

A GUIDE TO CREATING MAPPING TOOLS

2019

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WindsorEssex
YOUR LOCAL EMPLOYMENT PLANNING COUNCIL



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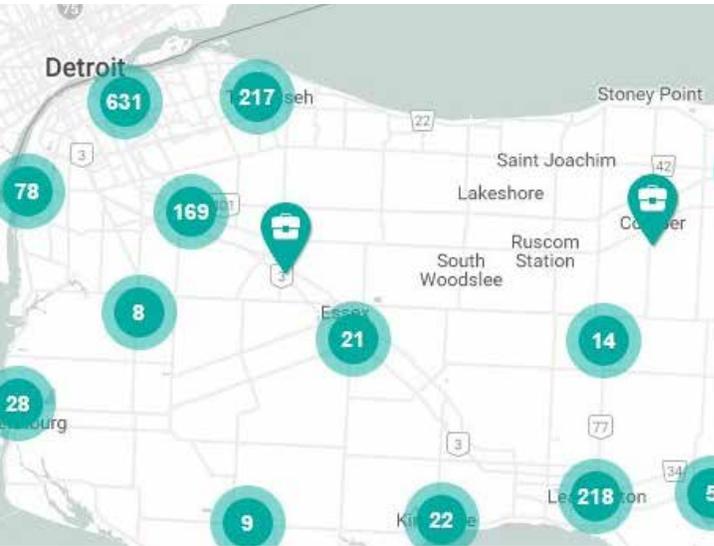
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Workforce WindsorEssex is committed to ongoing research to enhance local labour market planning in the Windsor-Essex region.

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TABLE OF CONTENTS



Introduction	4
Background	4
About this Guide	4
Why map digital data?	5
Developing your mapping tool	9
<i>Objectives</i>	10
<i>Data</i>	11
<i>Tools & Resources</i>	12
<i>Enlisting the Support of a Developer</i>	15
<i>User Experience</i>	16
<i>Testing your tool</i>	17
Launching your tool	17
Continuous improvement	18
Conclusion	19
Glossary	19
Bibliography	19

Introduction

Workforce WindsorEssex is a workforce and community development board that creates labour market tools, research, guides and events that save others time, money and effort. Serving jobseekers, employers, students, educators, and the community, Workforce WindsorEssex, acting as the Local Employment Planning Council (LEPC), is actively working to create positive change in the local labour market through community engagement and the dissemination of labour market information.

The Ontario Ministry of Training, Colleges and Universities provides funding support to the Local Employment Planning Council to undertake workforce development projects, including the development of WEmap and this Guide to Creating Mapping Tools.



BACKGROUND

For the past three years, Workforce Windsor-Essex has been involved in the creation of mapping tools aimed at local jobseekers and service providers. Mapping tools are powerful mediums to visualize and communicate valuable information with others, and conduct analysis on data that can fulfill service or business objectives. Mapping tools can be immensely valuable in many realms of work, including community development, market research, environmental conservation, business planning, supply chain management, transportation logistics, and more.

In the first phase of the LEPC project in 2016-2017, we visualized public transit routes and job postings to highlight the accessibility of job opportunities to jobseekers depending on their access to a personal vehicle. We called this tool WEmap and in LEPC 3 (2018-2019) we have been building on this platform

further. Our LEPC 3 project will result in the creation of an updated mapping interface and an expanded list of mapped assets, such as employment centres, language training centres, apprenticeship training sites, child care centres, and more. This improved mapping tool is called WEmap jobs. We also created another mapping tool called WEmap census, which will help users visualize and interact with locally relevant Statistics Canada Census data in a new, easy-to-use tool.

ABOUT THIS GUIDE

We developed this best practice guide to help other organizations, near and far, further their own interest in the use and development of mapping tools. In this guide, we share lessons from our experience in developing the WEmap tools and insights that we have gathered from community members on managing, analyzing, and visualizing geographic data.

This guide is intended for service providers, government agencies, educators, businesses, or other organizations that can benefit from visualizing regional data, community resources, and other spatial information using a digital mapping software. We hope that a wide range of organizations in Windsor-Essex, in Ontario, and beyond will use this guide to inform the development or improvement of their own mapping tools and spatial data strategy.

Why map digital data?

Maps are tools of orientation and representation. As a mapmaker, you or your organization can highlight relevant information for your audience in ways that existing maps do not, and include spatial data that has not already been displayed or integrated in a map or Geographic Information System (GIS). By incorporating GIS and mapping into your work, you create opportunities for users to connect with the right resources, and for your organization to make evidence-based decisions that improve business or service operations.

