Canadian Planning and Policy
Aménagement et politique au Canada

Dashboards as Conduits for Collaborative Planning

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Volume 2024, numéro 1, 2024

Technology and the City

URI : https://id.erudit.org/iderudit/1110266ar
DOI : https://doi.org/10.24908/cpp-apc.v2024i1.17503

Aller au sommaire du numéro

Éditeur(s)

Association of Canadian University Planning Programs
Canadian Institute of Planners

ISSN

2816-6256 (imprimé)
2562-122X (numérique)

Découvrir la revue

Citer ce document

DeLoyde, C. & Donald, B. (2024). Dashboards as Conduits for Collaborative Planning. *Canadian Planning and Policy / Aménagement et politique au Canada*, *2024*(1), 32–44. https://doi.org/10.24908/cpp-apc.v2024i1.17503

Résumé de l'article

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CANADIAN PLANNING AND POLICY JOURNAL

REVUE AMÉNAGEMENT ET POLITIQUE AU CANADA

Technology and the City

A joint publication of the Canadian Institute of Planners and the Association of Canadian University Planning Programs.

En collaboration avec l'Institut canadien des urbanistes et l'Association des programmes universitaires canadiens en urbanisme

CANADIAN PLANNING AND POLICY JOURNAL
REVUE AMÉNAGEMENT ET POLITIQUE AU CANADA

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Dashboards as Conduits for Collaborative Planning

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Abstract

Dashboards are not new to planning and much has been written about them especially around the user experience and technological failures. Missing in the literature, however, is a discussion around the processes behind making an urban data dashboard and what that process can do in terms of building relationships and supporting collaborative planning. Through a case study of a dashboard making process in Kingston, Ontario between September 2020 and August 2023, the authors show how the dashboard making process led to technological innovation, improved collaboration amongst the partners, strengthened relationships and improved organizational and management processes for all partners involved. More than a technocratic or rational planning exercise, dashboard making has the potential to be a conduit for collaborative planning which is a cornerstone of a healthy, democratic society.

Résumé

Les tableaux de bord ne sont pas nouveaux à l'aménagement et beaucoup a été écrit à leur sujet, particulièrement autour de l'expérience de l'utilisateur et des échecs technologiques. Il manque dans la littérature, cependant, une discussion sur les processus derrière la création d'un tableau de bord de données urbaines et ce que ce processus peut faire en termes d'établissement de relations et de soutien à l'aménagement collaboratif. Grâce à une étude de cas d'un processus de création de tableaux de bord à Kingston, Ontario, entre septembre 2020 et août 2023, les auteurs montrent comment le processus de création du tableau de bord a conduit à l'innovation technologique, à l'amélioration de la collaboration entre les partenaires, au renforcement des relations et à l'amélioration des processus organisationnels et de gestion pour tous les partenaires impliqués. Plus qu'un exercice d'aménagement technocratique ou rationnel, la création de tableaux de bord a le potentiel d'être un canal pour l'aménagement collaboratif qui est la pierre angulaire d'une société saine et démocratique.

Keywords:

dashboards, technology, city, platforms, collaborative planning

Mots-clés:

tableaux de bord, technologie, ville, plateformes, planification collaborative

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Canadian Planning and Policy / Aménagement et politique au Canada, Technology and the City Issue 2024, pages 67-79

ISSN 2562-122X
DOI 10.24908/cpp-apc.v2024i1.17503

Introduction

There are many ways to think about technology and the city. In this paper, we focus on the collaborative planning benefits of collecting and visualizing real-time urban data through city dashboards made with multiple partners in the academic, municipal, and non-profit sectors. Urban dashboards are not new, and much has been written about them (Gray et al., 2016; Halabi et al., 2015, Jing et al., 2019, Kitchen et al., 2015, Lock et al., 2020). Most of the conversation, however, is about the user experience and the design, content, usability, and utility as experienced by users (Young & Kitchen, 2020). There is also a small body of literature questioning the value of data dashboards given their inherent technological challenges and technological sustainability (Sadowski, 2021). However, as we have written elsewhere, many of these latter criticisms focus on the private sector component of the dashboard or the artifact they produce (DeLoyde et al., 2023).

What we want to explore in this paper is the value that the processes behind making an urban data dashboard can play in building relationships and supporting collaborative planning approaches. We make our arguments through a case study of the multi-year making of an urban dashboard, Kingstoninfocus.ca, in partnership with Queen's University, the Centre for Advanced Computing, City of Kingston and other partners during the Covid -19 pandemic. What started as a curiosity-driven exercise documenting the impact of the Covid pandemic lockdowns on mobility and other services, morphed into a longer-term conversation and relationship with the partners about effective ways to document the changing nature of urban services in the City of Kingston. Because the focus was on relationship building, collectively making sense of the data, and data transparency, the project transformed from a Covid curious and student employment exercise to longer-term monitoring of urban services in the City of Kingston. During the second year of the project, it became apparent that the relationship and collaborative component of the team was what was sustaining the dashboard, leading to new research questions around the collaborative nature of the dashboard creation process. To better understand this process, 10 semi-structured interviews were conducted with community partners and users of the dashboard between January 2023-August 2023. These interviews were recorded and transcribed and results from this data are also presented in this paper.

