Aata Paata Horaata: A Learning Ecosystem

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Abstract: *Aata Paata Horaata* is a system comprised of face-to-face and virtual interactive learning spaces. The design was driven by the need for after-school safe havens for play and learning as articulated by children from urban-poor communities in Bangalore, India. Two concerns in particular helped to focus the design process. Young girls infrequently participate in play or learning opportunities, and many young boys become addicted to gambling at a very young age. The design team carried out field research using a wide range of participatory design methods including mapping tools and cultural probes in order to elicit candid conversations with the children about their environment. The *Aata Paata Horaata* system incorporates core ideas drawn from principles of sustainability, the use and wisdom of the hand, and the need for new economic models for learning. The design concepts were validated through a series of participatory workshops with the children from the urban slums.

Key words: Participatory Design, Action Research, Play, Classroom 3.0,

1. Introduction

Aata Paata Horaata is a system comprising of face-to-face and virtual interactive learning spaces. The design has been driven by the need for after-school safe havens where play and learning reinforce each other. The urban environment for poor, school age children is not encouraging. Consider this assessment from Bangalore's Urban Development Department (2009):

> Nearly a third of the State's population lives below the poverty line. In urban areas, the growth of employment in the informal sector has not been accompanied by corresponding rise in the availability of housing; as a result large numbers of people now live in slums, without adequate access to education, health or sanitation. The actual extent of this shortfall is also not well known, as the data on poverty levels and extent is very poor, and based on thresholds that do not properly reflect the cost of living in urban areas. The development programs for the poor are also not sufficiently participatory, and this too must be revised.

While verifiable estimates are difficult to come by, it is widely regarded that children from slum communities drop out of government schools at very high rates, perhaps reaching 70% by 10th standard. There are multiple reasons for this trend that range from infrastructure,

relocation, or that they are unable to engage with types of teaching and learning systems being implemented. In response to this crisis, some of these children are supported through initiatives such as *Drishya Kalika Kendras* in full day learning or other programs. However, it is often observed that many children from these communities are exposed to neighborhood gangs that encourage and foster activities that impede childhood social and cognitive development.

The goal of the design process was to create a play-learn system that could dynamically affect to the conditions and situations that these children live, work, play, and learn. We asked how design could increase wellness and the opportunities for entrepreneurial thinking and self-initiated leadership in children between the ages of 11-15. We also wanted to know how designing a learning environment could extend ideas that will help those young people develop adaptive learning skills that they can use as a source of empowerment and transformation. In a more pragmatic way, our questions led us to investigate the materials and spaces used for play, the types different forms of games in everyday practice by children, to ask how, where, what, and who does the playing, and how play contributes to cognition and desire.

2. Methodology

In order to facilitate opportunities for children not in school through the design of learning places and spaces, we collaborated with AVAS (Association for Voluntary Action and Services), a non-profit community-based organization working with multiple slum communities, DRIK (Dwarkanath Reddy Institutes of Knowledge), an education movement responding to need for innovative education for children in urban slums, and DRISHYA KALIKA KENDRA, a learning center for urban poor.

The design team carried out field-research using design methods that relied on the participation of the communities that were being design for in three, overlapping phases. *Making and Being* included workshops for and with children that involved learning play and technology. *Listening and Looking* used interviews and artifacts to create common platforms for discussion with the children and community partners. *Exploring and Thinking* expanded the domain of interaction to experts versed in teaching, learning, technology, community, and interaction design. The research methods were inspired by contemporary arts and educational research. These foundations have sometimes been quite different from the traditions of design, religion, science, and educational practice that have historically influenced the local context. While designing our methods of inquiry we had

accepted the goals of embracing ambiguity, valuing subjectivity, encouraging imagination, and allowing the children to project their hopes and desires in imaginative forms such as visual maps or cultural probes (e.g. Gaver et al., 2004).

2.1. Making and Being

The workshops were conducted jointly between the Drishya space and the space where the team was located in an adjacent building. A variety of workshops were conducted including those illustrated in Figures 1-5.

2.2. Listening and Looking

2.2.1. Conversation 1

Working with a focus group of eight children, we interviewed and asked them a few questions related to games and the habits of play. We asked, "What are the different games and toys you play with?", "If you had a whole day to do anything, what would you do?", "If you could have any game/toy, what would it be?", and "What is your fantasy game/toy?" Since we had gotten to know each of the children well during the previous workshops, it was a casual set of conversations. Some of them also drew a picture to supplement their answers about the various activities that shape their everyday life.