Digital mapping magnifies the benefits of traditional mapping in many ways. For example, desktop tools for spatial data, such as Esri's ArcGIS, can incorporate large amounts of data and conduct complex analyses that can underpin rigorous business operations, research, and business or service planning. They can also generate data visualizations or maps that are insightful and useful to a diversity of audiences.

Like desktop tools, online mapping tools for the public can also incorporate a large and varied set of locations and other spatial information, and yet allow users to highlight specific information that is relevant to them. These tools also allow for you or a developer to create innovative interactive elements that permit users to find the information they need.

With improvements in the power, integration, and accessibility of GIS, managing and mapping regional spatial data is quickly becoming an effective and accessible way of reaching service and business goals. The following case studies highlight the value of digital mapping tools for government agencies, businesses, and community services.

WHAT IS GIS?

Geographic Information Systems are frameworks for collecting, analyzing, and interpreting spatial data to create useful information about areas, specific places, and the connections between points in space on the Earth. GIS are made up of five major components:



PEOPLE

PEOPLE play a role in every process and component in a GIS. For example, members of the public contribute to a GIS through the provision of geo location data that is collected from cellular devices, and people including GIS specialists and other professionals play a role in data analysis and the interpretation of information that is created through a GIS.



HARDWARE

HARDWARE, including desktop computers and GPS devices play a role in data collection and analysis.



SOFTWARE

SOFTWARE can include programs that manage, analyze, and display spatial data such as ArcGIS or QGIS, and peripheral programs for processing spatial data and presenting information, such as Microsoft Excel, Google Maps, and publishing software.



DATA

DATA that is incorporated in a GIS can be diverse, including information and data on physical maps, data tables listing locations and specific information, and GIS-specific data formats such as shapefiles



APPLICATIONS

APPLICATIONS define the ends towards which people, hardware, software, and data interact to process spatial information.

To learn more about Geographic Information Systems, visit Esri's online webpage titled "What is GIS?" at www.esri.com.

Case Studies

GOVERNMENT: **COATICOOK REGIONAL COUNTY MUNICIPALITY¹**

The Coaticook Regional County Municipality (MRC de Coaticook) is a rural municipal government in Southeastern Québec. As a municipal government, they managed a variety of spatial data and information, including data on roads, trails, internet coverage, property boundaries, flood zones, and forests. However, until around 2015, data was maintained in physical format on maps, making it challenging to compare, analyze, and share with the public and other government stakeholders.

To leverage modern GIS technology and to integrate spatial data on a single platform, the Municipality invested in ArcGIS Online: a cloud-based software developed by Esri for online storage and display of spatial data. The geomatics team of the municipality already had the expertise to manage the back-end of the software, and the online, front-end of the tool was accessible and easy to use for the public. Investment in this tool and transition from physical storage of spatial data to online storage and display led to time-savings across the board. Where stakeholders and the public previously would have to request specific data, they can now access data directly and online, creating opportunities for them to make better use of this information, and saving staff time.



1. "Small Regional Municipality Dreams Big with ArcGIS Online," Esri Canada, 2015, <https://resources.esri.ca/case-studies/small-regional-municipality-dreams-big-with-arcgis-online>

