

Futures Thinking & Imagination in K12 Education LFC Annual Report 2022-2023

Ruth Wylie

Steve Zuiker

Michelle Jordan

Ed Finn

Laura Cechanowicz

Bregje van Geffen

Contents

1. Introduction	3
2. Members of the Futures Thinking and Imagination in K12 Education LFC	3
3. Overview of the LFC Meetings	4
4. LFC Achievements, 2022-2023	10
5. Focus goals for next year (2023-2024)	11

1. Introduction

The goal of education is ostensibly to prepare students for the future: to engage in their future careers or function as thoughtful citizens. Yet, most school learning focuses on already established knowledge, information, and skills derived from the past. We propose that education demands a more forward-looking mindset, to prepare students not only to react, but to anticipate, imagine, and be proactive in designing solutions and systems for better societal futures. This shift means that futures thinking needs a clear presence in schools and classrooms. Over the past year, we have built a successful Learning Futures Collaborative (LFC), which aims to address how we can best prepare youth to think critically about and take agency for their futures. In this 2022-2023 annual report, we summarize and reflect upon the results of a year of collaboration on the theme *Futures Thinking & Imagination in K12 Education*. To this end, we present our members (section 2), a detailed overview of each of our LFC meetings (section 3), our accomplishments for the past year (section 4), and finally, our focus, insights, and framings for future inquiry and collaborative work for the 2023-2024 year, described in a series of short papers on a variety of educational stakeholders, populations, and institutions, ranging from teachers and schools to students and broader publics (section 5).

2. Members of the Futures Thinking and Imagination in K12 Education LFC

The LFC on *Futures Thinking and Imagination in K12 Education* consists of 14 members from a broad range of ASU units, representing various university populations and career phases: faculty, staff, graduate students, and undergraduates.

Faculty

Laura Cechanowicz, Arts, Media + Engineering and Graphic Information Technology

Ed Finn, School for the Future of Innovation and Society and Arts, Media + Engineering

Michelle Jordan, Mary Lou Fulton Teachers College

Shawn Jordan, Ira A. Fulton Schools of Engineering

Matthew Odebiyi, Mary Lou Fulton Teachers College

Maria Teresa Tatto, Mary Lou Fulton Teachers College

Ruth Wylie, Mary Lou Fulton Teachers College

Steve Zuiker, Mary Lou Fulton Teachers College

Staff

Bob Beard, Center for Science and the Imagination

Graduate Students

Kevin Brown, Mary Lou Fulton Teachers College (LLT)

Bregje van Geffen, Mary Lou Fulton Teachers College (LLT)

Undergraduate Students

Brian Neal, Engineering/Industrial Management

Elizabeth Quigley, Sustainability and Supply Chain Management

Marie Vandian, Family and Human Development

3. Overview of the LFC Meetings

For 2022-2023, the LFC had planned a total of seventeen biweekly meetings. Fourteen meetings took place as planned. Thirteen were regular lunch meetings from 12:30-15:00 on the first and third Friday of the month. One was an additionally scheduled LFC game night. Three meetings were canceled; one of these cancellations allowed all LFC members to participate in the Anticipation 2022 conference on futures thinking and foresight tools, hosted at ASU's Tempe campus. In the overview below, each LFC meeting is described in more detail.

Meeting 1: September 2, 2022

Activities:

- Getting to know each other and the LFC
 - » Haiku
 - » What is futures thinking?
 - » What is a Learning Futures Collaborative?
- Goals of our working group
- Futures by Chance | Futures by Choice game (Facilitated by Ruth Wylie)
 - » Timeline activity in which we build a future world scenario in four rounds. The activity includes “futures by chance,” with items placed on the timeline as determined by dice rolls, and “futures by choice,” wherein participants write their own future events for the timeline.
- Imagining the Future of our LFC (Facilitated by Bregje van Geffen)
 - » Creating a newspaper headline on how LFC members imagine the future of the LFC 10 years later.
 - » Imagine our LFC 5 years from now – what do we want to achieve?

Meeting 2: September 16, 2022

Reading: Jennifer M. Gidley, *The Future: A Very Short Introduction* (Oxford University Press, 2017),

<https://global.oup.com/academic/product/the-future-a-very-short-introduction-9780198735281>.

Summary: From the beginning of time, humans have been driven by both a fear of the unknown and a curiosity to know. We have always yearned to know what lies ahead, whether threat or safety, scarcity or abundance. Throughout human history, our forebears tried to create certainty in the unknown, by seeking to influence outcomes with sacrifices to gods, preparing for the unexpected with advice from oracles, and by reading the stars through astrology. As scientific methods improve and computer technology develops, we become ever more confident of our capacity to predict and quantify the future by accumulating and interpreting patterns from the past, yet in truth, there is still no certainty to be had.

In this *Very Short Introduction*, psychologist and futures researcher Jennifer M. Gidley considers some of our most burning questions: What is “the future?” Is the future a time yet to come? Or is it a utopian place? Does the future have a history? Is there only one future, or are there many possible futures? She asks if the future can ever be truly predicted or if we create our own futures – both hoped for and feared – through our thoughts, feelings, and actions, and concludes by analyzing how we can learn to study the future.

