MAPPING INSTABILITY: THE EFFECTS OF THE PANDEMIC ON THE CIVIC LIFE OF A SMALL TOWN

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INTRODUCTION

The Covid-19 pandemic has affected our global society in drastic and immeasurable ways and many of the impacts we are so far unable to categorize or quantify. The work on this project developed in response to the observations made during the lockdown, both personally and professionally. The built environment is both the locus to which we add our projects and the landscape that shapes our surroundings. Faced with the now too familiar challenges of life during the lock down: school closures, remote work, lack of access to services and many forms of leisure, we soon realized that the effects of the pandemic, both visible and invisible, echoed back to the now empty streets of our small town. Located in an agrarian and previously industrial part of Massachusetts, the town in which we live now serves as the host of the state University flagship campus as well as a conglomerate of private colleges (the University and the colleges are commonly referred to as the Five College Consortium.) The population of this town nearly doubles during the academic year, and many of the services and small businesses located in and around the town are directly or indirectly connected to the collegiate population. Due to the vibrant academic scene, offering a rich and diverse host of artistic and athletic activities, the area continues to attract residents who enjoy the benefits of living in a small city within the reach of two large metropolitan areas (Boston and New York) while offering many of the amenities of a small town. These benefits have contributed to a large influx of people who come to Amherst to live or retire.

Following, a large population of Amherst is made up of college age and university age students, the majority of which attend the University of Massachusetts. The pandemic directly impacted the presence of the students from UMass and the surrounding colleges, but in disparate ways; while UMass students were sent home, the students from Amherst college and the other neighboring liberal arts colleges were provided some form of residency (still, extremely limited to a life within the confines of their small campuses). To investigate this phenomenon, our interdisciplinary team of architects and computer scientists began an investigatory process of tracking movement and mapping patterns of mobility as it is related to the unmeasured aspects of the pandemic. It is from these observations that our team set out to analyze the short-term and long-term effects of the pandemic, specifically regarding the residents of a small town. We had a special interest in studying issues related to mobility and access to collective resources and were invested in using our specialized ways

of researching and individual interests in the built environment and digital civics to investigate larger patterns of how a major crisis and its social, economic, and cultural repercussions affect one's sense of community, mobility, and social connectedness.

FROM INTUITIONS AND OBSERVATION TO FORMING DIRECTIONS

In large cities, dwelling, working, socializing, commuting, and mobility rely on collective infrastructures which operate at an urban and territorial scale to keep the rhythm of daily life constant. However, in smaller towns such as Amherst, Massachusetts, which lack these integrated structures, the routines of life and work are different, relying mostly on individual resources and spaces, and self-created or sustained structures.[1] For example, local farmers and vendors supply food and resources to many local stores, stands, and cafes, many of which gather at the weekly Amherst Farmers' Market during the summer and, biweekly, at the Hadley Farmers' Market in Hampshire Mall during the winter. The localized Farmers' Market also provides an opportunity for community socializing, interaction, and education; but, like many industries, the pandemic affected local agricultural production and thus deeply impacted the resources available at the normally consistent market.[2] Here, in a rural community, the changes and disruptions become more eschewed as they may result in irreparable damage to the daily lives of residents. However, while there are many conditions that may affect small town daily life negatively, there have been moments of resourcefulness and ingenuity displayed by the residents and community at large. One instance is an initiative by the Amherst public health director who partnered with local ambulance and firetruck drivers in order to administer Covid-19 vaccines to Amherst residents with limited transportation mobility.[3] Another local initiative involved a librarian from the Amherst Public School System, who decided to make sure children had access to books during the lockdown by forming a network of volunteers and hand-delivering curated bags of books to individual students, appropriately selected for each one, based on age range and classroom level.[4]

In our project, we began comparing these unique anecdotes along with own experiences to larger population changes and movement patterns among the local residents, and the students of the University and colleges. For many residents, the previous lines of home-life, work-life, and school-life—particularly in connection to the educational institutions—were no longer distinct, superimposed onto each other at times, threatening any semblance of a balanced life. Many students, regardless of location, have found themselves learning and working from home, often with now additional home and family-oriented responsibilities.[5] This extreme change in routine has impacted students' motivation, academic performance, social lives, financial situation, and ultimately, mental health.[6][7][8]

These changes in mobility, attitude, and ways of thinking will affect all of our public and private lives for years to come—and we are still unsure exactly at what scale and how drastically these changes will affect us long term.