BUSINESS: WALMART²

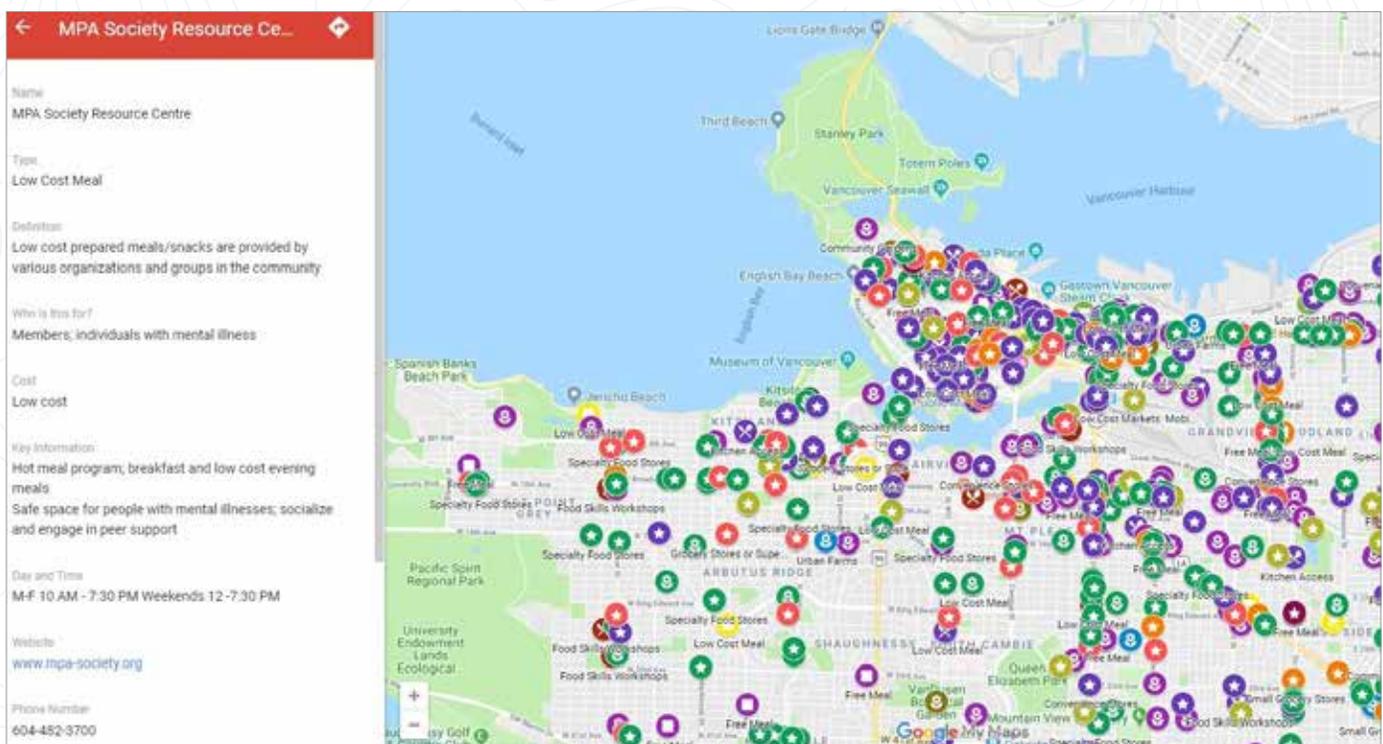
Walmart, as the world's largest retailer, deals with complex challenges of transporting goods from suppliers to retail stores. Real-time tracking of the location of transport trucks using GPS technology in the last 20 years has led to improvements in logistics, but delays at various points of the delivery systems have led to inefficiencies. GIS allows large businesses like Walmart to use the real-time collection and analysis of large amounts of data from GPS tracking to optimize the use of time and resources in the transportation of goods.

COMMUNITY ORGANIZATION: VANCOUVER NEIGHBOURHOOD FOOD NETWORK³

As part of a city-wide strategy to address food insecurity in Vancouver, British Columbia, the Vancouver Neighbourhood Food Network partnered with Vancouver Coastal Health and numerous other community-based organizations to create the Vancouver

Food Asset Map. The creation of asset maps is a common practice in bottom-up community and economic development because it builds awareness for existing resources and community wealth that can be leveraged to address an issue or achieve a collective goal. Asset maps also help community members orient themselves in space and learn about opportunities to connect with others based on where they live, work, and play.

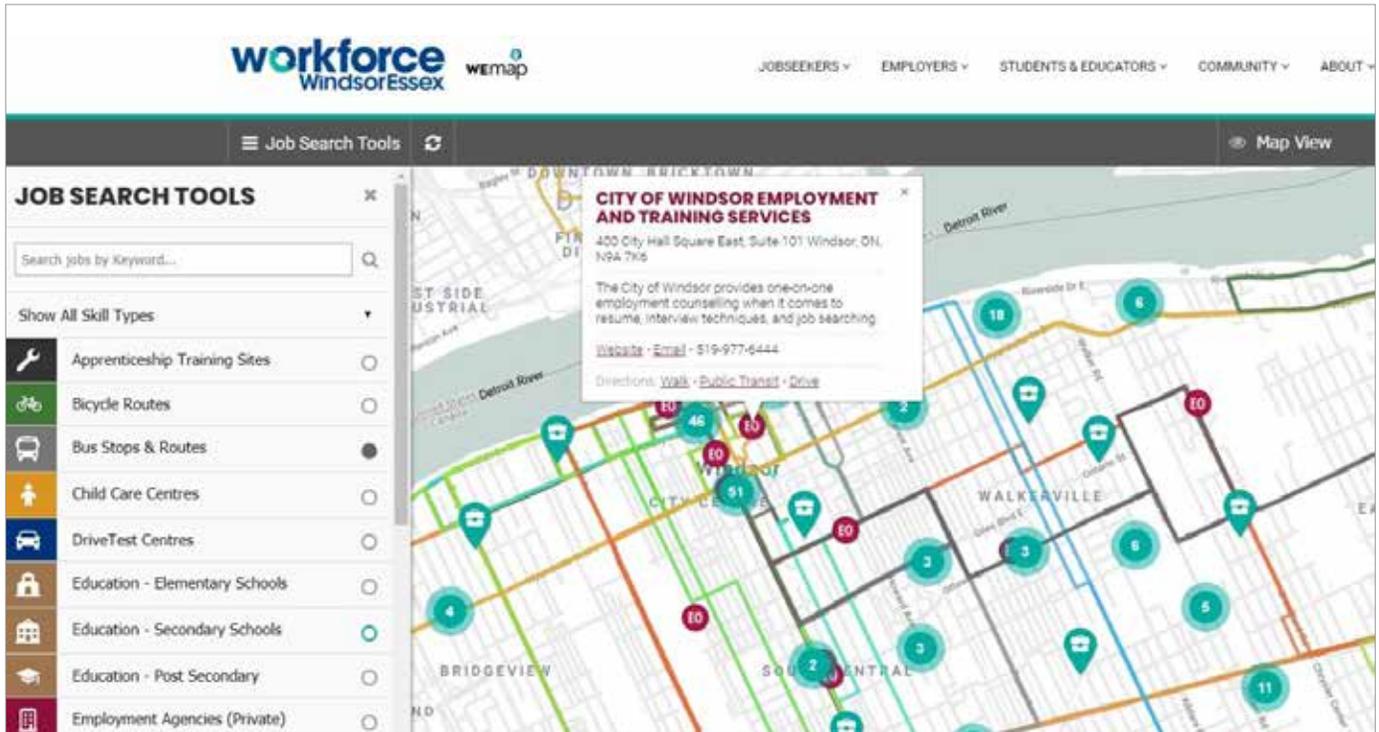
The Vancouver Food Asset Map is hosted on Google My Maps, a free and open online mapping program. As an online and interactive mapping tool, it allows users to display different layers of food assets depending on their interests (e.g. low cost food programs, kitchen programs, community gardens, markets, etc.). Users can also click on individual assets to access more information, including web links and contact information. The tool is widely shared by member organizations of the Vancouver Neighbourhood Food Network to promote the use of programs and resources that alleviate individual food insecurity, and contribute to the development of a healthy, sustainable, and equitable local food system in Vancouver.