- Explains the history of our conception of the future from the emergence of the theory of linear time in ancient Greece 2,500 years ago, and looks at the way human beings have prophesied, foretold, predicted, and attempted to control the future
- Introduces the field of futures studies, spanning social, cultural, and environmental innovations, as well as technological advances, and dispels some of the common misconceptions about the field
- Discusses the reality of multiple futures in a world of quantum possibility, and explores how we can become the creative agents of our desired futures

(Note: Resource of the text <https://global.oup.com/academic/product/the-future-a-very-short-introduction-9780198735281?cc=us&lang=en&#>)

In addition to discussing the reading, we explored podcast ideas for the MLFTC Learning Futures podcast. Some topics that emerged are:

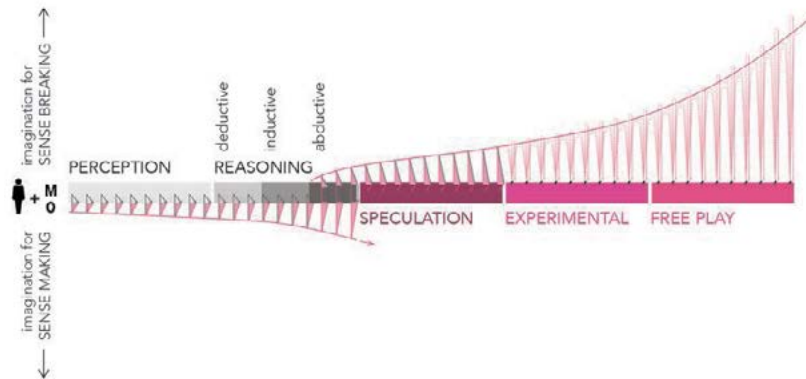
- When is imagination? (Steve Zuiker)
- Climate futures (Michelle Jordan and Bregje van Geffen)
- Social justice problems (Maria Theresa Tatto)
- Cross-cultural benefits of futures thinking (Matthew Odebiyi)
- Instrumentalize imagination (Steve Zuiker)
- Water pedagogies (Kevin Brown)

Meeting 3: October 7, 2022

Reading: Ann Pendleton-Jullian and John Seely Brown, “Pragmatic Imagination,” from *Design Unbound: Designing for Emergence in a White Water World* (2018), 385-447.

Summary: “Pragmatic Imagination” begins with an assumption that agency in the world today requires a productive entanglement of imagination and action. It then presents a framework for unpacking the imagination as a wide range of mental activity that can be put to purpose in this world. This is the Pragmatic Imagination: a concept and framework of six principles.

1. The imagination serves diverse cognitive processes as an entire spectrum of activity.



2. The imagination both resolves and widens the gap between what is unfamiliar – new/novel/strange – and what is known. This gap increases along the spectrum from left to right. Within the range of [abductive reasoning](#), there is a shift from using the imagination for sense-making to sense-breaking, where one first widens the gap and then resolves it with the imagination.

3. The Pragmatic Imagination proactively imagines the actual in light of meaningful purposeful possibilities. It sees opportunity in everything.

4. The Pragmatic Imagination sees thought and action as indivisible and reciprocal. Therefore, it is part of all cognitive activity that serves thought and action for anticipating, and thought and action for follow-through.

5. The imagination must be instrumentalized to turn ideas into action – the entire spectrum of the imagination. And the generative/poietic/sometimes-disruptive side of the spectrum is especially critical in a world that requires radically new visions and actions.

6. Because the imagination is not under conscious control, we need to understand, find, and design ways to set it in motion and scaffold it for play and purpose.

(Note: Text adapted from: <http://makecommoningwork.fed.wiki/view/pragmatic-imagination> and <http://www.pragmaticimagination.com>)

Meeting 4: October 21, 2022

Reading: Laura Harjo, “It Is Your Turn: Tools of Futurity.” In *Spiral to the Stars: Mvskoke Tools of Futurity* (University of Arizona Press, 2019), 221–240 <https://doi.org/10.2307/j.ctvh4zjdg.11>.

Summary: Harjo’s book is structured to introduce and explain a set of concepts – estecate sovereignty, the decolonization of knowledge, transformational power, and transformational geographies – that are the constituent elements of mapping a path to the next world. This final chapter provides tools that communities, whether big, small, informal, or formal, can use together with their members to provide a platform for producing local knowledge; sorting through and reflecting on individual and collective wants, desires, and issues;

moving information through the community; and devising concrete actions.

(Note: Resource text: https://www.jstor.org/stable/j.ctvh4zjdg?turn_away=true)

Meeting 5: November 4, 2022

This LFC was canceled. Instead, everyone was invited to attend virtual sessions of the Anticipation 2022 conference.

Meeting 6: December 2, 2022

Readings:

Stephen T. Asma, “Imagination is Such an Ancient Ability it Might Precede Language,” *Aeon*, September 11, 2017.

Intro: Imagination is intrinsic to our inner lives. You could even say that it makes up a “second universe” inside our heads. We invent animals and events that don’t exist, we rerun history with alternative outcomes, we envision social and moral utopias, we revel in fantasy art, and we meditate both on what we could have been and on what we might become. Animators such as Hayao Miyazaki, Walt Disney, and the people at Pixar Studios are masterful at imagination, but they’re only creating a public version of our everyday private lives. If you could see the fantastic mash-up inside the mind of the average five-year-old, then *Star Wars* and *Harry Potter* would seem sober and dull. So, why is there so little analysis of imagination by philosophers, psychologists, and scientists?

(Note: Resource of the text: <https://aeon.co/essays/imagination-is-such-an-ancient-ability-it-might-precede-language>.)

Stephen T. Asma, “Why We Need a New Kind of Education: Imagination Studies,” *Aeon*, May 26, 2022.

Intro: A chasm divides our view of human knowledge and human nature. According to the logic of the chasm, *facts* are the province of experimental science, while *values* are the domain of religion and art; the *body* (and brain) is the machinery studied by scientists, while the *mind* is a quasi-mystical reality to be understood by direct subjective experience; *reason* is the faculty that produces knowledge, while emotion generates art; STEM is one kind of education, and the liberal arts are wholly other.