This paper is organized into five main sections. First, we provide an overview of key elements of literatures that contribute to our argument that dashboard making processes can be important conduits for relationship building and collaborative acts in planning. We pull three themes from Patsy Healey's research on collaborative planning which are evident in our case study findings (1) recovering the creative energy of the planning project by "starting at the beginning" (2) building the institutional capacity for the inclusion of diverse voices; and (3) collaborative capacity-building. Second, we provide a brief description of the case study dashboard and detail the technical and "best practices" side of creating the dashboard, working in partnership with the Centre for Advanced Computing at Queen's University. Third, we provide evidence of how the Kingston In Focus dashboard process was an example of planning collaboration with our partners in terms of Healey's first theme around recovering the creative energy of the planning project. Fourth, we explain how the organization and management processes behind the dashboard over-time seemed to strengthen the relationship and bond amongst the team and open spaces for Healey's thesis around ethics of inclusion. Fifth, we demonstrate the improvements to processes that occurred for all the partners involved in the making

of the dashboard, including the non-profits, the city, and the university, highlighting the collaborative capacity-building that happened for all players. Most fundamentally, we hope to demonstrate throughout this paper how sound practices in dashboard making, can contribute to good, collaborative planning, which is a cornerstone of a healthy, democratic society.

Literature Review

Collaborative planning is both a theory and a practice in urban planning. Patsy Healey's classic book, Collaborative Planning: Shaping Places in Fragmented Societies, if often cited as the watershed text on collaborative planning. In it, Healey argues that if we want to achieve more common purpose in shared spaces of increasingly fragmented societies, planning must move from the traditional technical and procedural focus towards a more communicative and collaborative model. Since that publication, many articles and commentaries have been written about whether planning has achieved the lofty goals of true, meaningful collaboration in the planning of our shared spaces (Goodspeed, 2016). However, in many democratic societies, there is now both legal requirements, normative goals, and community expectations to engage with collaborative approaches to urban planning issues (Healey, 2003, 2006).

To engage with collaborative planning approaches, then, is to bring together stakeholders and engage them in processes to make decisions together in a way that respects everyone's positions. It is also sometimes called communicative planning (Goodspeed, 2016). There are many new methodologies that have emerged for collaborative planning such as public participation GIS (Kahila & Kytta, 2009; Kahila-Tani et al., 2019) but as the authors of this work have argued, participation is rarely comprehensive, and the results can be both frustrating for participants and for those arranging the processes (Kahila-Tani et al., 2019).

Collaborative initiatives in which a variety of partners work together is gaining momentum in society. In the academic sector, many national and international granting council competitions place a heavy emphasis on the importance of working and researching with project partners. The promise of collaboration lies in the breakdown of barriers between universities, local governments, businesses, universities, citizens, and other stakeholders (Leino & Puumala, 2021), including Indigenous groups (Ho-Tassone et al., 2023). For these collaborative initiatives to work, good project management is usually required, including setting clear goals and expectations, engaging in diverse methods, empowering, listening, and involving the participants, and following up and following through. Collaborative planning initiatives are time-consuming and require long-term investment in relationship building based on trust.

Patsy Healey (2006) provides several themes on the collaborative planning process that are relevant for our case study on Kingston's dashboard making process. First, Healey writes about recovering the creative energy behind the planning project, by involving "multiple actors in new combinations and new arenas. [The actors] come together through recognising mutual dependencies. They are prepared to be power equalising within their working practices, granting mutual respect and listening to other participants. They draw on and mix together experimental and 'localised' knowledge, with systematised scientific and technical knowledge." She goes on to emphasize the value of time spent together by collectively learning and co-generating knowledge which can endure over time (Healey, 2006:332). Second, Healey discusses the building of institutional capacity for creative and inclusive benefits and the inclusion of a diversity of voices at the table. In contrast to much contemporary institutional design that sets up formal contracts and performance criteria, collaborative design creates

processes where citizens and stakeholders feel included and can expect to be involved in any initiatives that affect them. This doesn't mean that citizens will necessarily feel that they have to be involved in all decision-making processes, but that they seek "evidence of the quality of the attention being paid to them" (Healey, 2006:335). The third theme from Healey's extensive writings on collaborative planning revolve around capacity building of all stakeholders in the collaborative process. This rings true for our case study on dashboard making as all actors were collectively learning and upskilling through the newer technical and 'localized' knowledge requirements in effective dashboard making.

Dashboard making, we argue, can be a particularly good process for facilitating relationship building and collaborative planning. Dashboards are a well-known tool in urban planning. They are information management tools that can host a tremendous amount of information through a web hosted interface that users can review. The data is received through a linked database and organized in visualized form, such as in graphs, charts, tables (Kitchen et al., 2016). Users can quickly identify information through the clicking of panels (Smith, 2013), and use urban dashboards to monitor performance of their city or organization to make data-driven decisions for their organization. Users can also take the information found on dashboards to write grants, create reports, and set targets for the future.

