analysis, version updates and new levels
- Good to have partners to recruit the kids (schools, NGOs, churches, other forms of community-based organizations, etc.). Campaigns (on and offline) and community sign-up efforts are also an option
- Consider that most students will use a phone (not even a tablet). Make it as light and low data consuming as possible as people have simple phones and restricted data access. Include a WIFI only version for data transfer
- If learning app, and not video game, try to gamify the learning (like Duolingo).
- Video games and learning apps can be combined with F2F or online lessons. Khan academy has good examples of online lessons. Cuantrix also has over 100 videos in Spanish and English easily translatable, dubbed or replicable
- Lightbot and hour of code are two examples though not exactly engaging video games. Grasshopper is an interesting learning app

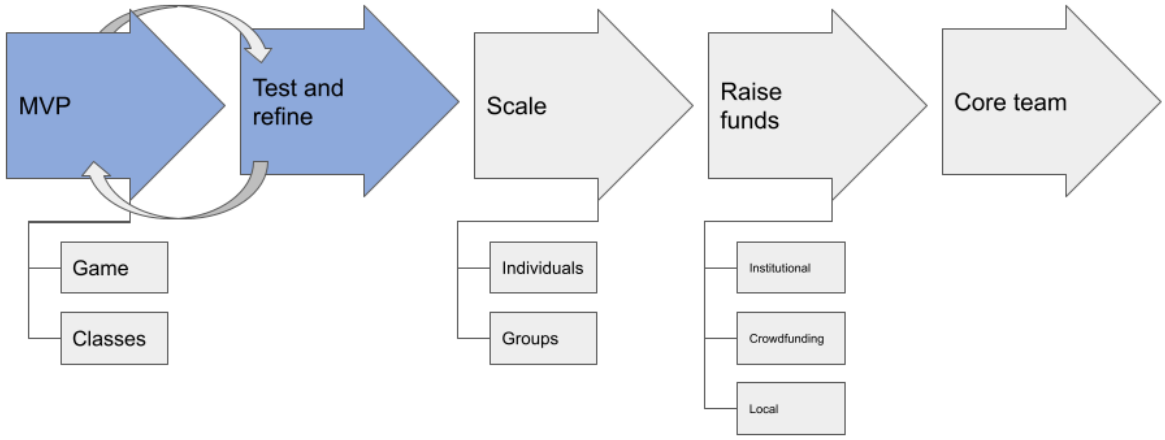
6. Product Roadmap

As mentioned in the previous technology section, after the conversations and workshops with the LEAP Fellows, TPH decided to narrow its focus to the nine to 14 age group. The second key decision they made was that, although they have a core team of enthusiastic volunteers, TPH needs to raise funds in order to continue with its mission and to materialize the video game idea. Even a relatively small investment or donation would provide a more robust operation and team covering basic development, marketing, and administrative costs. A potential roadmap that gives the organization the traction and credibility to be more effective was discussed in this workshop.

1. **Develop a minimum viable product, test it and refine it**

TPH's experience with live lessons provides meaningful insight into what children find interesting and what facilitates engagement. To enrich TPH's own ideas for the initial game, both in the technology and in the roadmap workshops, we provided several references of proven games for the same target population that they chose. However, there were three elements that we all agreed are critical for this stage:

- To develop the initial MVP they will need to have a clear design hypothesis to begin with, to include a detailed profile of their users' persona, such as the kind of device they have, if they are attending school, if they have access to connectivity, etc.
- It is fundamental to have a **viable** prototype game soon, even if it is a very simple version with one or two levels, created by TPH or adapted from an existing product, which can be played by real users thus giving the team direct feedback for improving the initial levels and allowing TPH to keep building their long term platform and game(s). It will be more effective to have something small, simple, and usable to test than wait to have all the features that they would eventually like to include.
- While they develop this initial MVP, they may keep teaching and therefore learning. One option is to provide live lessons including third-party games. Another is to just test these games with their users to get feedback.