The above stated anecdotes point to momentary and continuous disruptions of social structures which will eventually permanently affect our living environments, both on a larger scale in our communities, and on a smaller scale, within our homes. Our interests for this study ultimately lie in answering big questions referring which can help us grapple with these presently unknown changes. For instance, how do these momentary or continuous disruptions to our social structures affect our living environments? What are the consequences of this pandemic on our lives and the town in which we live? What resilient strategies can be put into place to sustain and protect us in the face of such devastating occurrences?

Instead of reacting to these major questions with results that we cannot yet quantify, we set out to pursue gathering data that can shed light on how our known patterns of life and work have given way to new ways of conducting ourselves and our society at large.

OUR APPROACH TO GATHERING DATA IN AN EQUITABLE MANNER

A first step towards investigating these larger concepts was collecting data from the public that may enable us to begin to analyze the impact of the pandemic on small town citizens; thus, we felt that much of the data on which our project should be based is from firsthand experiences and accounts. In *normal* circumstances, we might have proposed to collect this data through in-person interviews, focus groups, or social observations—but with the current crisis, these traditional methods of collection were not possible and are still, presently, difficult to organize in a safe manner.

Accommodating our need to collect data remotely, we moved to considering online civic engagement platforms, such as "CommunityCrit,"[9] and online surveys, both tools which allow people to provide information and opinions at their own discretion and from the secluded safety of their own homes. Still, both platforms, while safe and reliable methods of data collection, lacked the ability to engage their participants in larger conversations that may sustain dialogue and encourage a more genuine opinion out of the members. A shared conversation has the unique ability to help people communicate their struggles, needs, and issues through a shared sense of mutual understanding, experience, and connection. To do so, we chose to design our project around an emergency type of Artificial Intelligence-based conversational chatbots, called "CivicBots." These CivicBots can engage in and sustain a complex and multi-layered conversation, which can change the user experience into one of a social activity which in turn improves interest, engagement, productivity, depth of information gathered, and the ultimate quality of outcomes. This platform provides us with the ability to both keep our audience safe, but also interested and engaged.

CONCEPTUALIZING THE CIVIC BOTS

While the CivicBots were the most promising tool for our project, we still encountered many design challenges. One of the most prominent dilemmas was related to the demographics of the users and how this may impact the quality of the information gathered. Throughout our design process, we continually analyzed the effects of age, education, language proficiency, living situation, and employment status on the perceived usefulness and effectiveness of CivicBots. Another challenge was creating a chatbot that was engaging and "personable," to instill a sense of trust in the user helping them to share their genuine thoughts and feelings. Finally, we grappled with how to evaluate the dialogue quality, and how to build measures into the community agents data collection and storage mechanisms to preserve an individual's privacy.

PROBING THE PARAMETERS OF CIVIC LIFE AND MOBILITY THROUGH A CONVERSATIONAL PLATFOM

Last winter—in January 2021—the Architecture segment of our team began a brainstorming charette wherein expansive lists of questions and curiosities relating to Covid-19 were discussed and recorded. Many of these questions addressed ways in which the pandemic had changed our personal lives in our recent past, current present, and the possibilities of a change in our impending futures. We initially worked with a Google Document amounting to 10 pages of questions, wherein we were able to organize the questions into larger topics and categories. Our work started before the distribution of the vaccines at the height of the lockdown, and we later annexed questions about the later stages of the pandemic. Understanding that there may be overlap within each category or areas of shared interests, we required a more flexible tool that would allow us to understand and easily experiment with the way in which subjects were related to one another, and how we might be able to create specific categories that were part of a larger conversation.

We settled on using an online platform called "Miro," self-described as a "Visual Collaboration Platform."[10] The organization of Miro is quite simple; it has a few essential tools such as post-it notes,

tables and diagrams, text, and custom flow-chart arrows, but allows multiple users to work within the same document at the same time. This workflow allowed our team to post each question and topic of investigation and implement flow chart arrows to experiment with various conversational flow possibilities; such a process allowed us to begin the design of the chatbot conversational flow in an early conceptualization phase, allowing a natural conversational progression.