Brief Overview of Kingston Dashboard – Technical Story Behind Dashboard Creation

The Kingston dashboard, available at Kingstoninfocus.ca, was conceived in the Spring of 2020, at the beginning of the pandemic, when the Principal Investigators (PIs) started looking for ways to document the changing nature of urban services brought about by mandatory lockdowns and business and service closures in the Kingston area. The dashboard's geographic focus is the City of Kingston and the Kingston Census Metropolitan Area (CMA) as well as the catchment area of the Kingston, Frontenac, Lennox, and Addington Health Unit. The Kingston CMA was among the top 10 mid-sized CMAs that experienced the largest growth rates in Ontario between 2016 and 2021. The 2021 population of the Kingston CMA was 172,546, consisting of a growth of 11,371 persons or 7.1% since 2016. The City of Kingston represents the largest population within the Kingston CMA region, with 132,485 persons in 2021 (Statistics Canada, Census of Population, 2017 and 2023). See Figure 1.

The PIs were particularly interested in the impact that these lockdowns were having on public transit services, business closures, and social service delivery like food and housing. The authors had been inspired by the public health dashboards that were tracking Covid related infections and deaths in cities around the world and began to explore ways to extend this data monitoring to other services in the city.

The PIs initially reached out to the Centre for Advanced Computing at Queen's University who provide custom-tailored solutions designed to facilitate academic research. Researchers can gain access to high-performance computing, secure data storage and advanced research tools to analyze large datasets. The PIs wanted to have a real-time dashboard that linked publicly accessible datasets to a web-hosted page where viewers can see a host of information about Kingston. It was very important for the data to be publicly available and transparent so that users could trace the source and quality of the data in question. This was also a key requirement in

working with the Centre for Advanced Computing. Drawing on the dashboard creation literature (Lechner & Fruhling, 2014:53), the Centre for Advanced Computing adopted best practice elements of effective dashboard design. These include elements such as (1) designing the dashboard to have a customizable, actionable "launch pad" (Few, 2006); (2) ensuring the dashboard support correct data interpretation and allowing the user to "drill down into different aspects of the dashboard" and (3) focusing on "information aggregation" to emphasize condensing data to show high-level view of indicators most important to users. It is important in this design that users can understand and perform actions correctly and support meaningful comparisons.