(Note: Resource of the text: <https://aeon.co/essays/why-we-need-a-new-kind-of-education-imagination-studies>)

Special Meeting: December 5, 2022

Coyote & Crow game night: *Coyote & Crow* is a Nebula Award–nominated sci-fi and fantasy tabletop role playing game dedicated to raising the voices, ideas, perspectives, and imagination of Indigenous creatives throughout the game industry. The game is set in a First Nations alternate future where colonization never happened. This game was created by an all-Native team. In March 2021, *Coyote & Crow* became one of the most successful role playing games to ever fund on Kickstarter, raising more than \$1 million dollars.

(Note: Text adapted from the game’s official website, <https://coyoteandcrow.net>.)

Meeting 7: December 16, 2022

Canceled

Meeting 8: January 20, 2022

Activity: During this session, we played the game “*IMPACT: Learning Edition*”, a strategic foresight game designed to help people imagine and think critically about emerging changes that could impact the future of learning. Three to five players can take on distinct characters, each with their own role, values, and hopes for the future. Players connect with avatars like Ayren Batiste, our “most likely to become president” high-school learner, who pursues STEM learning experiences and work experiences aligned with his career hopes, and Pat Li, a nonbinary learning-journey mentor who guides and supports learners to design and enact pathways through a focus on balancing healthy bodies, minds, and relationships. They, and other personas, compete to create a world where their future role is relevant and secure. More details on the game are available at <https://education-reimagined.org/impact-learning-edition-a-game-to-engage-in-futures-thinking>.

Meeting 9: February 3, 2023

Activities:

- Identify potential projects for the group to work on during the Spring semester:
 - » American Educational Research Association (AERA) conference grant proposal
 - » Futures by Chance | Futures by Choice update for middle school students
 - » Guadalupe community futures project
 - » Digital educational infrastructure for classrooms worldbuilding
 - » Futures thinking in the past (paper-based game)
 - » Creating a measure for futures thinking or imagination
 - » Worldbuilding research and futures dictionary
 - » Worldbuilding as educational model/tool
 - » Make progress toward making imagination studies in the field
- Futures by Chance | Futures by Choice game development is happening through Bregje van Geffen and Rebekah Jongewaard (graduate student at the Mary Lou Fulton Teachers College). We are organizing a workshop with teachers to codesign a prototype and implementation proposal.
- Other selected projects we are going to work on are:
 - » **Guadalupe community futures project**
Description: This project addresses local and community climate futures using intergenerational learning and worldbuilding. It unites the Town of Guadalupe – a predominantly Hispanic and Native American community of approximately 5,300 residents situated within the larger Phoenix metropolitan area – with researchers from Arizona State University and experts from SciTech Institute. Working with Guadalupe’s civic leaders and senior center, we will use a codesign process to iteratively develop an informal learning program where youth and elders work together in a collaborative discovery and creative process of worldbuilding. Combining traditional community knowledge, cultural geography, scientific research, and speculative futures, including Indigenous futures approaches, participants will imagine positive, scientifically grounded futures for the town.

Participants' visions for the future of Guadalupe in the face of climate change will be shared with the broader community through futures festivals and other happenings to catalyze dialog, reflection, and action with community stakeholders. The worldbuilding process will be documented in a lab notebook, a living reference and design document, and creative outputs will be curated on a website for broader dissemination. Drawing on our findings, the project team will host worldbuilding workshops with other underrepresented communities in the final two years of the project. This work will build agency among participants and their communities by increasing climate science knowledge and offering 1) tools for anticipating and contending with the local impacts of climate change and 2) shared ideation and narratives regarding concrete next steps for positive change, while 3) building capacity for communal imagination, deliberation, and action.

» **Futures Thinking in the Past game**

Description: A game that provides structure for participants to apply futures thinking protocols to “alternate histories” thinking. Engages with themes of agency, trauma, and habit, as well as the activity of envisioning alternative futures. The game will cue players to ask: what new predictable past variables could have led to a different present, and also could now lead to a new future? Gameplay will engage both personal histories and larger-scale social events. A more intimate version of this experience could be designed to engage parents and families, or people in particular spaces and groups. Perhaps we should work with a psychologist in designing.

» **AERA grant proposal**

Description: This project seeks to address the question of imagination as an overlooked yet essential aspect of effective K12 teaching and learning. We posit that the world is confronting a collective crisis in imaginative thinking and efficacy that has significant implications for our capacity to address unprecedented global challenges such as climate change. For this reason, we will focus the conference on futures thinking as a primary domain or practice area for “applied imagination.” We will gather experts from various disciplines to explore how the fundamental cognitive capacity of imagination can be fostered and supported in formal learning environments. Specifically, we will facilitate discussion around a) articulating and reflecting upon what constitutes imaginative thinking and efficacy; b) the role of imagination in learning and knowledge attainment; c) how educators can apply imaginative thinking in the classroom, and how efficacy may be measured; and d) the relationship between imagination and creativity in solving “wicked” problems – problems that are difficult due to their complex and interconnected nature. These insights will enable us to cultivate a theoretical understanding of imagination and imaginative thinking that lays the foundation for a refined interdisciplinary field of applied imagination.