Using Miro helped us realize that introductory demographic questions were a crucial part of understanding how to direct the conversation for each individual participant. Creating a way to collect demographic information became an important part of the data collection process, wherein we designed pre-study questionnaires to be administered to chatbot participants, helping to guide the conversations in meaningful ways. Using the demographic questions, we were able to recognize separate conversational categories related to mobility and the built environment and positioned each category as part of a larger whole. The conversational categories consist of twelve topics, addressing separate aspects of home and public life as it related to the pandemic. The first two categories, "Households," and "The Indoors" addresses changing aspects of the household, family sizes, feelings of entrapment inside the indoor environment, and leaving the home.
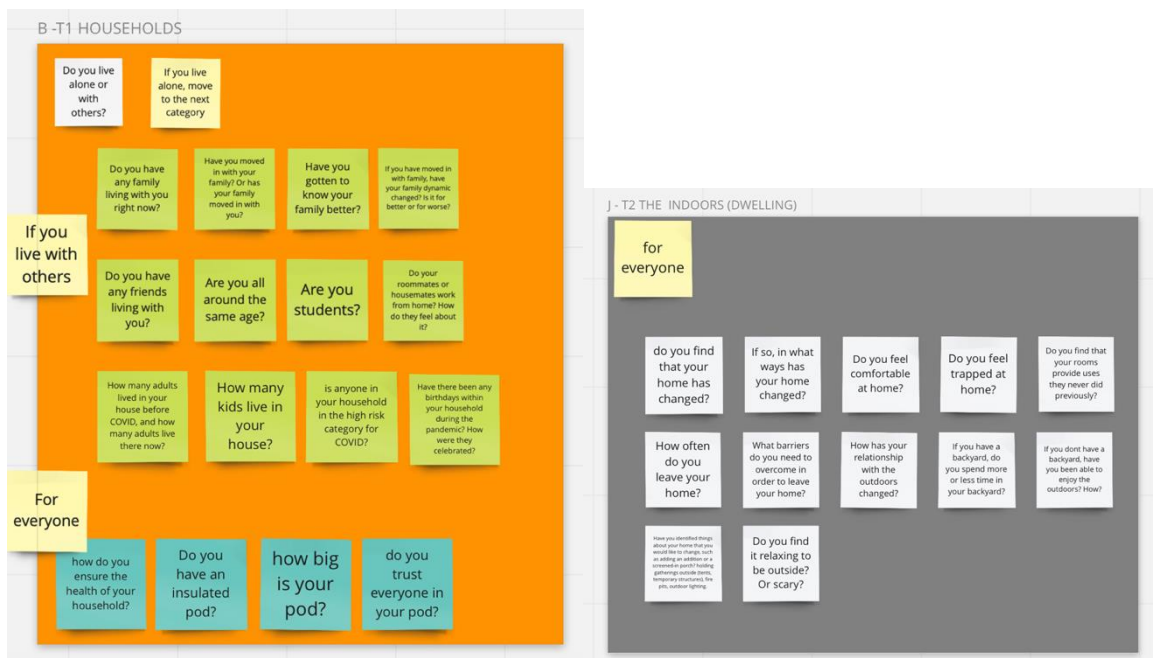

Figure 1. Households + The Indoors, (Snapshot from Miro Board).

The "Education" category was developed in two parts: education for adults and teens, and education for children, separately considering remote learning in households with small children, and also remote learning for high school and college age.
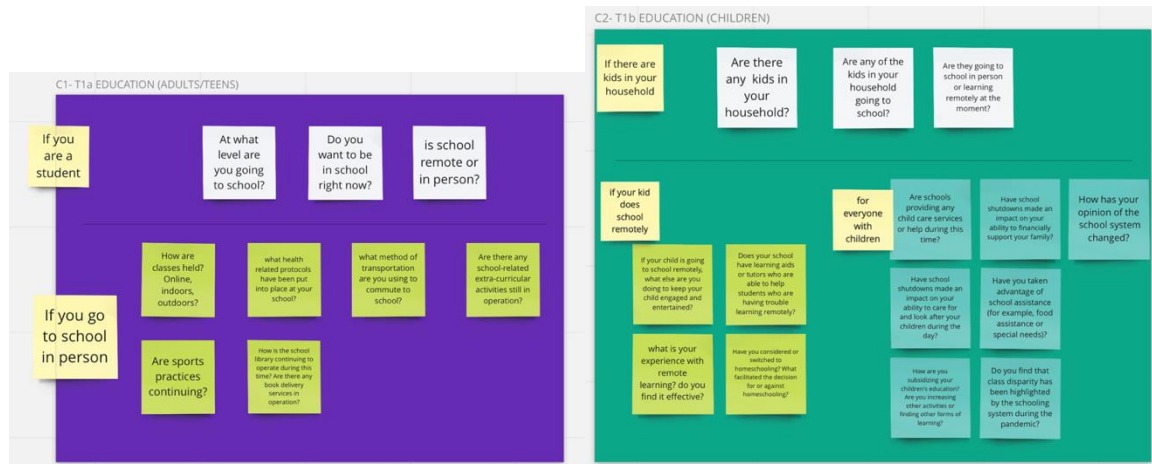
Figure 2. Education: Adults/Teens + Children, (Snapshot from Miro Board).