Fig 1. Scratch Stories: The goal was for children with little-to-no understanding of programming to understand and implement the Scratch programming language to create interactive stories.

Fig 2. Earth Art: Mandalas were created using natural materials like soil, stones, dried leaves, and colorful pebbles and to embed Pico Cricket sensors for interactive art-base installations.
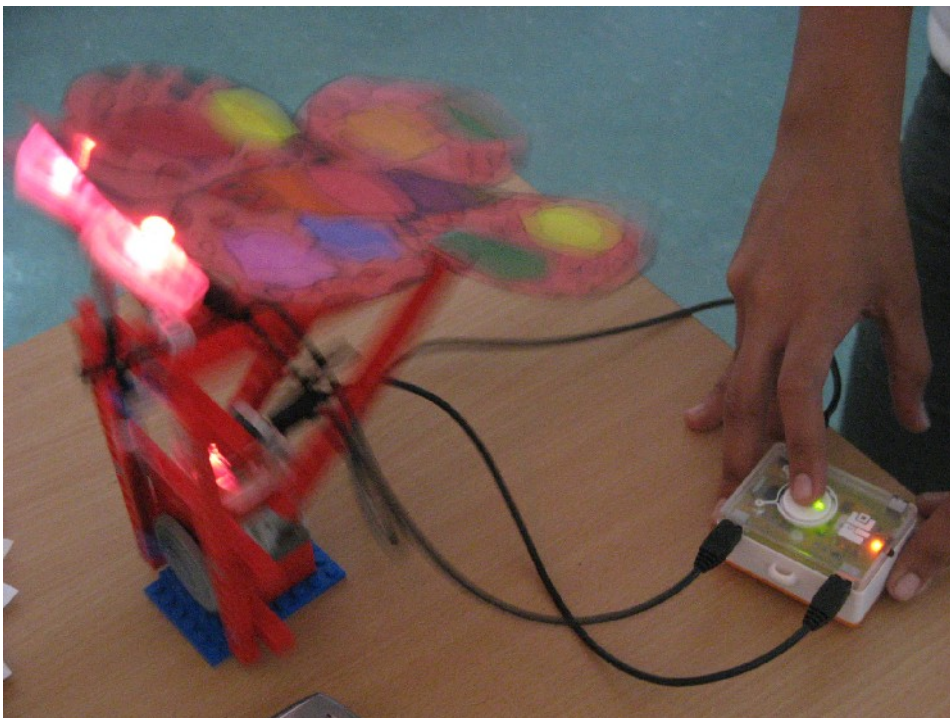

Fig 3. Tech-Play: Teach-Learn-Play sessions with Lego blocks and Pico Cricket sensors to explore interactivity, causation, and to apply concepts learned elsewhere.

Fig 4. Junk Toys: Discarded material was used to create interactive toys by embedding Pico Crickets.

Fig 5. Craft: The production of hand-crafted toys was explored with a regional craft center in Bangalore and children then developed their own toys.