Meeting 10: February 17, 2023

Activities:

- Project work time; everyone works on the projects defined earlier
- Report out on progress

Meeting 10: February 17, 2023

Activities:

- Project work time; everyone works on the projects defined earlier

- Report out on progress

Meeting 11: March 3, 2023

Activities:

- Finalizing AERA workshop proposal
- Semester plan on Futures Thinking in the Past game (see meeting 9 for a description)
- Timeline of Guadalupe Community Futures project

Meeting 12: March 17, 2023

Activities:

- Working in project teams; everyone works on the projects defined earlier
- Report out on progress

Meeting 12: March 17, 2023

Canceled

Meeting 13: April 7, 2023

Activities:

- Valerie Molina, Mayor of Guadalupe, joined to discuss the Guadalupe Community Futures project
- Other project updates

Meeting 14: April 21, 2023

Activities:

- Kevin presented a possible collaboration with the Labriola National American Indian Data Center on photo obscura and asked for feedback
- Futures by Chance | Futures by Choice update from Bregje van Geffen and Ruth Wylie
- Other project updates
- LFC summer plans – we will be planning LFC meetings but will be flexible if people prefer to be online.

4. LFC Achievements, 2022-2023

Below is a description of what we have achieved over the past year, broken down into projects, guests and presentations, feedback opportunities, and other achievements.

Projects

- NSF proposal Guadalupe Futures Project grant submitted and under review (involving five LFC faculty)
- AERA workshop grant proposal submitted and under review (involving five LFC faculty)
- New middle school version of the Futures by Chance | Futures by Choice game codesigned with middle school teachers – planning for pilot in fall semester.
- Started design for Futures Thinking in the Past game.

Visitors, guests, and presentations

- Naomi-Grace Lau, MLFTC prospective student
- Peter Bishop, Teach the Future
- Lauren Keeler, School for the Future of Innovation in Society
- Sultan Sharief, visiting scholar from USC
- Valerie Molina, Mayor of Guadalupe
- Rebekah Jongewaard, MLFTC PhD student
- Xueting Wu, Herberger Institute for Design PhD student
- Huabing Yu, Herberger Institute for Design PhD student
- Ruth Wylie guest lectured in Matthew Odebiyi's class
- Kevin Brown and Bregje van Geffen represented the LFC with a poster at the TCDC conference
- Bregje van Geffen represented the LFC in a panel discussion at the Learning Planet Festival
- Ruth Wylie and Bregje van Geffen presented the Futures by Chance | Futures by Choice game at SXSW EDU, as part of Stanford d.school's Futures Cantina in Austin, Texas.

Opportunities for formative feedback

- Ed Finn and Ruth Wylie piloted futures thinking activity for ASU President's Club event
- LLT doctoral students Bregje Van Geffen, Rebekah Jongewaard, Xueting Wu and Huabing Yu received formative feedback on their Futures Thinking workshop they designed as part of Punya Mishra's Design Thinking course
- LLT doctoral student Kevin Brown led a discussion about his proposed work with ASU's Labriola Center (scheduled for April 21, 2023)
- LLT doctoral student Bregje van Geffen piloted a research intervention on imagining the future and received feedback.

Other achievements

- Readings and discussions informed incorporation of an Imagination & Futures Thinking course as part of the MLFTC Sustainability Education MA program.
- Themes for pathways of future work generated, with a particular focus on identifying research and implementation needs.

5. Focus goals for next year (2023-2024)

In the 2023-2024 year, we plan to accelerate two existing LFC projects: 1) the community futures codesign project with the Town of Guadalupe and 2) the rapid prototyping of imagination activities and measures. To make this possible, we aim to invite new members and create more flexible attendance for biweekly meetings. In addition, the first two fall meetings will be used for "strategic doing" around existing and prospective projects. To enhance ownership of the LFC, the leadership and collective governance of the LFC will take place through rotating representatives of each population/career phase, like faculty, grad students, etc. In the short papers below, we have described per target group how our work in the past year informs our intentions for the future.

5.1. Publics: The Role of Imagination in Democratizing Futures

What does Imagination look like and why does it matter?

We celebrate imagination in young children but tend to discourage it as they grow older, disciplining students for daydreaming or questioning the boundaries and assumptions of their world. In fact, we mostly notice imagination when it goes missing: “failures” and “crises” of imagination that lead to catastrophic mistakes and systemic collapse. Imagination is a fundamental cognitive capacity. Perhaps the best way to understand it is as a mental system for envisioning or experiencing things beyond the present moment: memories, daydreams, and future plans are all examples of imagination at work. Imagination is the ignition system for empathy, foresight, and resilience. We use imagination when planning a shopping trip, looking forward to reuniting with friends, or listening to a story. Imagination is what allows humans to envision things that seem impossible and stretch our minds to contemplate a new idea for the first time. In other words, imagination is how we learn. Building our capacity to imagine—training it like a muscle—is essential for personal success and social progress.

Example of Public Imagination

Imagination is a team sport, and when groups of people start to share imaginative ideas they can change the world. Every human has been part of a shared imaginary, whether that means rooting for a favorite sports team, advocating for universal human rights, or participating in a big, shared story like a political or religious movement. Dr. Martin Luther King Jr. is celebrated for his “I Have a Dream” speech, which explicitly describes an imaginative vision of a more just society. Dr. King was also a fan of the original *Star Trek* television show because it portrayed a positive, racially integrated future. When the actress Nichelle Nichols considered leaving the show after its first season, Dr. King persuaded her to stay on because it was so important for young African Americans to see someone like them participating in this public imagination of the future. Dr. King saw the power of *Star Trek* as an engine of shared, public imagination about the future, and the importance of inclusion and representation in that future.

Opportunities

We use our imaginations constantly to anticipate the future in small ways without even realizing it. There is a tremendous opportunity to tap into this imaginative capacity in more deliberate ways. If we want to navigate the challenges of the twenty-first century, many more people need to feel invited, empowered, and inspired to imagine their own futures. Changing how we teach and learn using imagination is the key to harnessing this incredible human capacity for anticipating and enacting positive change. The first stage is to make imagination more visible: learning to see how imagination works at the individual and collective level. The second stage is to create space for individual and shared imagination, and understand how storytelling, artistic practice, scientific research, and other modes of creation and inquiry can motivate and inspire imagination. Finally, we need to empower “applied imagination,” giving people tools and methods for putting imaginative ideas into action.