"Transportation" was of particular interest as it related directly to mobility throughout the pandemic, it covered modes of transportation around public places, commutes or lack thereof, and movement preferences as related to health and safety. A similar category, "Delivery," was also of particular interest, as previously delivery services were virtually nonexistent in our rural town, and the pandemic brought with it an introduction of food delivery services and a perceived increase in online deliveries.
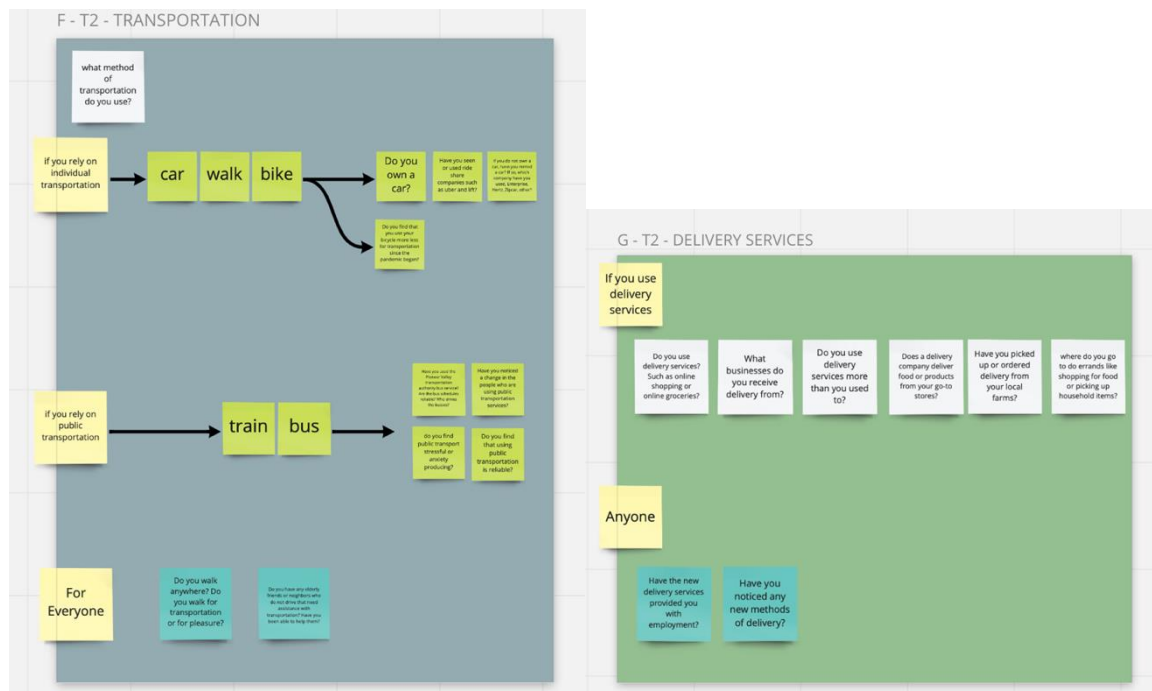

Figure 3. Transportation and Delivery Services, (Snapshot from Miro Board).

Other than Education, the "Work" category was perhaps the most expansive category; it was an arena in which our team had observed the largest amount of change. Figure 4, below, displays questions about remote work, working at home with children, continuing to work in person throughout the height of the pandemic, and loss of employment.

Figure 4. Work, (Snapshot from Miro Board).