2.2.2. Spatial Mapping

This exercise was designed to support the children as they shared meaningful information about themselves, their communities, their play habits, spaces and interactions. Inspired by the Situationists' psychogeographical maps (Pinder, 1996), we designed a tool that would allow the children to indicate the emotional topography of their communities – local landmarks, where they lived, their play places, friends they played with, and anything else they might want to share. A collection was handed out consisting of stickers, paper, colored pens, and a camera. We asked them to take back the material over a long weekend and make maps of all the things they did during that time.
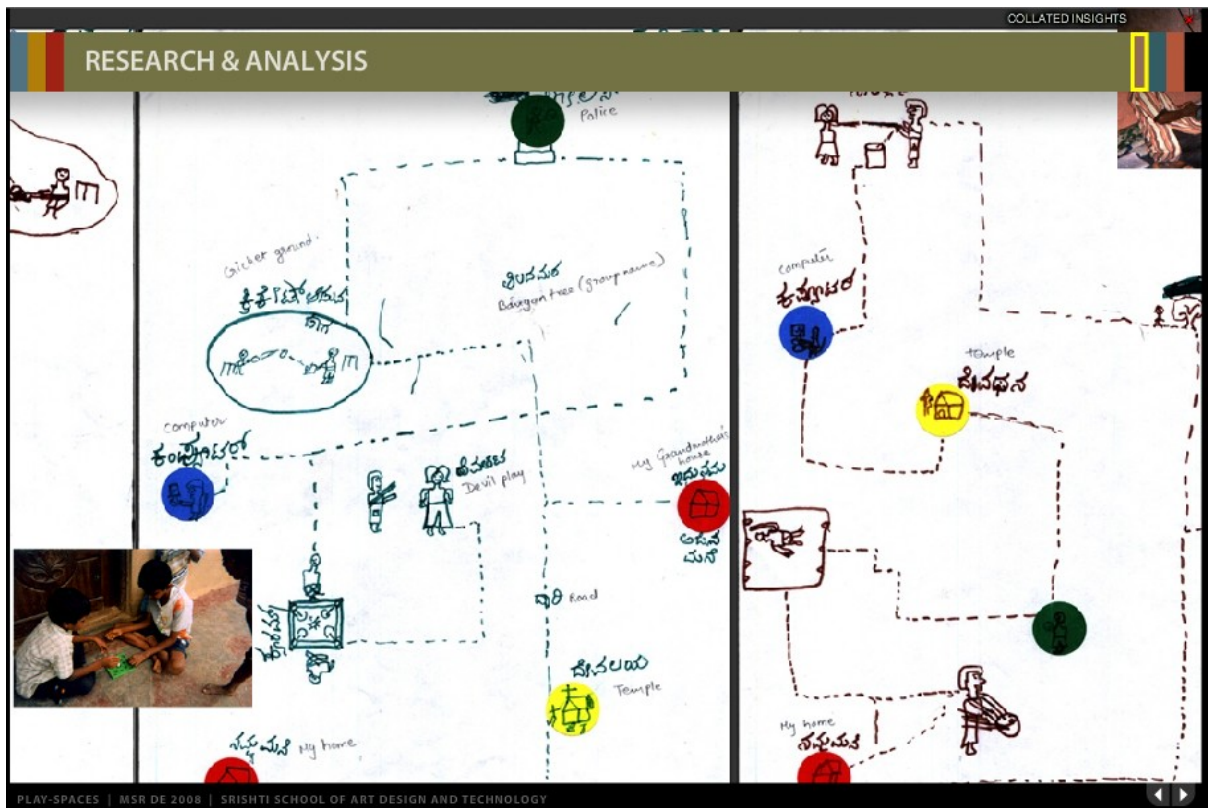
Fig 6. Spatial Mapping: Everyday experiences and influences in the local community were documented and annotated by the participant children.

2.2.3. Conversations 2

When the maps were brought back, they were projected onto a wall and discussed. We annotated them with insights received from the children using their stories and narrations (Fig. 6). Some of them chronologically explained their maps and their photographs, while some only spoke of specific details. These annotated maps were printed in large format, and the children pinned their photographs onto them to reference specific locales.

2.2.4. Expert Knowledge

Additionally, many insights were gained from talking to facilitators and learning from the history of Drishya community experiences (e.g. Fig 7). This came from interacting with community organizers as well as on an informal basis with other extended participants. Regular discussions with Padmini Nagaraj and Geetha Narayanan, both Drishya coordinators, emphasized the fit of the emerging research ideas with the vision and goals of Project Vision (Narayanan, 2007), DRRT, AVAS, and Drishya. This included additional discussions with Anitha Reddy, a social activist and leader of DRRT and AVAS. Group presentations and feedback of design ideas also came from experts in other fields of education, design, media, and art.

Fig 7. Expert and Community Feedback: Frequent session with stakeholders including instructors and Drishya community members provided insight and response to research and emerging design propositions.

2.3. Exploring and Thinking

An analytical and creative process that helped provide the 'material' needed to develop the ecosystem requirement and form. This followed from annotations, observations, and insights surrounding the games and narratives which the children had provided. We further divided the lists of documented games by concept (situation, cognition and interaction) and the toys/tools (techniques, methods, materials and processes) after Ingram et al's. (2007) description of technology in everyday practice. This allowed us to understand the different interactions, processes, contexts of the games while allowing us to extract more relevant insights for designing a supportive ecosystem for educational play.

3. Observations and Dialogue

Some of the insights collected throughout the process led to specific conclusions and guidelines that were supported by our conversations with community members. Table 1 illustrates a fraction of these insights and the specific design propositions that followed.

Games involve physical activity
Money plays a crucial role (Gambling)
Access to screen-based technology
Guys spend money on technology and games
Gambling is generally a team affair

Things needn't always make sense
Influence of devil and death
Fear of the dark
Enjoy the freedom of creativity
Strong social networks
Undertone of aggression
Reusing, recycling, repurposing
Toys from found materials
Fantasy toys involve robotics
Prefer staying in learning centers to going home

Prefer learning centers to home
Some public spaces are considered to be safer than home
Security in numbers, hang out with large group
Games involve grown up scenarios
Girls spend money on food

Many boys become addicted to gambling at a young age.