2. **Scale the MVP**

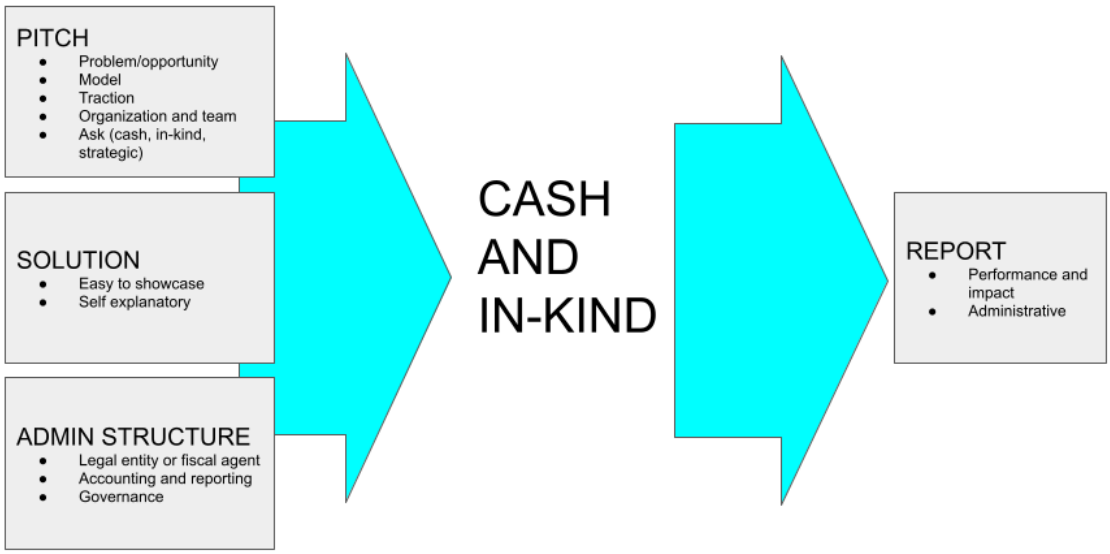
The team of LEAP Fellows suggested that based on the initial product and findings, TPH tries to increase the number of users by approaching both individual children or situations where there are groups of children, since each may have different drivers. For example, the motivation of an individual child to try the game may come from a parent's suggestion, but the child experiencing the game has to enjoy playing it and must be able to fully understand it with little or no help—otherwise the child will drop it almost immediately. While a motivated individual child user is the ideal scenario, working with groups of children where teachers are present can be a faster way to get traction. Teachers or community workers may even promote or incentivize the game participation and give support to their students despite initial shortcomings in the offering.

3. **Raise funds and strengthen your core team**

During the workshop we discussed several important elements to effectively fundraise. The first is to have a good pitch deck even if the reality is that each funder will eventually request an application form as part of their process. The deck must contextualize the problem and provide a strong purpose statement for the organization. It has to show commitment, experience, and lessons learned to be a credible and attractive partner. It is, of course, highly beneficial to demonstrate a provocative idea that has traction with users. Finally, a clear ask considering cash and also in-kind donations, like professional advice, server space, or connections to other potential partners.

The LEAP Fellow team also proposed that TPH have a ready-to-show version of their platform or game, even if very simple but consistent with the key design principles from the workshops and with improvements already incorporated from the initial testing phases.This will enhance the credibility and prove what a team of committed volunteers can achieve with limited resources.

In addition, the LEAP Fellow team highlighted the need to administratively prepare an option to receive the resources that may be acceptable to donors. This may vary from international agencies, foundations or corporate responsibility programs to local companies or crowdfunding efforts. Specifically, the TPH team mentioned already having a fiscal agent in the US. We talked briefly about the pros and cons of this option including the duties of the partners. Finally, we talked about the responsibilities that come from receiving third party funding, including reporting, transparency, and lawful practices.



B. Recommendations

The LEAP Fellow team believes that it is important to summarize our understanding of TPH's current situation in order to better contextualize recommendations.

- Thate Pan Hub works to teach computer science to children and youth in Myanmar to provide them with better opportunities. In order to do this, they have a small core team of committed volunteers with additional help from more sporadic volunteers that teach children live lessons or engage in tech development and support.
- To scale their impact, TPH wants to move from live lessons to a mobile game for independent learners. During our conversations, TPH leadership agreed to focus on basic coding skills for children nine-14. It is our understanding that, as of today, they are implementing other projects as well.
- After adjusting the original scope of the project and based on TPH's request, we are helping them with a plan mainly focused on scaling through a coding video game. However, we believe that above all, their guiding purpose should drive innovations that are responsive to the needs and access issues of their community. Their current focus on a coding video game may ultimately fulfill their purpose; however, given the current status of the organization, a video game platform may lack the robustness and effectiveness needed to truly scale and achieve their purpose.
- With an iterative cycle of investigation and improvement to their materials and methods, TPH can work toward gaining traction and scaling computer science education for Myanmar youth.

Recommendations

1) **SKILL DEVELOPMENT.** Define what basic skills kids should learn with an initial educational approach and a way to measure to what extent they acquired them (creating a final project, successfully completing certain activities online or offline, taking an exam, etc.). It is OK to begin with very, very basic skills for a specific target group (age, educational background, etc.), as this allows TPH to create a relatively simple but effective solution that shows traction.

2) **GOALS AND INDICATORS**. Based on those skills, set a clear measurable goal of the number of children to impact in 2023, with this making specific reference to those that will acquire the defined skills that the game is seeking to help them develop. Differentiating between children participating and successfully "graduating" may help as a performance indicator. Target numbers do not have to be huge, but large and achievable enough to create excitement and show growth from 2022. Where the primary goal is changed from participation to graduation and therefore set at a higher qualifying level to be considered a success, it is OK to scale down the reach from the previous year as the goal will better measure real impact.

