

Question 1: Narrative Description of Activities.

BACKGROUND

The mission of the Dynamicland Foundation is to enable universal literacy in a humane computational medium.

The greatest leaps in the progress of civilization have come from new forms for seeing and discussing ideas: written language, printed books, mathematical notation. Each of these mediums enabled humanity to think and communicate in ways that were previously inconceivable. Each medium was made possible by *public institutions* committed to providing *universal access and education*.

The computer has the potential to become the next great medium of thought, in which every human being is literate and fluent in a computational medium for understanding and debating complex systems. Such a literacy, made universal by new public institutions, could empower humanity to address its ever-growing systemic crises, and develop a more democratic and enlightened civilization. However, the computer as we know it today cannot serve as a basis for this vision, for two reasons:

- **Productization.** Today's computers and apps are *products*, created by professional elites for consumers. To use a computer means to constrain one's work and thought to the features of these mass-produced "tiny worlds". This is utterly unlike real literacy, which is an *ability* that we *teach* to every person, empowering them to create their own writing to express any possible idea without constraint. There exists no corresponding form of computing: an *ability* which could be *taught* to every person, empowering them to *create their own computing environments* to express any possible idea computationally.
- **Isolation and disembodiment.** Computing today takes place on private individual devices, so every move toward computationally-aided discourse pulls people apart into isolated virtual worlds, depriving them from working face-to-face with others, working with their hands, and using the space around them. The vast repertoire of human abilities is reduced to scrolling, clicking, typing, and staring into screens. This is inhumane.

These problems call for a fundamentally new form of computing. Instead of a product, it must *belong to the public*: a public good transmitted by public education (like written language) supported by public institutions (like libraries, schools, and museums) and powered by public utilities (like electric light). Instead of isolating and disembodiment, it must *bring communities together* in the same physical space, to teach and discuss ideas face-to-face, to build and explore ideas with their hands, to solve problems collectively and democratically. For universal literacy, and for a humane medium, these are requirements.

ACTIVITIES

The Dynamicland Foundation pursues its mission in two ways: (1) deep research into novel forms of humane computing, and (2) incubating a culture of literacy via the development of educational and community-based institutions.

1) Research Activities.

To make possible the creation of these new educational and community-based institutions, Dynamicland researchers are inventing a new form of computing which takes place in physical space, using ordinary physical materials such as paper, pens, cardboard, and clay. There are no screens and no apps. Instead, people craft computational activities together with their hands, and these activities can take up as much space as necessary to convey their ideas, even filling rooms. Large groups of people can come together to inhabit, learn from, and debate these large-scale computationally-expressed ideas. People can have face-to-face conversations while jointly exploring computational models on the table. Because everything is out and visible, people readily learn from and remix each other's creations.

For example, members of Dynamicland's community have created "textbooks" that play like board games; educational ecological simulations for children who hand-draw the characters and rules; toolkits for mapping transit, demographics, and economic indicators over a wall or table; educational seminars presented with collaboratively-crafted computational "murals" instead of slides; remixable musical instruments; interactive art installations of all kinds; and hundreds more. Unlike isolated apps, these projects all exist in the same space, can all be interconnected with one another, and can all be used by many people together. Anything can be freely modified by anyone, and often is.

This is "communal computing", and Dynamicland believes it to be the most humane and empowering basis for universal computational literacy. While all forms of work and discourse could benefit from this medium, or even be transformed, Dynamicland is particularly interested in its potential for *public spaces* in which people seek to understand and communicate — libraries, museums, classrooms, arts spaces, town halls, courtrooms.

The Dynamicland researchers are *not developing a product*. The computers that the researchers build are *models*: not for distribution, but for studying and evaluating. The goal of the research is not to provide hardware or software to users, but to *discover a new set of ideas* which will enable all people to create computational environments for themselves, with no dependence on Dynamicland or anyone else, and to understand how these ideas can be taught and learned. The end result of the research is fundamentally intended to be a *form of education*, empowering communities to be self-sufficient and teach these ideas to each other.

Dynamicland wishes its research to be free for all people to learn from and build upon, and will widely distribute its discoveries via publicly-published books, blueprints, papers, and video lectures, as well as in-person classes, activities, and exhibits at community spaces. There are no plans to protect or license any inventions.

Dynamicland spends approximately 50% of its time and resources researching a humane computational medium.

2) Educational and Community-Based Activities.

A new form of literacy cannot be invented by researchers in isolation. It must be co-created by communities shaping it for their own needs and teaching it to others. Dynamicland intends to incubate a culture of literacy in two ways: by opening and operating public-access community spaces, and by working with existing communities in mission-aligned public institutions such as schools, libraries, museums, arts spaces, youth groups, and science labs.

2a) Seeding Dynamicland Community Spaces.

The first Dynamicland community space was established in 2017 in Oakland, California. Visitors learn from and teach each other to create forms of computational media that have never before existed, in a supportive educational environment surrounded by everyone else's projects, all available to be learned from and remixed.