Young girls often do not play or learn in open spaces.

Table 1. Sample Insights: We grouped insights by theme, gender, or other impressions to reveal conclusions that could be used to develop robust design propositions.

4. Core Design Questions

Taken together, the research and discussions led to a recognition that the following general themes should focus our design practice (Table 2).

ECONOMICS	SUSTAINABILITY	LEARNING	WELL-BEING
Demonetization	Wisdom of the Hand	Play-Learn-Not School	Safety & Security
Base of the Pyramid	Craft Traditions	Technology	Gender Equity
Alternate Currencies	Livelihoods	Creative Spaces	Collaboration & Co-creation
		Networks of Learning	Community Building

Table 2. Design Themes: Fourteen more specific themes emerged from the research to support subsequent work with the form and meaning in the context of the community.

These themes were as much a series of questions as they were goals and characteristics.

4.1. Economic
Can money be deemphasized? Can the cycle of gambling be interrupted? Could a sustainable play-learn system be built which provides incentives and rewards other than money? Could the system address the poorest of the poor? Could the model be extensible and replicable?

4.2. Sustainability
Could sensibilities of the hand be integrated with the mind? Could dying craft traditions be a part of the model? Can craft be made contemporary and contextual? Could the system train for or provide livelihoods? Would it empower the children to lead better lives? Could the network be extended beyond the children into the community?

4.3. Learning
Could learning be made fun and engaging? Could learning happen out of classrooms? What role could technology play? Could technology be taught or learnt?
How to build creativity in children? How to build a network of creative communities? Could communities be the networks of learning? Could we draw on existing knowledge within communities?

4.4. Well-being
How to create safe havens for the children? What are the criteria for a safe space? Could the community provide a safe space? How can equal opportunity be a change from the present? How to foster an environment of co-creation? Could the system facilitate collaborative learning? Could play be a medium of child-to-child learning? Could the system engage with community issues? Could the system belong to the community?

5. The *Aata Paata Horaata* System
The design of *Aata Paata Horaata* builds social interaction and fosters community development through a series of modular, well-crafted experiences. *Aata Paata Horaata* is a phrase in Kannada, the dominant language in the Karnataka State region of India, that means *Play, Learn, Transform*. Aata Paata Horaata (APH) incorporates systems thinking to integrate project goals as they emerged from the research process (Table 3). Aata Paata Horaata also uses significantly methods and ideas from visual communication and branding to develop the system components, their relationships to each other, and their acquisition by potential participants (Figs 8-12).

Play-Learn-Teach Communities:	**Aata Koota** (play groups or clubs): Generate collaborative play and foster a spirit of sharing and learning across communities and age groups with ideas, toys, sound, and media pieces who can add their collective currencies and enjoy playing together.	**Leela Sangha** (creative play groups): Allows for more thoughtful and creative play when children form groups to work collaboratively on the design and development of new toys, games, or music/dance videos using new interactive technologies, handicrafts such as cane or handmade woodcraft, and with recyclable junk or by repurposing earlier generations of discarded tech toys.
Alternate Time and Learning Based Currencies:	**Sikka** (tradable currencies): Build in value through alternative forms of exchange that extend into the community (e.g. collecting kitchen waste and composting or making biofuels, growing food in gardens)	**Kalika Gante** (learning hours): Time banks for contributing to learning through exchange across communities--by giving time to teach someone what you know well.
Learning Exchanges and Safe Play Spaces:	**Kreeda Kote** (play haven): Develop real face to face networks of learning inspired by the children's own ideas and fantasies of play	**Bulbula** (play pod): Create a 'lab-in-a-bag' that can be earned (collectively or individually) and taken home to play (e.g. roof tops, open maidans) and learn science through investigation in their own environment.
Community Media Spaces and Digital Social Networks:	**Namma Nimma Radio** (our and your radio): Create and sustain interest in the activities through the setting up and running of a regular *aAta aAta HoOrata hour* on the children-run radio station.	**E-Saati** (e-exchange): Create an online platform in Kannada that will facilitate barter and exchange, sharing, community building, social networking.
Social-Economic-Learning Network and Personal Media Banks:	**Adlu Badlu Henike** (exchange network): Augment this with a digital network using a range of mobile digital technologies that allows for communication, sharing, exchange and collaboration.	**Khajana** (bank): Allows for the accumulation of wealth in the form of media, ideas, toys, credit, and food.