Challenges

The “failures” and “crises” of imagination we live with do not stem from a lack of imagination. People imagine things all the time. What we struggle with is the massive amount of energy we collectively pour into imagining the status quo and convincing ourselves that real change is impossible. We have populated our world with imaginative constructs like money and politics that overshadow many other kinds of imaginative possibility. In order to build imaginative capacity and create space for more inclusive futures, it is necessary to first break free of status quo thinking. Those human institutions that survive in the long run are quite effective at propagating their own imaginative constructs, and it can be difficult to create space for free imagination within the context of a school, university, or other environment that is structurally organized to perpetuate a particular kind of imagination.

Connection to 2023-2024 LFC Agenda

The Learning Futures Collaboratory (LFC) *Futures Thinking & Imagination in K12 Education* is a focused effort to understand the role of imagination in learning and particularly how imagination shapes our collective relationship with the future. In 2023-24, the LFC will explore imagination as a collaborative process or team sport. Through workshops, literature reviews, and pilot research, we will engage diverse communities of scholars, students, and other practitioners to make imagination visible and build collective imaginative capacity.

5.2 Schools: The Role of Imagination in Educating Present & Future Generations

What does Imagination look like and why does it matter?

A century of educational research conclusively demonstrates that learning is an active process and a team sport (as described in the “Publics” section, above), not a passive process observed from the sidelines. If active learning is a foundation, then it is amplified by the power of imagination. Classrooms can be workshops, laboratories, and studios that inspire and enable students to partner with their teachers in putting learning and ideas to work. When schools put imagination to work, projects challenge teams not only to see what currently is but also to imagine what possibly might be. To thrive in a world of accelerating change, schools must invite classrooms to step into rich, authentic problems, not only to see these challenges as they present themselves in our reality, but also to imagine how circumstances and possibilities might relate differently. Re-centering classroom experiences around projects and complex problems links subject areas with real-world contexts. Authentic challenges in nature and society rarely align with a single subject like a story problem in a math textbook. When classes explore genuine challenges, it might not look or feel like math or science, and will probably demand imagination in at least two complementary ways. First, imagination helps fill gaps in understanding a problem, making sense of a problem and of the situations in which it arises. Filling gaps also entails noticing what remains unseen, like Sherlock Holmes noticing the absence of dogs barking at a crime scene. Second, imagination also helps expand gaps in order to break sense and spark rethinking, reframing, and repurposing to understand the problem more deeply – some problems are solved by asking new questions. What could it look like when problems put

learning into action, powered by imagination?

Example of Imagination

The Sonoran Photovoltaics (SPV) Lab illustrates how schools put imagination to work in classrooms. SPV Lab invites teachers and students to step into a problem unfolding in the Sonoran Desert right now and to learn by taking action, through research in their neighborhoods and collaboration with local universities. Classrooms explore how their local contexts and communities can address the combined challenges of reduced access to water and increased demand for food and energy. SPV Lab organizes research sites on school campuses where students conduct experiments with agrivoltaic gardens, exploring how a novel sociotechnical system can use less water to produce more fruit and vegetables and cleaner energy. SPV Lab also encourages students to view their communities as a site for research. For example, interviewing neighboring farmers, electricians, and landscapers typically reveals different perspectives on these combined challenges. (The same proves true when interviewing professors of agriculture, engineering, and geography.) Each person that students interview lends insight into the problem, but inevitably reveals an incomplete picture. Classes fill these gaps by working individually and in groups, but always as a team, to make sense and connect these perspectives together. For example, how might the land that farmers irrigate and the solar panels that electricians install on rooftops relate to one another? At the same time, classes must also look at the problem in new ways – asking, for example, how smarter systems can meet community demand by reducing how much they need.

Opportunities

As classrooms think about, play with, and make things for authentic problems, they build robust sets of experiences glued together by processes of sensemaking (filling gaps) and sensebreaking (expanding gaps), fueled by individual and collaborative imagination. The play of imagination that accompanies engagement with authentic problems can bind new things, new resources, and new ways together, helping classrooms maximize their grip on these problems. If the last century of schooling concentrated on well-framed problems pulled out of the real world, the next century will likely push classrooms back into the real world to engage with deeply entangled problems where imagination is imperative for understanding that solutions depend not only what is inside the problem, but also the systems, contexts, and relationships in which the problem is embedded.

Challenges

Schools are spoiled for choice when embedding classrooms in authentic problems that integrate imagination, but will continue to navigate an enduring challenge: curricula remain organized into subjects, while authentic problems in nature and society are not. Schools must explore how to redraw the boundaries that organize classrooms to forge partnerships with problems and the people connected to them.

Connection to 2023-2024 LFC Agenda

Our LFC will explore these opportunities and make progress on these challenges through thematic readings of relevant work, discussions with local partners, and pilot projects that

integrate imagination explicitly through activities and implicitly through design. In particular, our work will couple thought and action in collaboration with leaders in local schools, governments, and nonprofit organizations.

5.3 Teachers: The Role of Imagination in Teaching the Emerging Future

What does Imagination look like and why does it matter?

To be successful, teachers must employ imagination throughout their day while also challenging their students to do the same. They envision the needs of each of their students and develop ways to foster successful learning. Imaginative thinking is also a critical competency that teachers pass on to their students when teaching futures thinking in their classrooms. Futures thinking is a mental and often collaborative process of identifying and imagining possible trends and developing scenarios in response. Futures thinking can develop greater agency towards the future (shifting the relationship from “the future is something that happens to me” to “the future is something I can influence”), foster empathy (critically reflecting on scenarios to examine how their impacts would be felt differently by different communities), and support young people in becoming more resilient to ever-changing conditions.