The Vancouver Food Asset Map is a mapping tool hosted on Google My Maps that was created by the Vancouver Neighbourhood Food Network. The tool allows users to explore a variety of food-related programs and places in the city.

2. Batool Alhenaki, "Using GIS/GPA to Optimize Supply Chain Management and Logistics at Walmart," International Journal of Scientific & Engineering Research 7, no. 6, (2016): 745-748, accessed January 22, 2019, <https://www.ijser.org/researchpaper/Using-GIS-GPS-to-Optimize-Supply-Chain-Management-and-Logistics-at-Walmart.pdf>

3. "Food Asset Map," Vancouver Coastal Health, accessed January 22, 2019. <http://www.vch.ca/public-health/nutrition/food-asset-map>



WEmap jobs displaying job posting locations, bus routes in and around Downtown Windsor, and information about an Employment Ontario site.

What is WEmap?

WEmap is a mapping tool platform that was developed by Workforce WindsorEssex with the assistance of a local company to map labour market information such as job postings, jobseeker services, and census data. The creation of the platform allows us to re-create new mapping tools with new data sets as the needs arise.

In the third phase of the LEPC pilot project, we launched a new version of original WEmap, called WEmap jobs, and we created a second mapping tool called WEmap census.

WEmap jobs is a comprehensive, regional employment-finding tool that allows jobseekers to explore job postings based on their location. It builds on the previous version of WEmap with an improved user interface, the display of job opportunities by street address, and the addition of services relevant to jobseekers, including Employment Ontario locations, job training centres, and childcare centres. WEmap jobs also incorporates an expanded display of public transit routes, including those in the Town of Tecumseh and the Municipality of Leamington. Its intuitive and attractive interface and comprehensive display of job postings and jobseeker services is intended to

make it an empowering tool for members of the public who want to explore the job market and employment-related services while navigating transportation options and daily activities (e.g. dropping a child off at a childcare centre or school).

WEmap census is a mapping tool that service providers, government agencies, businesses, and researchers can use to support business and service planning through regional data research. The tool displays 14 categories of census data gathered by Statistics Canada at the census tract level, such as, population, income, education, journey to work, languages, etc.

In the following section, we will share what we have learned through our own experience, through conversations with other regional stakeholders, and through our research about the steps involved in developing data mapping tools.