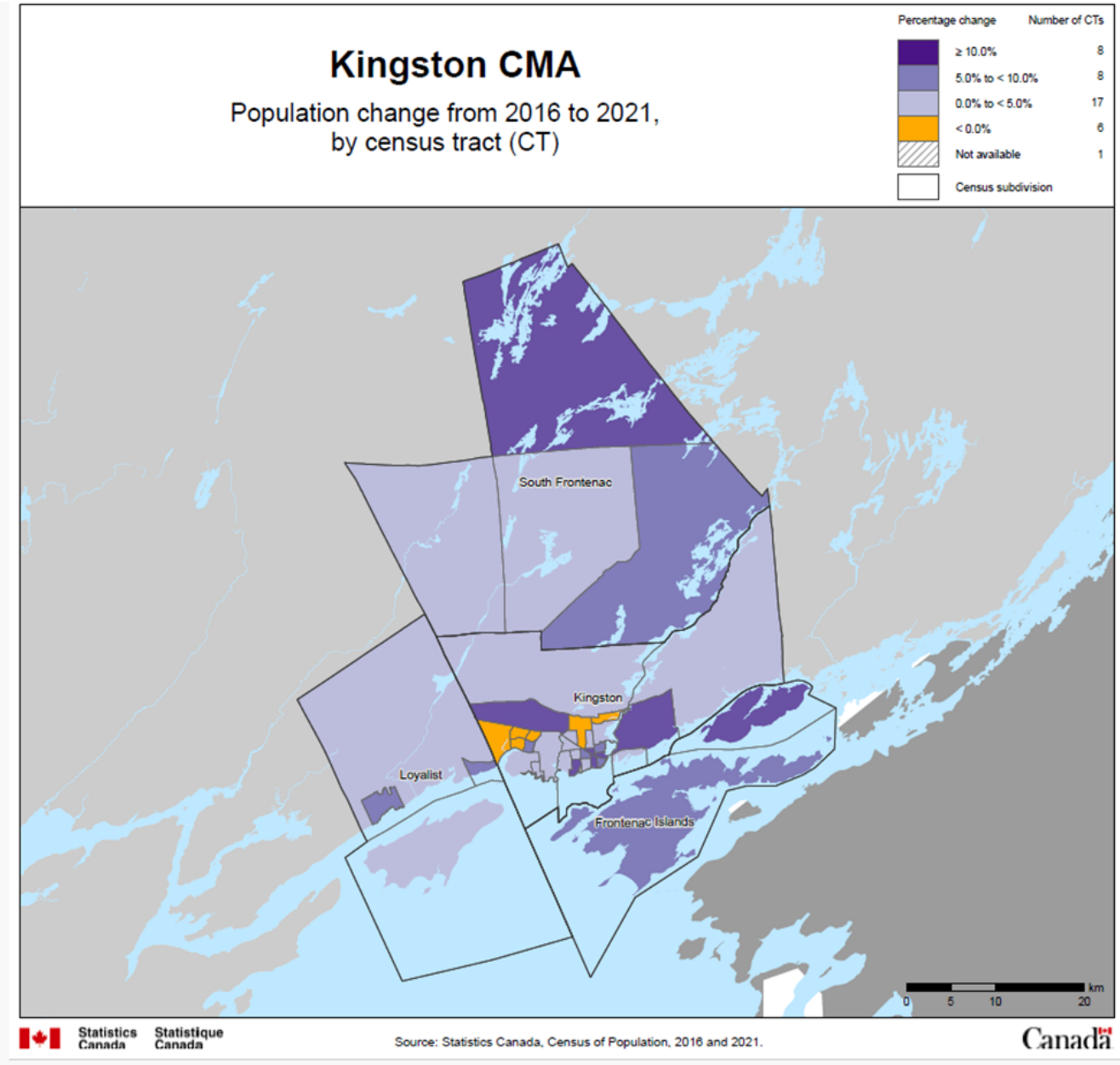

Figure 1. Kingston Census Metropolitan Area Population Change from 2016 to 2021. Source: Statistics Canada.

In addition to working with the Centre for Advanced Computing, the PIs at Queen's University partnered to develop the dashboard with the City of Kingston, Kingston Economic Development, and the Kingston and Area Association of Museums, Art Galleries and Historic Sites, and Queen's Office of Indigenous Initiatives.

The dashboard was two and half years in the making and involved countless hours of working together. Team meetings were held weekly for 2 hours/week over two years and 1.5 hour long partner meetings were held bi-weekly during the school year and monthly in the summer months. In addition, a Post Doctoral Fellow was employed full time for two years on the project, and doctoral students were hired part-time. The dashboard, Kingstoninfocus.ca, was officially launched January 25, 2023 (Figure 2). As of writing, the dashboard has had 3,700 unique visitors, has been viewed over 11,000 times and covered in social media, CTV News, CBC Morning, the Queen's Gazette, and Kingston Whig Standard. Since the launch, new partners have come on board including several local food providers, housing organizations and Indigenous organizations. Further funds have been obtained to hire an Indigenous doctoral student and gain insight into including Indigenous voices on the dashboard. The plan is to launch Dashboard 2.0 in the Spring 2024 and to continue engaging with requests from new partners and seek new sources of funding.

Technical Review

Common dashboard technology platforms include the private sector platform Tableau and Power BI. The challenge with these private technology tools, however, is that they limit the user to certain kinds of visualizations (which are usually more targeted to businesses than non-profits and community groups) and sometimes the data draw is unreliable and there are limited functionalities such as a lack of automatic data refreshing. Moreover, while there are also private companies that sell "plug and play" data packages with limited dashboard capability to municipalities and local non-profits, often the data is not sufficiently local or helpful to the organization in question. Another challenge related to reliance on private sector solutions to urban data is the user is not able to trace where the data comes from or validate the source of the data. For the Kingston In

Figure 2. Kingstoninfocus.ca dashboard – landing page

Focus team, data transparency was a necessary condition to the creation of the dashboard.

The Kingston In Focus dashboard is custom made. There are three unique attributes: (1) front facing with the goal of knowledge translation out to the community; (2) middle end with unique software coding that enables data to be gathered from public data sites like Statistics Canada and displayed in a unique front facing format; and (3) the back-end which is transforming the way some partners are collecting information by creating a data store with information based on their own unique needs.

The software innovation in the dashboard platform process is in all three areas. First, the dashboard is made for communities not corporations. The visualizations are unique to the needs of municipalities and the non-profits that work on municipal issues like housing, food security, community health, transit, and environmental issues. Second, some of the written code is original and the PIs hold the intellectual property to the innovation. The code allows for drawing data from data sources like Statistics Canada and daily data refreshing. Third, there is a back-facing element to the software. This is the aspect of the project where the research team is collaborating with communities and creating unique data stores. This aspect of the research is quite time-consuming because it involves regularly meeting with local organizations to determine their data needs and building an appropriate software system that can capture their wishes. It can also be transformative from an organizational management perspective, as described in section five below.

Collaboration

In addition to the technological innovations behind the dashboard creation led by the Queen's PIs, the process in creating the material was very much a collaborative effort with community partners, which brings us to our third point. The dashboard making process was not simply an academic exercise where academic researchers got partners to sign letters of support for the purposes of a research grant, but rather the practice was collaborative and was sometimes in real-time. In this way, the collaborative process very much followed in the spirit of Patsy Healey's collaborative planning thesis and her theme of the creative energy behind the planning process. This process was particularly evident in the creation of the dashboard themes. Before work began on the dashboard, the academic researchers hosted and facilitated a workshop with the community partners to work through as a group which dashboard themes were the most important for the community. The top dashboards that everyone agreed to focus were on the topics of local economy, employment, community health, mobility, environment, housing, cultural heritage, and demographics (Figure 3). The dashboard partners came together in real time to discuss and agree upon these major groupings.