Example of Imagination

During this year’s LFC, we organized a series of co-design workshops with teachers in order to adapt an imaginative futures-thinking game for middle school classroom lessons. The game, Futures by Chance | Futures by Choice, engages young people in a series of rounds to develop a timeline for the next fifty years. The first round features a set of themes (e.g., school, sports, climate), each with a positive and negative event (e.g., positive school event: “Personalized portfolios replace standardized assessments in PK12,” negative school event: “Only 50% of children in the US attend public schools”). Small groups of 3-5 students determine which event to place on their timeline by rolling a die or flipping a coin. The second round allows teams to select events they would like to add to their timeline, and to write their own future events. Finally, teachers play a critical role by facilitating reflection and discussion by posing questions like, “What would we need to start (or stop) in the next year to create the future your team developed?” “Who is privileged or holds power in your future? Who is disadvantaged?” and “How would this future impact you, your family, and your community?” “How would this future impact communities that are different from yours?” We have plans to pilot test Futures by Chance | Futures by Choice in middle school classrooms in Fall 2023.

Opportunities

There are incredible opportunities and responsibilities to teach futures thinking and imagination within formal education settings. In addition to dedicated lessons like the one described above, imagination and futures thinking can be integrated into normal classroom practice. Teachers can engage students in oral and written reflection prompts that invite them to reflect on how the material they are learning may become more or less relevant in the near future, and to look for trends that may shape possible futures. These imaginative acts about the future can engender a more reflective approach that persists

when students leave the classroom. As we highlight in other sections of this report (including “Schools,” above), teachers can also contribute to broader changes in schooling, often through partnerships.

Challenges

One of the biggest challenges in bringing futures thinking and imagination to formal learning environments is the lack of high-quality and scalable measures of self-efficacy, agency, and perceptions of possible futures. Teachers are accountable to state standards and standardized tests, and while the futures thinking and imaginative exercises we have developed in the LFC align with several state standards, standardized assessments remain rigid. To truly prioritize imagination and futures thinking in formal education environments, we need to reimagine the role of standardized tests in order to provide teachers and students with information that allows for iterative improvement of teaching, feedback to students on progress, and collective accountability.

Connection to 2023-2024 LFC Agenda

As mentioned, we are excited to continue exploring ways to partner with teachers in order to bring imagination and futures thinking into K12 classrooms with our 2023-2024 LFC. By working closely with middle school teachers, we can implement futures thinking lessons with approximately 100 students in order to test the impacts of these activities on students’ perceptions of possible futures and their role in shaping the futures we will all inhabit.

5.4 Youth: The Role of Imagination in Learning What Could Be

What does Imagination look like and why does it matter?

As children age, their play seeds the ground for adult imagination. At a young age, they create make-believe worlds with plastic dinosaurs or have deep make-believe conversations with stuffed animals. When they grow older, they utilize their mind’s superpower as a tool to time-travel back to medieval Europe during history class or wander off on an adventure while curled up with a Japanese manga. A pragmatic approach to the imagination allows us to see the actual in light of the possible, which can help children learn from past mistakes at personal, local, and global levels; come up with creative alternatives for the future; and develop empathy towards others who might live different lives with different resources, experiences, and goals. In addition, many children feel disempowered and pessimistic about global issues. Creating spaces where they can turn their imaginations into practical ideas can give them the agency to put thought into action and foster feelings of empowerment.

Example of Youth Imagination

Children and young people use their imaginations continuously. The inspiring examples of Boyan Slat and Thandiwe Abdullah show that children have the ability to use their imaginations in unique ways, sometimes leading to impactful innovations. Boyan Slat was 16 years old when he discovered more trash than fish in the sea while scuba diving. He imagined a solution to clean up the pollution in the ocean, which led to the development of the “Plastic Catchment System,”; a technology to collect large amounts of plastic from the ocean. Thandiwe Abdullah was still a minor when she co-founded the Black Lives Matter Youth Vanguard and helped incorporate Black Lives Matter into school programs. Although these are good examples

of what imagination in children and youth can do, great imaginations don't need to scale for global impact. Many everyday innovations contribute to meaningful change in local or even individual contexts. For instance, a team of high school students in Arizona set out to improve access to clean renewable energy in their community by designing a Solar Pavilion for students. Imagining a space where youth could safely gather for informal conversation or outdoor classes, they partnered with university engineers, local architects, district leaders, and city officials to bring their idea to fruition on the middle school campus many of them had attended as younger students.

Opportunities

Prior knowledge and experiences are the foundation of the imagination. To this end, the imagination in young children hasn't reached its full potential yet. Therefore, it is important for children to continuously engage in real-life experiences (like those discussed in the "Schools" section, above) and use these in imaginary journeys in which they navigate between the past, present, and future. This should help them build their imagination muscle that they need to anticipate coming changes and make long and short-term trade-offs. To help them with this, it is important to provide youth with experiences in which there is room for imagination and ideation and in which they can explore the real world in a safe setting.

Challenges

We live in a world where facts and truths are highly valued. As a result, children learn from an early age that the subjects and narratives of their creative play are not real, or that what they are drawing is not realistic. Once they start school, following school rules and performing well within the bounds of standardized curricula that are often decontextualized are highly rewarded capabilities. As a result, children do not gain the necessary experience and practice to bring their imagination to its full potential. In addition, a performance-based curriculum can actually discourage children from taking risks and making mistakes, which can have the effect of stifling children's imagination and creativity.