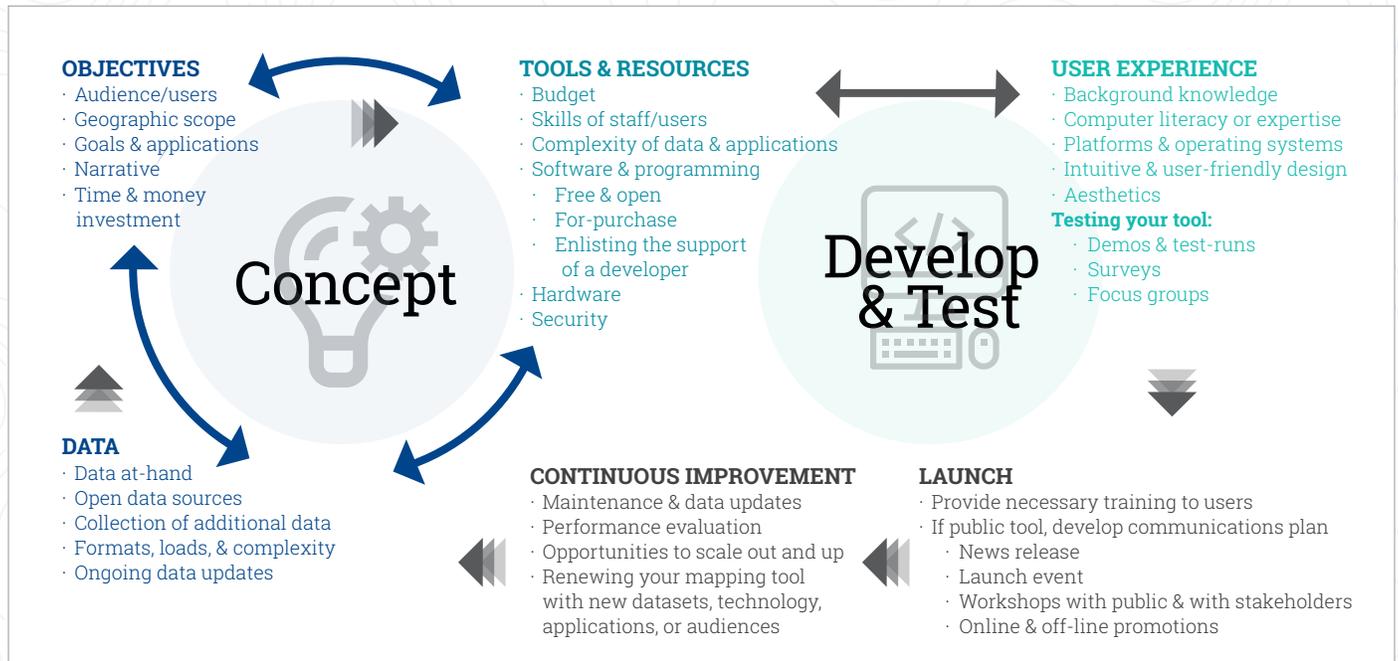
Developing your Mapping Tool

Given the wide-ranging applications of mapping tools, you may be able to identify an application for mapping tools or software in your work. But where do you start?

There are multiple interacting considerations that will affect your mapping project. For example, your objectives may determine what tools and data you want to use, as well as the budget you plan to

allocate, but available tools and data can also expand or limit the scope of your project and objectives.

In the following section, we will provide several tips for each of these areas of consideration that impact your development of a geographic mapping tool. Below is a visual summary of this process.



Below is an overview of all the remaining sections of this guide. For each, we also provide insights into our own experience going through each of these stages of project development and execution for the WEmap tools.

OBJECTIVES

What will the outcome of your mapping tool be? What gap will it fill? Who will it serve? This section provides guiding questions that can initiate the development of a concept for your mapping tool.

DATA

Where will you find the data that powers your tool, or how will you produce it? How will you manage it? This section provides advice and tips for finding and managing spatial data.

TOOLS & RESOURCES

What software option for creating your mapping tool best suits your needs? This section will guide you in navigating some of the options available based on applications, audience, budget, and other factors.

ENLISTING THE SUPPORT OF A DEVELOPER

Is it worthwhile, given the scope of your project and your budget, to contract an external developer to create your mapping tool? This section provides guiding questions for exploring this option, and several insights from our own experience working with a developer.

USER EXPERIENCE

What makes a mapping tool worthwhile, effective, or even enjoyable to use? Here, we provide tips for creating a tool that will exceed the expectations of your users.

TESTING YOUR TOOL

Developing a mapping tool that fits the needs of your users requires their feedback along the way. We provide some strategies that you can use to solicit and incorporate their feedback for your project.

LAUNCHING YOUR TOOL

How will you ensure that your users are ready to make the best use of your tool, and if you are targeting the public, how will you build mass awareness? In this section, we provide tips for developing a plan that will facilitate your tool's impact in your community or workplace.

CONTINUOUS IMPROVEMENT

How will you keep your tool relevant over time? How will you evaluate its performance? How will you leverage opportunities to scale its impact? In this section, we provide some final reflections for you as you move beyond the development of your mapping tool, and towards next steps.