Table 3. The Aata Paata Horaata system: A modular system of teaching and learning components that bridge communication, meaning, social, and economic boundaries.
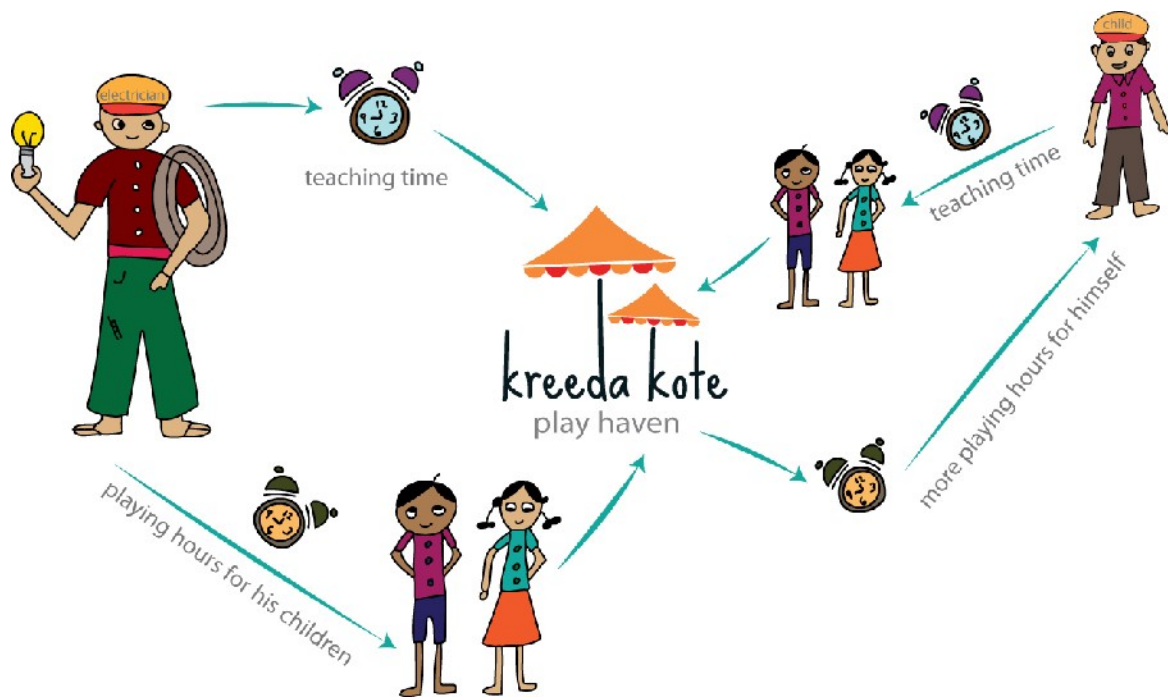
Fig 8. Kreeda Kote (play haven) **and Kalika Gante** (learning hours): Time banks for contributing to learning through exchange across communities support real, face-to-face networks of learning inspired by the children.

collecting daily kitchen dumps from the community for biofuels exchanging service for sikkas

working in community edible garden exchanging service for sikkas

Fig 9. Aata Koota (play groups) **and Sikka** (tradable currencies): Generate collaborative play, sharing, and learning across communities while building in value through alternative forms of exchange that extend into the community.