Connection to 2023-2024 LFC Agenda

In 2022-2023, the scholarly focus of the LFC on *Imagination & Futures Thinking in K12 Education* was to better understand the working mechanisms of imagination and futures thinking processes. The LFC used these processes to design experiences in which youth can learn to look beyond the actual and put their ideas into action. For example, the LFC began designing concrete futures thinking activities that can be implemented in K12 educational contexts and curricula. In 2023-2024, we will continue to build on these initiatives by implementing designed activities in K12 classrooms. In addition, the LFC will contribute to scholarly discussion by studying the working mechanism behind the designed activities, how they affect students' ability to utilize imagination – to see the actual in light of the possible – and how they affect youth's agency to transform thought into action. To this end, the LFC will develop appropriate and suitable measuring instruments that make it possible to assess the activities we are designing and implementing.

5.5 Partners: The Role of Imagination in Unsilo-ing Futures

What does Imagination look like and why does it matter?

How individuals and collectives think about the future greatly influences how they act in the present. Thus, supporting young learners' agentic action starts with helping them consider the kinds of futures they want their actions to bring about. This requires acts of imagination, forming internal images and generating ideas about things and situations that cannot be perceived with the senses. Acts of imagination include envisioning alternative preferred futures, what young learners see as desirable for themselves, their communities, and the planet. In K12 contexts, the work of imagining is in service to forwarding and amplifying learners' agentic action in, on, and with the world, as described in earlier sections on "Youth" and "Schools." Thus, futures thinking as an educative approach involves promoting individual and collective capacities to not only envision alternative possible futures, but also to pursue preferred futures. This capacity to couple thought and action relies on the capacity to couple reasoning with imagination. If putting imagination to use requires the coupling of reasoning and imagination, then it is imperative that K12 learners have access to cadres of adult supporters with diverse knowledge, experience, access, and perspectives to help them make this connection and turn ideas into action. One limiting factor for creating such access is that many children and youth are largely isolated from adult members of their neighborhoods and communities for much of their daily life, siloed away in schools, classrooms, and youth-only programs. The members of the LFC for Imagination and Futures Thinking in K12 see community and organizational partners as vital to unsilo-ing K12 learners and thereby unsilo-ing futures. We invite partners to join us in considering: How can adult collaborators form a network of support to foster children and youths' leadership in imagining sustainable and equitable futures for themselves and the people and places they care about most? How might we re-envision relationships between K12 learners and adult members of the communities those learners inhabit?

Example of Public Imagination

The Community Energy Engineering (CEE) cross-age afterschool club provides one powerful example of partnering for public imagination to un-silo futures. CEE invites middle and high students to take agency in conducting community ethnography to explore the needs, values, and strengths of their community with the aim of identifying a problem or opportunity in their neighborhood that can be addressed through renewable energy innovations. Collaborating across middle and high school campuses, the youth scholars of CEE simultaneously learn and contribute by taking action in their neighborhoods, seeking to engage in [real work with real consequences](#) for themselves and their community. A central tenet of this school-based program is the need to foster imagination and agency for such work by teaming up with a network of community partners. These partners act as consultants, advisors, and collaborators who offer expertise, experience, funding, and, most importantly, access to spaces and materials from which youth are often barred. Having previously partnered with CEE, collaborators from the local parks and recreation department approached the youth with a challenge: improve the structure and that social value of the neighborhood's current Little Libraries, which were being damaged by park users, were in disrepair and underutilized. In consultation with community-based engineers and architects, nonprofits and government

officials, the CEE youth and their parks and recreation partners worked to collectively imagine, build, and install an innovative new model of Little Library for the planned redesign of a neighborhood park.

Opportunities

We see promising seeds of opportunity for cultivating the role of imagination in existing community partnerships between K12 learners and adult collaborators. These seeds could be cultivated more widely to un-silo futures for our children and youth. For instance, organizations are currently creating opportunities for children and youth to contribute to public conversations around local and global futures. For example, the IEEE Photovoltaic Specialists Conference (PVSC) hosts a yearly competition and showcase of youth solar futures narratives, and provides participants with mentoring from solar energy experts. The youth's stories of their imagined future communities are then showcased on the organization's website as a source of insight and inspiration for adult and youth members alike.

The rise and expansion of community-based citizen science into K12 schools and informal learning programs is another opportunity for engendering the role of imagination on un-siloing futures. Not only are university researchers supporting young learners to participate in generating new knowledge for shaping the future, but businesses and community organizations can likewise support youth to contribute to local investigations in ways that are visible, believable and meaningful. For instance, one group of middle school youth scholars and their teacher partnered with a local urban farm to test different varieties of compost for cultivating crops in the Sonoran Desert. Community-based engineering, as in ASU's [EPICS High](#) program or Bioscience High School's [Better World Project](#), provide opportunities for imagining novel tomorrows and enacting them today.

Creating and expanding such opportunities requires imagining new positionings between youth and adult collaborators. For instance, adults have traditionally been invited as welcomed guests to K12 classrooms, to present and tell. But un-siloing futures for children and youth likely require that adults also act as collaborators, partners, consultants, and advocates for youths' ideas and actions. Repositioning adults as consultants on youth-generated futures projects also serves to reposition K12 learners as the drivers of the conversation, directing their adult collaborators to share knowledge and experience related to their own goals for the project and for the interaction.