Health and Wellbeing, pictured in Figure 5 below, introduced concepts of telemedicine, preventative care, as well as the inevitable consequences of the pandemic on mental and social health.
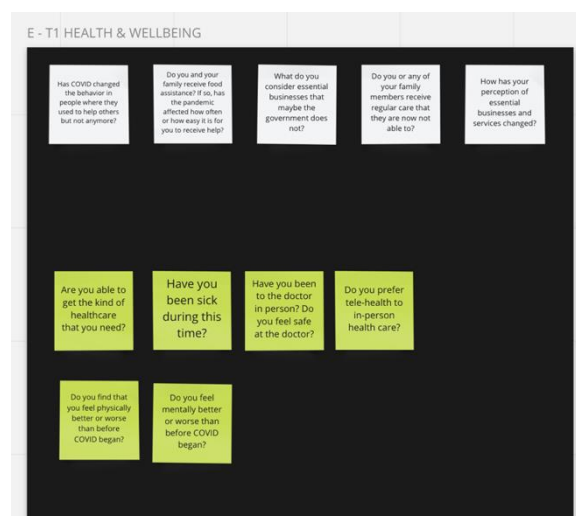

Figure 5. Health and Wellbeing, (Snapshot from Miro Board).

"Leisure," was split into three categories: Virtual Leisure, Physical Leisure, and Just Leisure. This category included changes in elective physical activity, down time spent in front of virtual screens, as well as miscellaneous questions related to "unnecessary" actions outside the home.

Figure 7. Leisure (Snapshot from Miro Board).

As a collective group, we found concepts of religious and non-religious worship particularly interesting, i.e. how regular services continued during times when social distancing was required, or if a spiritual practice (such as yoga or meditation), was essential for any of the participants—the "Worship" category is shown in Figure 8, below. The "Technology" category, likewise, was an interesting subject in that it inquired about human connection through screens and online platforms.
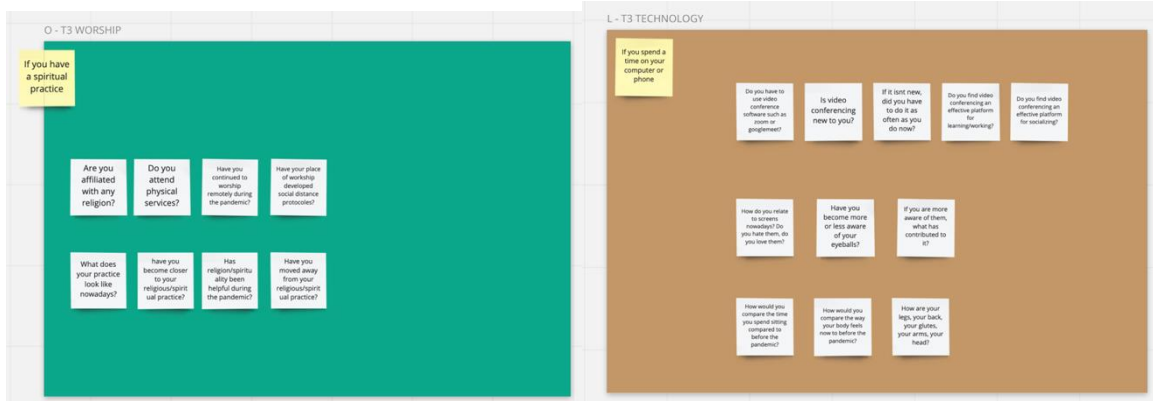
Figure 8. Worship and Technology (Snapshot from Miro Board).

In contrast, "The Outdoors," below, addressed how changing weather, seasons, and collective pandemic attitudes affected outdoor activities and social interaction.
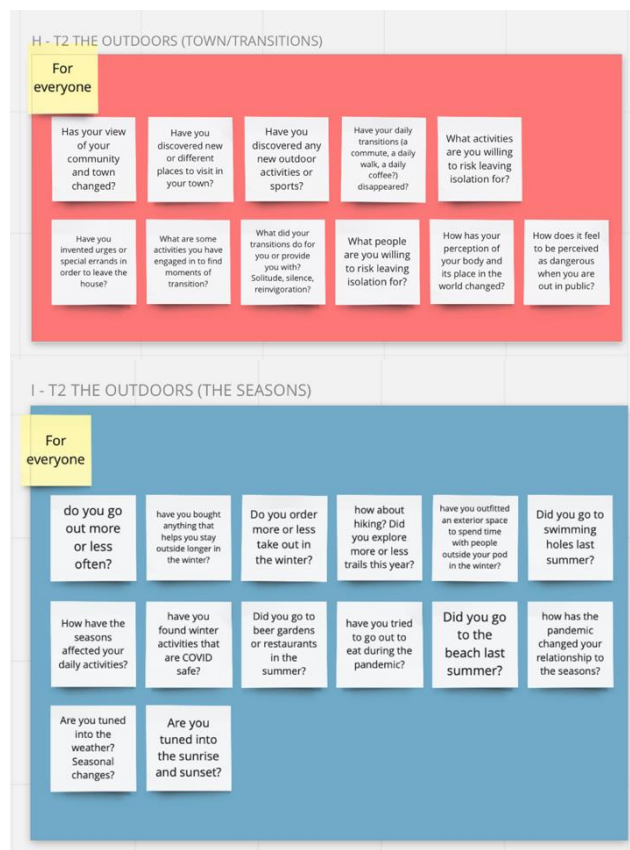