Fig 10. Khajana (bank): Allows for the accumulation of wealth in the form of media, ideas, toys, credit, and food.
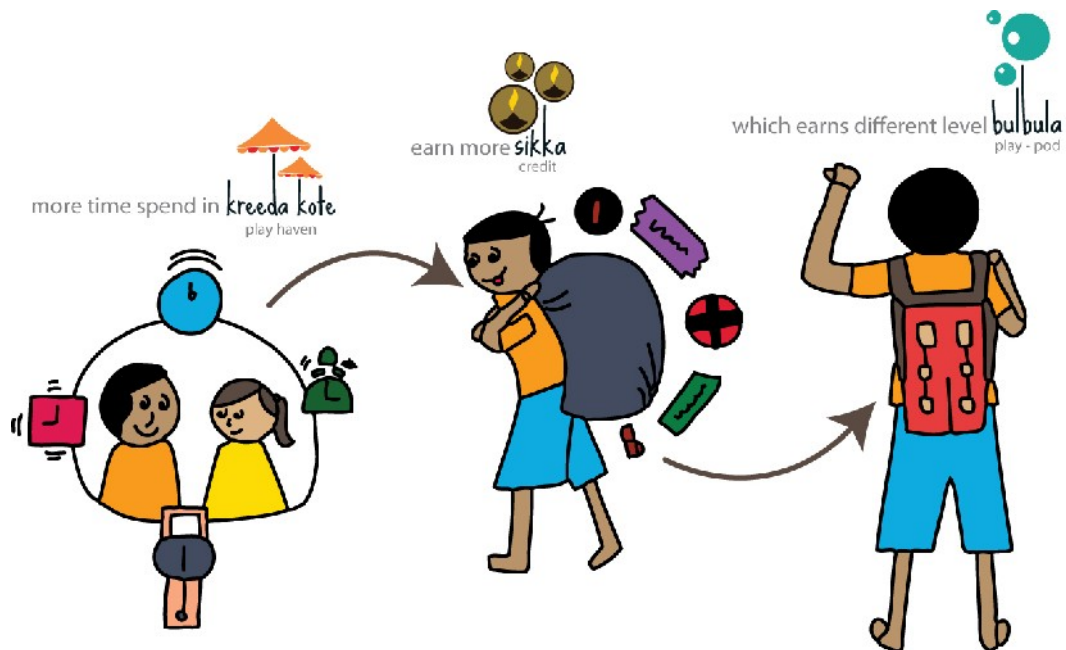

Fig 11. Kreeda Kote, Sikka, and Bulbula: Components working synergisticly to support a suite of behaviors that increase social and economic well-being.

Fig 12. An artist's rendition of the Bulbula concept: These playspaces support personal security with a visible and protected place to play and practice skills.

6. Validation

The design concepts were validated through a series of workshops in order to test and refine the individual concepts of the APH system. Two examples of these workshops included students from the Drishya Community who explored storytelling and basic biology using components of the APH ecosystem.

6.1. Transmedia Storytelling Workshop:

The Transmedia Storytelling Workshop integrated the *E-Saati, Leela Sangha, Namma Nimma Radio* and *Khajana* concepts in a complex amalgamation of analogue and digital cultures. The children worked in groups (Leela Sangha) for 6 weeks learning local folk cultures of puppet making and storytelling with media tools such as Scratch (http://scratch.mit.edu/) and mobile phones. Ning (http://www.ning.com/) was used to a media tool to develop and extend a collecting (Khajana) and networking (e-Saati) platform for the children as well as to communicate activities happening during the camp. Audio storytelling was conducted using mobile phones, which were collected on the Ning platform as radio 'narrowcasts' (Namma Nimma Radio). These stories continued to be shared and integrated as dynamic interactions between oral traditions and local craft practices of puppetry and digital environments using Scratch. The culmination of the

workshop brought together multiple analogue and digital media streams as puppet show for the extended Drishya Community.

Fig 13. Transmedia Storytelling Workshop: Integrating e-exchange, community radio, banks and creative play groups.

6.2. Interactive Insect Installation:

The concepts of *Kreeda Kote, Bulbula, Aata Koota* and *Khajana* were explored in a series of Interactive Insect Installations. The workshop involved the learning, application and integration of local traditions and interactive-sensor programming facilitated by teachers, technical staff, and researchers (Kreeda Kote). The children started by observing insect motion and insect behavior. They then translated those observations into construction drawings and crafted insects out of a combination of materials to articulate those behavior-movement patterns. This process that allowed them to explore relationships between form and function as well as basic physical principles. They then proceeded to incorporate behavioral traits with their insects using Pico Crickets (http://www.picocricket.com/) as programmable sensors, which they could attach to their crafted insects. Finally, they played with their constructed insect-toys (Khajana) in the garden in groups (Aata Koota) within pergolas (Bulbula) they had constructed.

Fig 14. Interactive Insect Installation: Exploring the integration of play pods, banks, play groups, and play havens design concepts.

7. Conclusions

The Aata Paata Horaata ecosystem is ultimately a hypothesis that continues to be tested and used as working proposition for new learning tools and capabilities in the local community context. While each aspect of the ecosystem is valid on its own, our intention was to build mutually reinforcing synergies between material, social, digital, and semeiotic forms. The goal of the project continues to emphasize the support of dynamic behaviors for new urban contexts, socially enriching forms of interaction, and economically empowering insights and activities. Further work now focuses on the means through which the components can scale together and translate across cultural, linguistic, and geographic contexts.

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