Challenges

Challenges abound for individuals and organizations seeking to understand and contribute to the role of Imagination in un-siloing futures. It requires imagination to envision ways to create relational agency between children, youth, and adults, and the organizations that contain and shape them – and that often keep them from encountering one another. At present, there is little civic, civil, or community infrastructure to support potential organizational partners wishing to help foster K12 students' imagination and futures thinking. Thus, civic and industry organizations seeking to partner with local K12 education organizations must generate their own idiosyncratic processes and materials rather than draw from existing resources. In our own work, we have found two challenges that present problems for partnerships. First, when there are few social structures binding us at multiple system levels, it is difficult to cultivate, nurture and maintain relationships across organizations. Organizations and online platforms

such as [Community Share](#) can act as bridges to safely link learners and potential partners. Second, un-siloing futures and cultivating public imagination is an ongoing effort; bringing imagination to fruition can entail devoting substantial spans of time. K12 teachers, students, and their community partners must recognize the need to create a collective sense of legacy, with current learner/contributors passing on the torch for the next group to take up and champion.

Connection to 2023-2024 LFC Agenda

The LFC for *Imagination & Futures Thinking in K12 Education* is committed to exploring ways to support partnerships between K12 teachers, students, and the community members and organizations that are needed to un-silo futures. We are pursuing pilot projects with local school, civic, government, and industry partners, and cultivating networks of relationships to create and sustain a local learning landscape to foster public imagination.

5.6 Collaborators: The Role of Imagination in Communities

What does Imagination look like and why does it matter?

The collaborative nature of imagination in groups or teams has often been neglected, perhaps because existing research often focuses on the experience of the individual, due to the unit of analysis of available evaluation tools. In parallel, imagination is often envisioned as a child with their toys, an innovator toiling alone in a tower, or an individual's ideation process as the unusual genius instantiation of a single brain's neural connections. Yet children play together socially, the innovator connects with a network of collaborators, and a genius is embedded with communities of research and inquiry, other thinkers, and even nonhuman agents like AI. These aspects of collaborations are not only hidden in real life but also in media depictions of imaginative work. Due to this longstanding bias toward looking at the introspective process of imagination, the role of imagination in thinking, art and design practices, innovation, education, and many other fields benefits from a reframing to focus on the imagination of groups collaborating in real-time and across time. Movie-making is an example hidden in plain sight. It has shifted from the singular vision of a director towards increasingly collective storytelling techniques due, in part, to more demanding technology and an obvious requirement for collaborative effort. The film industry, like so many fields, benefit from this renewed vantage point.

Example of Imagination in Communities of Care

Disadvantaged and minority communities are developing forms of collaborative imagination as futuring through the establishment of communities of care. As one example, Leah Lakshmi Piepzna-Samarasinha has written about Q-T-BIPOC (queer, trans, and Black, Indigenous, People of Color) communities and Care Webs in her book *Care Work*. These communities created networks, including Care Webs, to provide care that they fail to get from the rest of the world. Disabled and crip communities are exploring alternatives to standard economies and social systems, going beyond paid attendant care, embracing mutual aid, and testing and dreaming other strategies. Examples include a group effort during a conference in Detroit driven by Creating Collective Access (CCA), with a large sick, disabled, and queer crip community coming together to create access: finding fragrance-free soap, dealing with inaccessible shuttles, walking slowly, coming to each other in crisis, and forming strong

community, committed to leaving nobody behind and starting a movement. These emergent strategies of care through networks created knowledge of the world and the community's challenges within it. They continually lead to imagining together, collaboratively, which becomes collective action and collective dreams for the future. As these communities succeed in imagining different futures, there has been an ever-expansive action of disabled, sick, and crip folx continuing to develop and test ways of caring for each other, but also writing, imagining, and sharing their visions for better futures. These collective actions include forming communities of care, prototyping and testing ideas together, and imagining and communicating desired futures – leading to real world changes and impacts. These collaborative imaginings find momentum in visible and embodied experiences of change. Imaginative futuring among disabled communities illuminates the social-change power latent in communities built around imagination, action, and futures.

Opportunities

Within LFC, we are considering the application of imagination in the context of futures. What comes to the fore is that futuring empowers participants in abstract and concrete storytelling. Through concrete storytelling participants deal with current research, problems, and everyday challenges in depth; with abstract storytelling, they consider the everyday within the larger story of their life (for example, “How will my math learnings affect my future dreams?”) By developing the ability to imagine and tell abstract stories, learners can foster future health and well-being. Therefore, imagining the future can become a radical act of care that affects youth and their communities as they collaboratively apply imagination to the future.

These opportunities renew the idea of imagination as a collective and collaborative enterprise, sustained through the development of diverse communities empowered to imagine together. Opportunities are abundant when we consider creating educational situations for students to collaborate with adults. By cultivating collaborative imagination and engaging community groups as diverse, intergenerational, and interdisciplinary teams, everyone can have a greater voice in the creation of our futures through shared imagination.

Challenges

Generating evidence to better understand and support imagination in group collaboration remains a fundamental challenge. Rigorous science and psychology research often focuses on individual imagination, possibly due to a lack of evaluation tools for assessing collective and collaborative imagining practices. It may not be obvious how to apply processes for analyzing the brain to social settings. While evaluating collective and collaborative imagination may seem unapproachable, its foundational relevance to everyday life as a formidable tool for creating positive collective change, among other positive side effects, means that developing evaluative tools is a worthwhile enterprise. Longitudinal research, qualitative evaluations, and evaluations devised by communities are promising places to begin addressing these challenges.

Connection to 2023-2024 LFC Agenda

The LFC maintains a focus on our collective relationship with the future, as well as methods for fostering and developing communities that foreground imagination as a core practice in learning. Our activities will include prototyping evaluation tools, community-based workshops, literature reviews, and pilot research focused on collaboratively imagining futures.

Through these activities and the development of our intergenerational, inter-institutional, and interdisciplinary community, we will document, reflect on, and publish critical, creative, imaginative, and analytic reflections on methods for developing collective imaginative capacity within communities.