One interview participant highlighted the importance of listening as the starting point for the collaborative process.

> "Yes, so I think it all starts with listening. So, listening to everything that people want, all the features that the different partners wanted in the objective of dashboard. How it was meant to be used, and through listening to everything...in everyone's minds, just trying to come up with a list of requirements"
>
> -(*Research Interview Participant Number 2*).

Another interview participant recognized that economic forces played a part in their organization's participation in the project and the value of working with team.

> "I could never afford to do this level of research and product development, I would know...we would never like never in a million years...ever be able to afford to do this on our own...but then there was this whole...the whole phase of

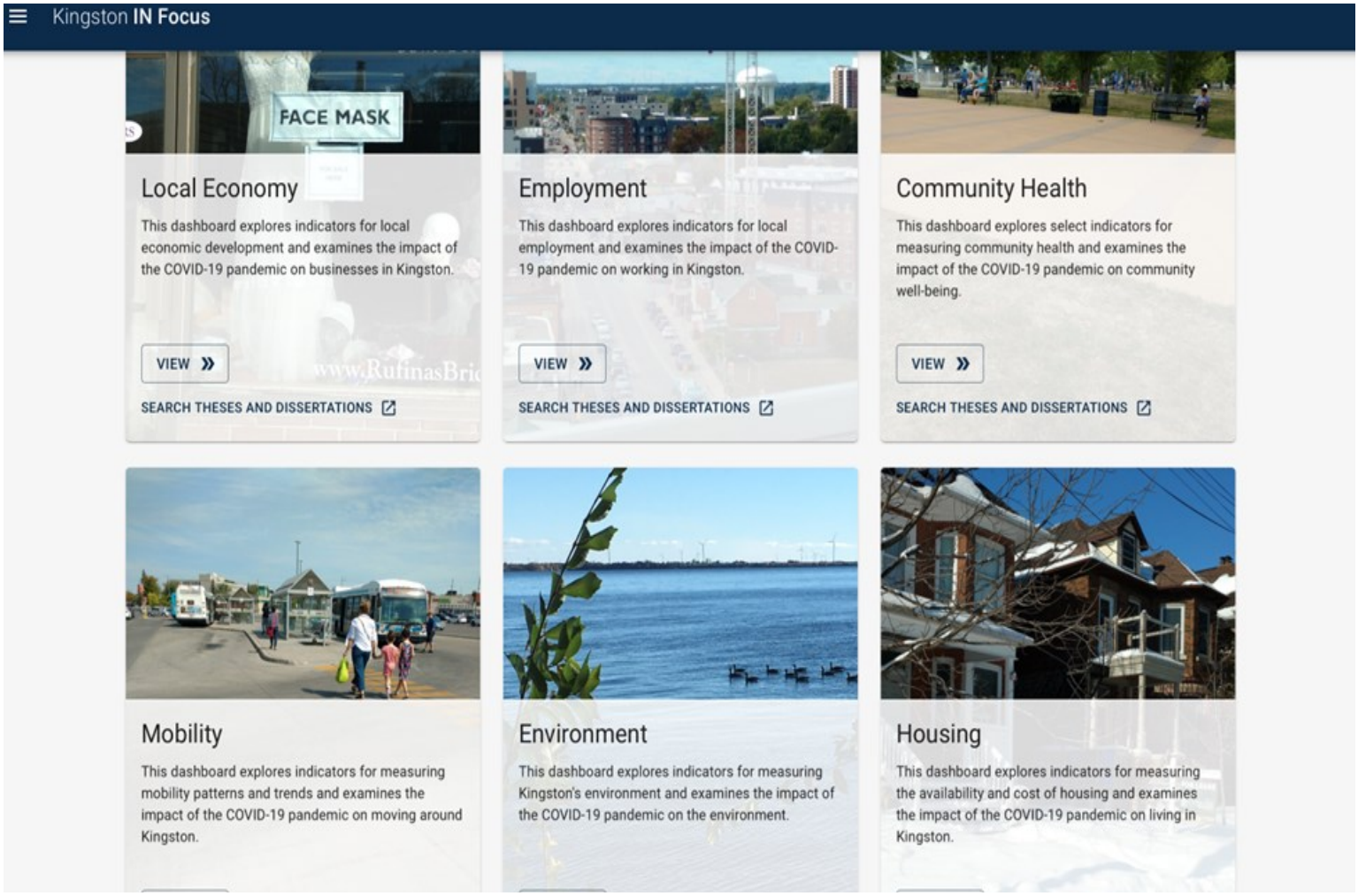

Figure 3. Example of 6 of the Dashboard Themes. Source: Kingstoninfocus.ca

working on the project with the project team".