Supported by a staff of volunteers, Dynamicland has held regular weekend community hours, workshops and classes on special topics, and other community events, in which visitors get in-depth experience creating and communicating using new forms of computing. Dynamicland has hosted over a dozen field trips with students of all ages, as well as multi-week residencies with educators, students, artists, scientists, and activists. Open houses have brought in thousands of people from the local community. All community visits have been free of charge. Dynamicland seeks to cultivate a diverse community with a wide range of interests and backgrounds, with a focus on those underserved or alienated by computers today.

This community space is an early model for a new kind of civic institution — a public library for 21st-century literacy. Dynamicland envisions a future where every town has a “dynamic library” with computational literature on every subject, where people gather to collectively author and explore this literature, using the medium to represent and debate their ideas using computational models. People will hold presentations and town-hall discussions on issues of importance to the community, using the medium to see facts, explore consequences of proposals, and make data-driven decisions collectively. The public benefit of transforming collective learning and civic engagement is potentially immeasurable.

Many of these elements have already been observed in reality at the Dynamicland community space. Dynamicland intends to cultivate additional community spaces around the world, some operated by the Dynamicland Foundation itself, but most by inspired guests who study at Dynamicland and take the ideas back home. That is, Dynamicland wishes to spread Dynamicland by teaching others to make it for themselves.

Dynamicland spends approximately 25% of its time and resources on developing and maintaining the community space.

2b) Programming with Educational and Community Institutions.

Dynamicland has dedicated significant time over the last few years cultivating relationships with many other cultural and educational institutions, including SFMOMA, Code for America, the Exploratorium, Oakland Youth Radio, California College of the Arts, and many others. Dynamicland intends to co-create future iterations of the computational medium with a diverse set of communities such as these, working in their spaces and incorporating the ideas and practices that emerge.

For example, Dynamicland worked with the Bio Nano Lab at the University of California, San Francisco, to research a “dynamic lab bench” where computational simulations live side-by-side with wetlab materials, and students see in realtime the invisible activity in test tubes as they transfer DNA. The Bio Nano lab has also explored the use of Dynamicland’s research for publishing scientific results, going beyond what’s possible with conventional scientific papers to enable entirely new forms of scientific communication and science education.

In the future, Dynamicland intends to develop computational textbooks and curricula in collaboration with schools and universities from early education through postgraduate, teaching students both the medium itself, as well as exploring the new possibilities of the medium within existing fields (architecture, mathematics, public policy, etc).

Dynamicland spends approximately 25% of its time and resources on conducting joint programming with other educational and cultural institutions.

EXAMPLES

Computing at Dynamicland has a unique culture and broad social impact which is hard to convey in the abstract. The following story gives a specific example of how community projects come about through close yet serendipitous collaboration. Because everything created at Dynamicland is communal and invites collaboration, the evolution of the technology is often a direct outcome of the culture of the community.

Example 1: Music Education. A Dynamicland researcher created a prototype “textbook of the future” titled Beats of the World that teaches drum rhythms from around the world. Unlike a traditional textbook, this piece of dynamic media resembles a board game, inviting intuitive, active, and communal learning that is impossible outside of Dynamicland: readers learn to compose various rhythms by placing tokens on a musical grid, audio plays in real-time, and as you turn the pages of the book, a map on the wall lights up to show where that rhythm originated from in the world. A former White House Head of Education couldn’t help but start dancing as he composed a salsa rhythm with his hands — something that doesn’t usually happen while reading a textbook. During a visit from a local school, children spread the pages of the book across the table to hear all the rhythms at once, freely mixing Reggaetón with Gamelan, creating and learning together.

Example 2: Increasing Access to Social-Science Data and Education. Inspired by Beats of the World’s mapping feature, a Dynamicland community member started a project to explore geographic maps of any location in the world. In collaboration with other community members, they enabled socioeconomic datasets such as income, racial demographics, and public transit to be overlaid on the geographic maps by simply placing paper dataset cards next to the map. During a visit, a group of high school students from East Oakland explored various datasets of their own neighborhoods and home towns, creating visualizations and sharing data-driven stories despite having no background in computer programming.

Example 3: Providing Public Access to Real-Time Data on Natural Disasters and Risks to Public Health. This dynamic map was extended by another community member during the 2018 California wildfires, to display real-time satellite data of smoke movement in the Bay Area alongside air-quality data to inform visitors if they needed to wear masks during their trips home. In one night, the Dynamicland community turned the space into one of the best places to understand an active environmental crisis and collaboratively mitigate its health risks. Upon seeing this, a member of the Hurricane Katrina rapid response team broke into tears, wondering how many more lives might have been saved if they’d had a space like this to manage the disaster. In times of disaster, present-day computers make timely and collaborative information sharing prohibitively cumbersome. As a result, underserved communities — who often have the least access to information — bear disproportionate harm.

The evolution of Beats of the World into a tool for data-driven mutual aid is one amongst hundreds of stories that together, contribute to a culture of curiosity, generosity, and resilience at Dynamicland. The goal of the Dynamicland Foundation is to make stories such as these a commonplace for every person on Earth.