3) **SOLUTION.** Draft what may be the possible paths to create the optimal solution to achieve TPH's goals, including TPH's current approach (or an evolution of it), the proposed game, or a combination of both synchronous and asynchronous solutions. Conduct this process with the realization that testing too many approaches at the same time with a very small team can reduce the efficiency of the team and the ability to implement, test, and learn in a meaningful way.

4) **INTENTIONAL TESTING.** Design specific experiments to explore what the students learn and why this is effective. Find evidence of impact and areas of improvement. Initially testing the learning with third-party solutions (Lightbot, code.org, or scratch, for example) may allow TPH to better understand the whole process and to make an even better original product design once they have the resources to develop, operate, and implement their own.

5) **TEAM MATCH.** Focus the scope of activity within the capabilities of TPH's existing full-time team. Avoid over-dependency on third-party support (like receiving funding or getting the right development volunteers), maintain a working culture and attitude that is agile enough to be comfortable adjusting the selected approach, the number of children, or even the defined skill set that students will achieve. It is OK to temporarily lower aspirations in order to create momentum.

6) **MINIMUM, VIABLE AND SCALABLE PRODUCT.** Review, refine, and/or create a solution that is simple, effective, and always keep in mind that it can be scaled based on the current team capabilities as expressed above in points 3 and 4. Understand that scale may imply more users, and also more skills. It is not dependent upon a significant number of game or platform levels from the beginning. New levels, new activities, and even new courses may be added along the road with lessons from the initial solution

7) **TECHNICALITIES.** Consider the multiple implications of developing and managing software so that the solution works seamlessly and can be developed with a consistently achievable technical roadmap:

   - Game pedagogy, narrative, and user experience.
   - Coding architecture.
   - Accessibility to multiple devices considering processing capacity, memory, and internet.
   - Hosting, debugging and upgrading.
   - Data collection, processing and availability for decision making (improvements, impact measurement, etc.).
   - Privacy and security, particularly as users are minors.

   It is critical to adequately contextualize the design, development, and operation to the Myanmar situation.

8) **IMPLEMENTATION.** Craft a clear internal process for implementation, gathering feedback and then continuing to improve with clear roles for each member of the team. Try to anticipate needs for funding, volunteers, and in-kind donations. Also, try to anticipate potential problems and solutions or alternative paths. Try to set weekly concrete operational milestones (finish X task, recruit Y person, finish Z product component) and performance objectives (reach X children, engage X parents or teachers, etc.

9) **OPENNESS.** Keep open to other solutions that may be easier to implement in the short term to keep gaining traction, even if this is done in parallel to creating an original game. Traction energizes a team, provides valuable insights and lessons, creates excitement to attract volunteers and partners, and generates credibility to raise funds.

10) **PARTNERSHIPS.** Seek and approach potential partners continuously with a clear purpose, a proposed approach (ideally including a MVP), and absolute honesty about results. There are people and their institutions locally and around the world keen to support computer science education. Most of them understand that improving computer science skills is a complicated endeavor and requires patience. Look for strategic relationships where there is a clear synergy and mutual benefit.

C. Conclusion

To paraphrase, the LEAP program “bridges research and practice” to advance “evidence-based learning solutions to help children thrive.” It has been our experience in this project that the combination of theory and rigor, with the practical experience of developing programs with limited budget and resources can be optimally delivered when drawing upon the combined resources of professional researchers and social entrepreneurs.

For the Thate Pan Hub project, we believe this combination has proven highly impactful. Advancing research and evidence-based practice in solutions is not something that applies only to mature projects with established processes, but something that brings value and impact from the inception of an idea and that actually becomes a conduit to scale.

The TPH Fellow team had initially anticipated a scaling and regularly-functioning learning program with the insights of thousands of Burmese students to draw upon. However in reality, the team pivoted the approach to meet the needs of a program that had made significant and impressive progress in educating thousands of children through a taught and in-person method; that now seeks to scale by moving to an asynchronous coding game; and that will in the future deliver basic computer science learning outcomes under the momentum of community recommendations and the agency of motivated young learners.

The TPH project is pre-funding with a full-time business team but only volunteer educational and technology personnel. Therefore, focusing on an evidence-led approach based around coding experiments with learners, prioritizes student learning. Consequently, learning outcomes continue to be delivered that support the core goal of basic computer science learning for Burmese youth. Progress delivers insights that enable a uniquely suitable offering for the specific requirements of Myanmar to be created, within constraints that the project can subsequently more easily endure. In the case of TPH, and likely in the case of many other similar projects in the future, the pursuit of evidence has shown itself to be the guardian of outcomes over the distractions of product.

The process delivered for the TPH project, that we have called the Social Enterprise Health Check, is a progression of workshops that act as a framework that other organizations can also pursue either for individual initiatives or to evaluate the direction of their organization as a whole. The framework for and illustration of this Health Check is freely available within this report for other organizations to use.

We live in a world intertwined with technology. It is therefore critical for students to learn to apply and create with technology to thrive in their futures. It is in this sentiment that we are proud to have had the opportunity to work with the Thate Pan Hub team on their inspiring journey to make this a reality at scale in Myanmar in the future.

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