-(*Research Interview Participant Number 10*).

This same interview participant went on to state,

"So it's like the process of making it, I think, was delightful, and one of the most functional and collaborative processes I have ever experienced"

-(*Research Interview Participant Number 10*).

Another Research Interview Participant recognized the value of working collaboratively and stated,

"I think it's important that we have public dashboards that are collaborations between government and academia...and again it's incredibly valuable for me...I make policy strategies, so I need to backup what I say"

-(*Research Interview Participant Number 5*).

Another Research Interview Participant indicated the value of the dashboard for their own research and writing of grants in their organization stating that

> "...anytime you have that type of website that combines lots of disparate data and puts it all in one place, I think is really helpful because when I'm doing research for any of the projects that I'm involved with or work on..." [I can refer to this website]
>
> -(*Research Interview Participant Number 3*).

The collaborative nature behind the process of the dashboard creation gave the users of the organizations confidence that their voices had been heard and their data presented in the best way possible. It also helped build trust amongst the partners, as described below.

Strengthening the Relationship

Building on Healey's thesis that collaborative planning can lead to much stronger long-term multi-actor relationships, our dashboard research found that the organization and management processes behind the dashboard over-time seemed to strengthen the relationship and bond amongst the team. There were some unique elements that facilitated this. The first reason behind the strengthening bond was likely because all members were likely "stuck-in-place" because of the lockdown realities during the initial phases of the Covid-19 pandemic, and because of these lockdowns more people were able to meet regularly online, and everyone seemed to have a sense of motivation and purpose around trying to make sense of what was happening locally because of the pandemic. Second was the small-town aspect of the dashboard and Kingston region. Many of the partners had had previous professional relationships with each other, for others they knew each other as neighbours, or their kids had gone to similar sports camps. In this sense, there were already strong social bonds, or what Putnam (2000) has referred to as social capital, defined as a public good in terms of the amount of civic trust in others available to cities.

There was also a strong element of trust around sharing the data. Kingston and Queen's University had very recently entered into a data sharing agreement which facilitated the flow of data between Queen's, the Centre of Advanced Computing, and the City of Kingston. According to a December 2021

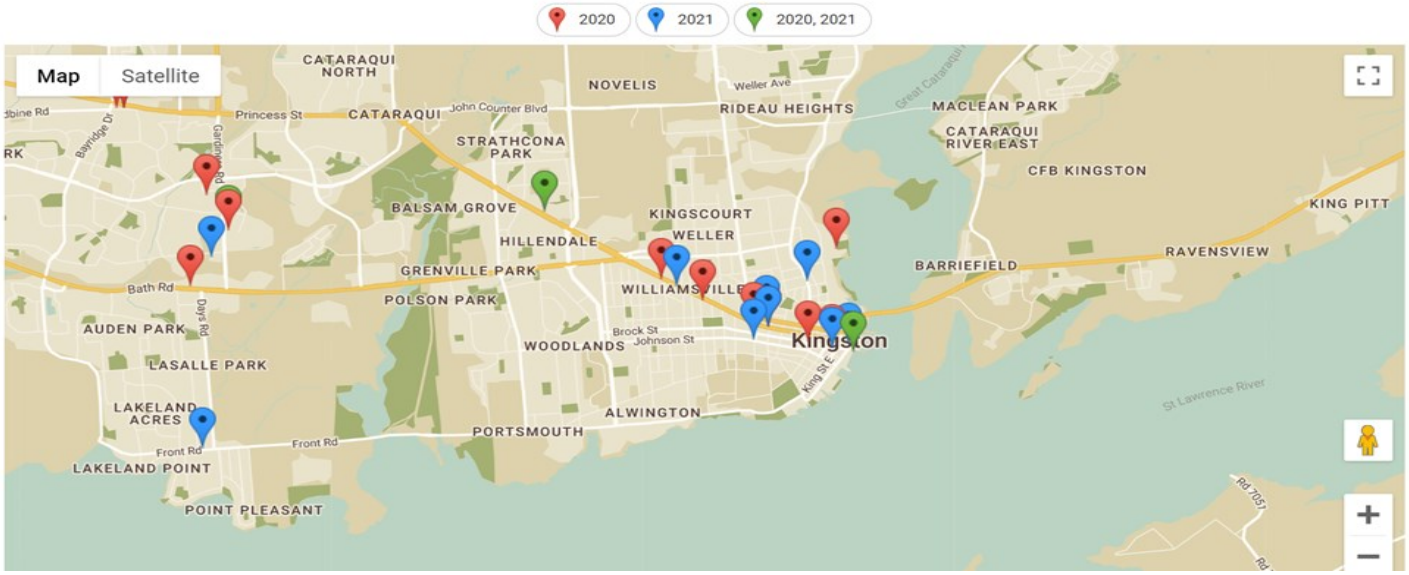

Figure 4. Location of patio permits in the City of Kingston. Source: Kingstoninfocus.ca