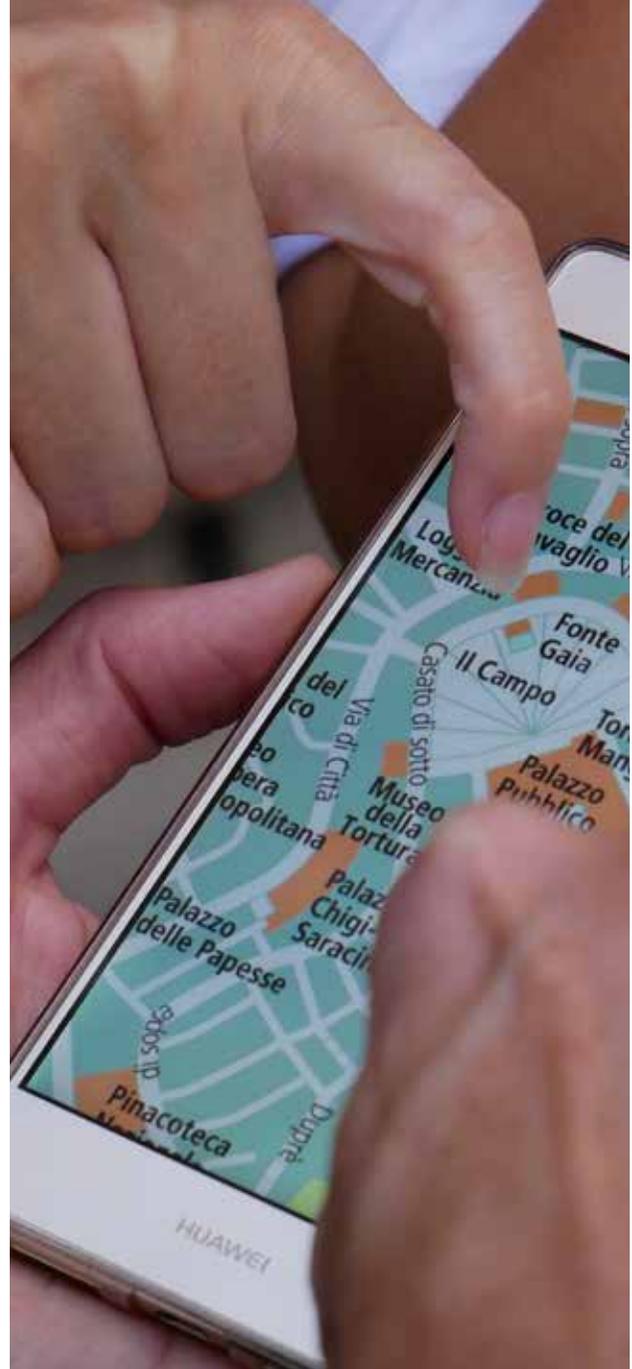
Objectives

As with any project, you will need to generate an idea of the scope of your mapping tool before accounting for other considerations. This will be important in guiding decisions on which datasets or features are worth incorporating.

Use these guiding questions to develop a concept for the tool that can guide the rest of the process:

- **Who are you developing your tool for?**
- **What is the geographic extent of your tool?**
- **What main questions will your tool be able to answer for users?**
- **What story or stories do you want to tell to users with your tool or maps?**
- **What financial and staff resources do you have available for this project?**

Flexibility about your objectives early-on in your project development will allow you to explore what tools, resources, and data are available to substantiate your project, which can expand the scope of some of your objectives, and render others less realistic. For example, considerations about what data is available may allow you to easily expand the utility of your tool if there is more easily accessible data than you anticipated. On the other hand, if you find that data is expensive to generate or acquire, you may reduce the scope and scale of your tool.





What we learned...

When Workforce WindsorEssex embarked on re-developing our WEmap tool, we planned to create two tools: a job market navigation tool for jobseekers and a regional social data analysis tool for service providers, government agencies, and local employers.

We defined the scope of our jobseeker tool, WEmap jobs, with the following:

An objective: To support jobseekers in navigating available job opportunities in Windsor-Essex geographically.

Geography: The City of Windsor and Essex County.

Questions the tool was intended to answer for jobseekers: Where are job opportunities in Windsor-Essex that match my skillset? By what means of transportation can I access these opportunities? Where are the jobs in relation to schools and childcare centres where I may also need to travel on a regular work-day? Where are access points for additional employment services that can help me find work and get the training I need?

Data

Early on in the project development process for a mapping tool, you will need to consider what data is available for your project, what data you are able to create, and what the use of these datasets will require.

There are many places you can start your search for data. What kind of data does your organization already collect? Perhaps you already collect data on the location and spatial activities of your business or your clients, or on the locations of other places that are relevant to you. If you collect this kind of data electronically, for example in a spreadsheet, there are ways you could convert this data easily into GIS-friendly formats.