Figure 9. The Outdoors (Snapshot from Miro Board).

The final category was "Daily Life," and covered changed routines, sleep, and daily transitions.
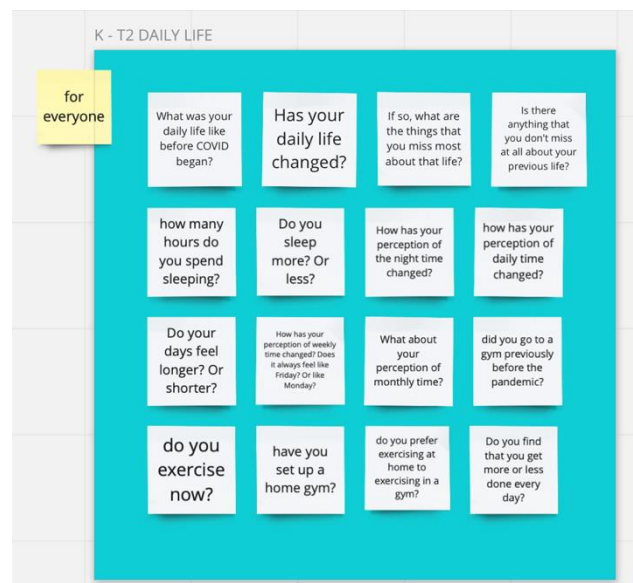
Figure 10. Daily Life (Snapshot from Miro Board).

Throughout various iterations, we were able to begin to create an organized and linear way of approaching the larger questions at hand and using an iterative process. In addition, using this iterative process and a communal, online based tool allowed the computer science team to collaborate with us, and direct the organization of the flow chart into a logic that would eventually be helpful in the design of the chatbot.

After finalizing the conversational flow using Miro, the computer science team moved onto the creation of the Chatbot, utilizing "Juji,"[11] a conversational bot platform that provided the infrastructure for designing and building intelligent chatbots. Currently, the chatbot is nearing completion and we are planning the soft launch within the next couple of weeks. We will disseminate the link to our online interactive platform that will host the community agents with the description of the project, the consent form, primary goals, and timeline through the contacts we have established with the town of Amherst with the local government, schools, and five colleges in the Amherst area. Once this project has unfolded, we will be able to extend this study to two other small towns nearby. The participants can choose to engage with the community agents and provide data for as long as they choose, and they can stop participation at any time. After the completion of the data collection phase, the Architecture team plans to use the analyzed data for designing and building a series of interactive visualizations such as maps and diagrams of Amherst's town and its neighborhoods to help both civilians and experts visually understand and absorb the implications of the pandemic on their lives within and along with the larger built environment.

REFLECTIONS ON THE PROCESS AND FUTURE STEPS

This paper is written at the time that the soft launch is being prepared. Provisional IRB (Institutional Review Board) has been approved, and multiple tests have been conducted to problem-solve the technical side on the computer science side. Using conversational agents to enhance the community data collection's depth and breadth can immediately benefit the residents of Amherst and surrounding areas. Collecting rich data and making it accessible enables local and state policy makers, government officials, community organizers, and residents to gain a more profound and comprehensive understanding of the Amherst community's issues, struggles, and demands in the face of the current pandemic. It can also facilitate identifying vulnerable (e.g., low-income families struggling for food), under-served, and unrepresented groups for allocation and prioritization of resources and materials.

Moreover, our outcomes, lessons learned, and insights gained from the pandemic's impact on the built environment in a small town in Massachusetts, will hopefully resonate for other small communities across the United States, extending the impacts of our work to a much broader scale. Eventually, we hope to implement/make accessible our multi-agent chatbot system on a national level as a tool to decode just how deeply the pandemic has transformed our collective attitude towards our communities, our built environment, and our mobility among and within the world at large.

NOTES

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