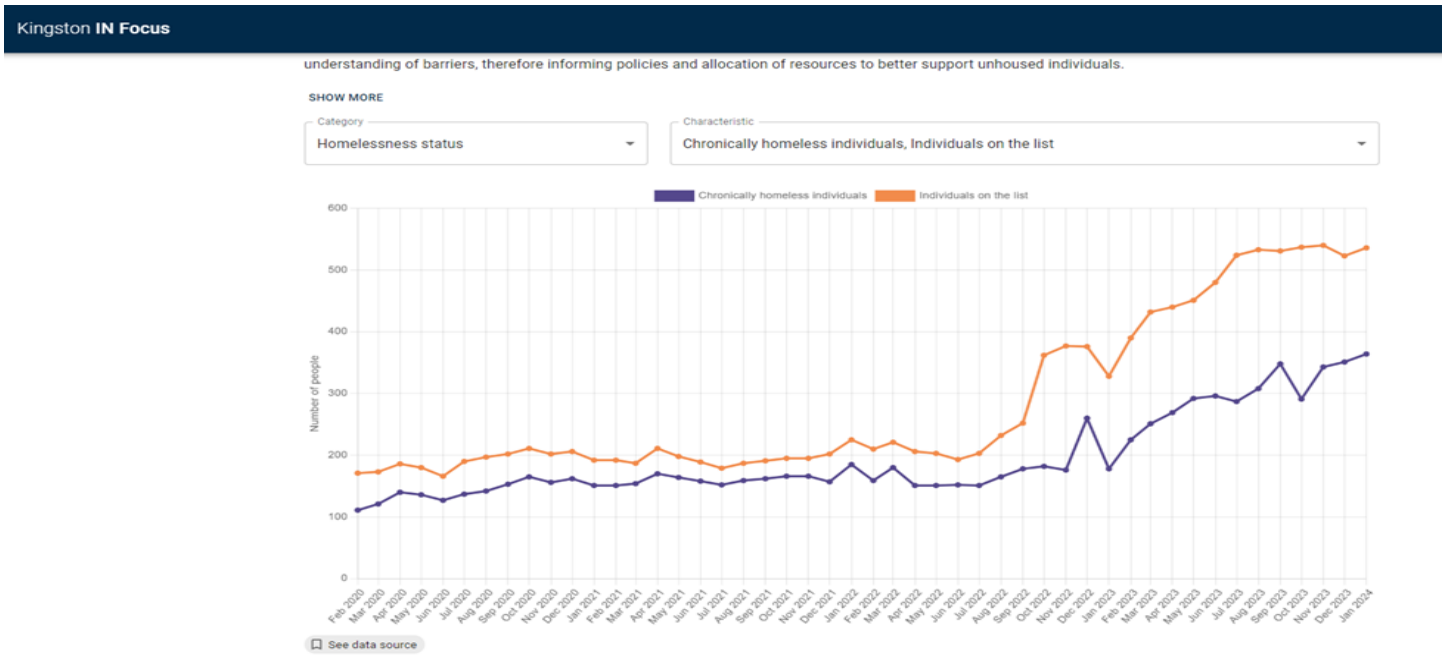

Figure 5. Homelessness data in Kingston, Ontario. Source: Kingstoninfocus.ca

Report to Council (Report Number 22-010, page 1-2 of 8) from then, Acting Commissioner, Corporate Services,

> ...[D]ata has become a critical asset to improve decision making and provide insights into future planning. The value of data is further amplified when it is shared and merged with data from several reliable sources.... To advance City strategic priorities and develop innovative partnership opportunities, the City periodically enters into agreements licensing third party-owned data to the City or licensing City- owned data to third parties. These agreements typically address issues such as ownership of the data, the scope of the licensed data, the permitted use or uses of the licensed data, and restrictions related to the creation, storage, and distribution of the licensed data. These agreements facilitate innovation and collaboration without the added costs of duplicate data collection efforts. In all cases, data is reviewed against privacy and security criteria, and is cleansed or anonymized when required.

One of these agreements has been with Queen's University. This agreement, in conjunction with an already excellent partnership between the City and the Centre for Advanced Computing over data security, meant that there were few concerns about sharing data across the partners. This existing and practiced trust further cemented the bonds amongst the team.

One example of the use of City data by the dashboard team was the creation of an indicator termed business patios found on the Local Economy dashboard. This map (Figure 4) shows the locations of outdoor patio permits in response to Covid restrictions about eating within enclosed places. Patios in the City of Kingston were an important part of the strategy to support commercial businesses when COVID-19 restrictions were still in place and social distancing requirements decreased normal

capacities. The City of Kingston worked to fast-track temporary patio permits on private and public lands. There was an increase in patios especially in the downtown as many of the expanded patios occupied parking spaces adjacent to participating businesses (www. Kingstoninfocus.ca).