Another good place to start for many organizations is by taking a look at what open data sources are available. If the focus of your mapping tool is the social or natural environment, and if you are working in a community in Canada, there are likely numerous open data sources you can use to populate your mapping tool with data for no charge and without special permission.

DID YOU KNOW?

Open data can catalyze economic development, innovation and community engagement. Organizations, companies, and computer programmers can leverage the value of open data by creating marketable tools that fill a local need. Government agencies, municipal administrations, and other collectors of data can spur innovation by sharing the data they collect on an open data platform, allowing others to use their data to generate new observations, approaches and solutions. When members of the public access these open data platforms, they naturally gain awareness of new resources in the community, sparking community engagement.

DID YOU KNOW?

Government agencies, and especially those at the municipal levels, are often founts of open data. Geospatial data assets from these sources can include city infrastructure, geology, the location of schools, the location of reported property crimes, and so on. In Windsor-Essex, the City of Windsor Open Data Catalogue, the Ontario Data Catalogue, and Statistics Canada are all sources for regionally-specific open data. Governments at all levels (municipal, provincial, and federal) collect and maintain data for themselves as a common practice, and it is often possible to make requests for data that is not already included on an online mapping catalogue.

Organizations in your field may also maintain geospatial data that could be incorporated in your tool, requiring permission and

at times the conversion of different data types. Thus, involving partner organizations and other stakeholders in your project development and data collection process can be valuable. If you are collecting data from suppliers, partner organizations, or other stakeholders, be sure to develop standard formats for your data so that time is not wasted reformatting it.

Keep in mind that sensitive and confidential data that you collect as a result of requests or direct collection may require special attention in storing and presentation. For example, if you are creating an internal mapping tool using data about your clients that is held in confidence, online tools for file management are usually not an option, unless you have stripped the data of identifying pieces.

As you develop a concept for your mapping tool, you should also determine if your tool requires ongoing data updates in order to be useful, and if so, what software or people power you can use to conduct automatic or manual data updates. Mapping tools, especially those destined to a public audience that display data that changes over time, can quickly lose their value if the data they use becomes outdated.



What we learned...

Both WEMap tools used a combination of data that we had at hand, data that we requested from stakeholders, and data that we had to collect or create on our own. All of this data was non-personally identifiable. For WEMap jobs, we used open source data for the bus transit lines in the City of Windsor, as well as the location of all schools within the city. For WEMap census, we used publicly available data from the Statistics Canada 2016 census to georeference census tracts and associate them with social data, including total population by age groups, languages spoken most at home, income level, and many other metrics.

We produced the remaining data (e.g. the location of employment services and the location of job opportunities) in various ways. For the location of services that was not yet in a georeferenced format, we used internet research and the use of geographic information systems programs (Google Maps and QGIS) to georeference the data and create it in an acceptable format for the web-based system our developer created. We successfully requested data from the City of Windsor for the location of childcare centres in Windsor and Essex County.

Tools & Resources

How will you decide on a software that will provide the infrastructure for your mapping tool? Several factors will play into this decision:

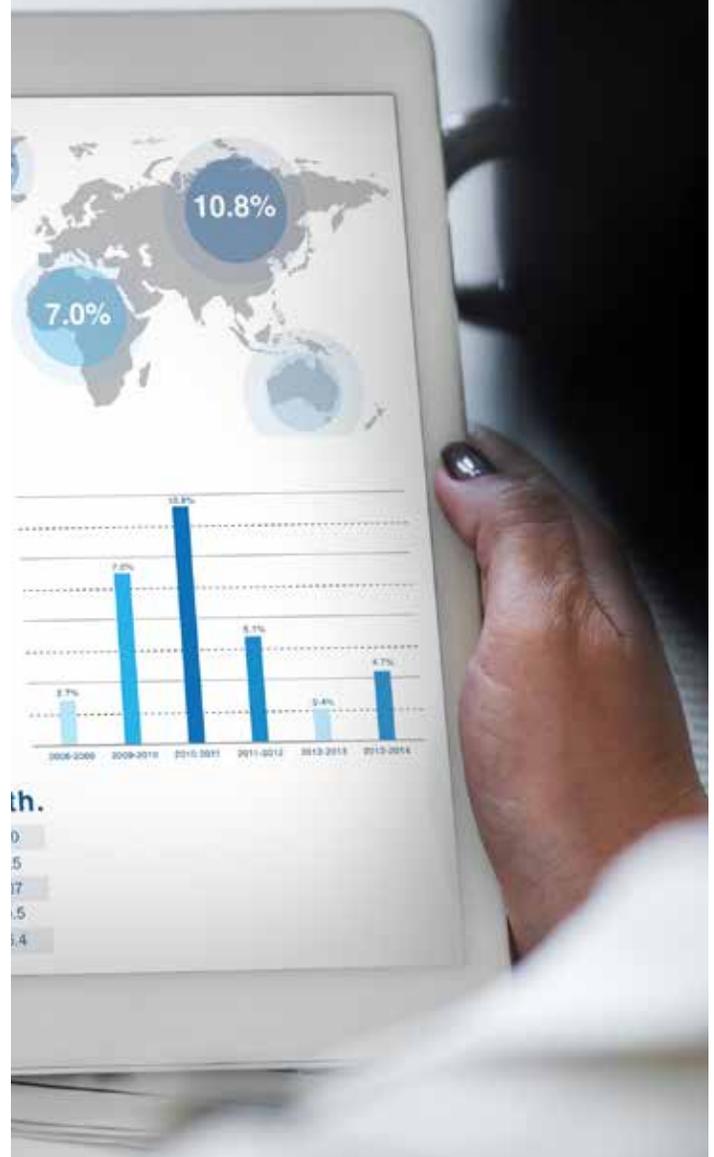
The complexity of data and applications: Depending on what you need your tool to do, you may benefit from a simple, low-cost program, or you may need a more sophisticated software. For example, if you are making a tool to display locations on a map for the public (e.g. an asset map), free online tools like Google MyMaps may be sufficient. However, if you need to do complex or real-time data analysis, if you are working with sensitive data and not sharing information with the public, or if the load of data is very high, you may need to invest in a desktop program or a more sophisticated online program (e.g. ESRI softwares).