While patio permits in and of themselves don't strike as particularly sensitive or onerous data to obtain, what was notable for the researchers was the willingness of the City partner to provide this data in a timely manner and experiment with the researchers on ways to display the information so planners and other community partners could see the number of Covid special permits allowed during this lockdown period.

Another, more sensitive, example comes from the sharing of homelessness data (Figure5). Homelessness is defined within Canada as a situation where an "individual, family or community without stable, safe, permanent, appropriate housing, or the immediate prospect, means and ability of acquiring it". As noted on the dashboard, "[w]orking collaboratively, the City of Kingston along with community partners support the collection of real-time data through the "By-Name-List" program...the By-Name-List system underwent a system upgrade, along with increase training for staff and community partner organizations. As a result, the data starting in October 2022 and onward will look higher than in previous months" (Figure 5). The City and their partners were very conscious of making sure users of this data understood the system changes but also open to ensure the information was as transparent as possible for the user. There was a genuine concern amongst all the partners that homelessness was a growing concern that needed the best possible data collection and as noted on the dashboard,

> "[t]hrough the collection of real time, actionable data there is an increased understanding of barriers, therefore informing policies and allocation of resources to better support unhoused individuals."

Of course, definitional change in the homeless data variable is an example of inherent issues with data comparability over time which is one challenge of dashboard making processes. The team, however, felt that it was important to signal the definitional change that had occurred and also point to the efforts in the community to allocate resources to better support unhoused individuals.

Organizational Improvements

In this fifth section, we demonstrate the improvements to processes that occurred for all the partners involved in the making of the dashboard, including the non-profits, the City, and the university. From the perspective of the non-profit partners, some of them were able to change some of their internal reporting systems because of learning about the technical aspects of dashboard creation. This falls in line with Healey's capacity-building theme in collaborative planning. From the City's perspective, they were able to speed up and improve some of their service delivery and knowledge mobilization through open access improvements. The dedication of resources to Open Data Kingston as part of the dashboard project ensures that the dashboard can continue to draw data from the Open Data portal. As noted by one Research Interview Participant,

> "any part of the data in our open data making sure...the main goal that we had was the sustainability of the dashboard that we're going to have because we want this to be around and be updated for the years to come. And so that was our main mandate"
>
> -(*Research Interview Participant Number 6*).

Another Research Interview Participant stated:

> Working with the project team and understanding what the data was, going to look like... the end, the visualization of that data at the end, it absolutely, it was like ...an iterative loop in the sense that suddenly the ask became much more clear, because when we're looking at the way our data was sort of coated and like sort of in the lumps, it sort of sat in. It wasn't conducive to an efficient.... or like accessibility, or people reading it, and I knew that was a problem. But I didn't know how to fix it within the practical and knowledge-based limitations that we had....then once ...I understood that there was this very concrete way of expressing, sharing, making this data accessible, and interconnecting it sort of on the comparative chart with this other sectoral data....so this is how we want to restructure it.

-(*Research Interview Participant Number 10).*

From the researcher/academic institution, the researchers and their student teams were able to continuous learn best practices in technical dashboard making as well as improve skills around communication, project management, grant writing, technical skills. It also sharpened the relationship between social sciences and data analytics and the universities' commitment to computational analytics and its relationship to social science and humanities research projects. Social science and humanities researchers are increasingly collaborating with data sciences and software engineers to help them answer societal questions. Throughout the project, these data science and software engineering students developed their skills in coding, digital mining, digital visualizations, project management and communication. Some of the alumni of the project have now gone on to work in other sectors including data analytic companies and the federal government.

Conclusion

The concept of a dashboard conjures up images of technocratic and rational planning because of the relative technological novelty and the large number of quantitative data sets that are displayed on a dashboard. However, what we have shown in this paper is that what made this Kingston In Focus dashboard project work was the collaborative and participatory approach to the project concept, design, and implementation. The project was founded on partnerships, trust and build upon a mutually respecting team of experts across the City. Far from simply a technocratic exercise, the Kingston In Focus dashboard epitomized a collaborative planning approach. Building on themes from Patsy Healey's ground-breaking research we demonstrate how important the processes are coming together through recognizing mutual dependencies and of building the institutional capacity for the inclusion of diverse and multiple voices in the dashboard planning and visualization processes. Finally, we demonstrate the capacity building benefits of good dashboard making in terms of new technical skill development, new communication tools and collective learning. The work was indeed time-consuming, requiring good project management and a continuous search for credible data and funding. All this in turn created an effective social model of collaboration, that is a shared set of values that allowed the individuals working on the project to achieve a common purpose. That purpose was fundamentally motivated by a desire to provide the best possible data to help decision makers verify and understand complex planning issues in the City. But more than just a product of credible data sources for decision-making was the on-going process of collaboration based on expertise, experience, and good judgement – all crucial elements on the path to good planning.

Acknowledgements

This academic work was supported by Mitacs through the Mitacs Business Strategy Internship. The Kingston In Focus Dashboard draws upon research supported by the Social Sciences and Humanities Research Council Insight Grant 435-2019-0022. We also thank the anonymous referees for their insights.

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