The skills of the people maintaining and using the tool: If you are creating or investing in a software that staff or researchers will use, consider whether it makes the best use of their skills, and consider how much investment would be required to equip them with the skills and knowledge needed to use the program if they do not already have these. If you are creating a tool for the general public, consider how intuitive the tool is for the regular computer and mobile-device user, how smoothly it will operate on a diversity of operating systems, how much data needs to be loaded, and how aesthetically appealing and pleasing the program is to use.

Budget: Financial resources and staffing capacities allocated to your project will determine the kind of tool you will invest in, or whether you will enlist the support of a developer. This will in-turn determine the power or complexity of your tool.

Hardware: Is the computer hardware that you already have sufficient to run your mapping tool, or will you need to invest in more? If you are planning on creating something simple, such as an asset map powered by Google My Maps, this may not be so much of a concern. But if your applications involve processing a large amount data, and the use of a software such as ArcGIS, you will need to verify your hardware capacity and account for the costs of upgrading, if needed.

Other Software Required: Making the best use of spatial data often requires a combination of software. A common example is that datasets that eventually get integrated in a GIS software are often managed first in a software like Microsoft Excel or SAS. When you have identified software that is complementary to your tool, verify that you have the budget and capacity on your team to make good use of these.



Security: Depending on the sensitivity of your data, and whether you will need to protect proprietary programs, you may need to protect your data and your coding.

Data: Is the data that is stored on your tool public, or sensitive? If you are working with sensitive data, this will require a desktop mapping tool and other methods to ensure that your physically stored data is protected from unauthorized access, such as prevention of theft of your desktop, and encryption of data.

Coding: If you are having a mapping program specially developed, how will you protect the value of your program? Especially if it is online, you will need to ensure that you have necessary protection using firewalls to protect your program from hacks and from proprietary theft.

Below is a list of software and development options that you could use for your mapping tool project, depending on the applications of your tool, the budget you have allocated, and the skills on your team. In the following section, we will provide several tips for each of these areas of consideration that impact your development of a geographic mapping tool.

SOFTWARE AND DEVELOPMENT OPTIONS FOR MAPPING TOOLS		
Mapping Tool Option	Software Examples	Example Applications
Free and open software	<ul style="list-style-type: none">  Google MyMaps  QGIS 	<ul style="list-style-type: none"> • Display of locations and areas online • Spatial data analysis and visualization
For-purchase software (“off the shelf”)	<ul style="list-style-type: none">  ESRI ArcGIS  ESRI ArcGIS online  ESRI Geocortex  Carto  Mango 	<ul style="list-style-type: none"> • Management and analysis of spatial data, including social, environmental, and GPS data • Optimization service and business decisions • Social and environmental research • Spatial data visualization • Map-making • Interactive online maps • Business and transportation logistics
Developing your own	<ul style="list-style-type: none">   Mapping tool development software, such as Mapbox   Developer-made software, programs and APIs 	<ul style="list-style-type: none"> • Unique analysis and data visualization tools • Interactive online maps • Integration with other software and information systems

LEGEND



Requires little-to-no GIS knowledge or skills to set-up or use



Requires knowledge of GIS to set-up and use



Requires knowledge of GIS to set-up



Requires programming knowledge to set-up

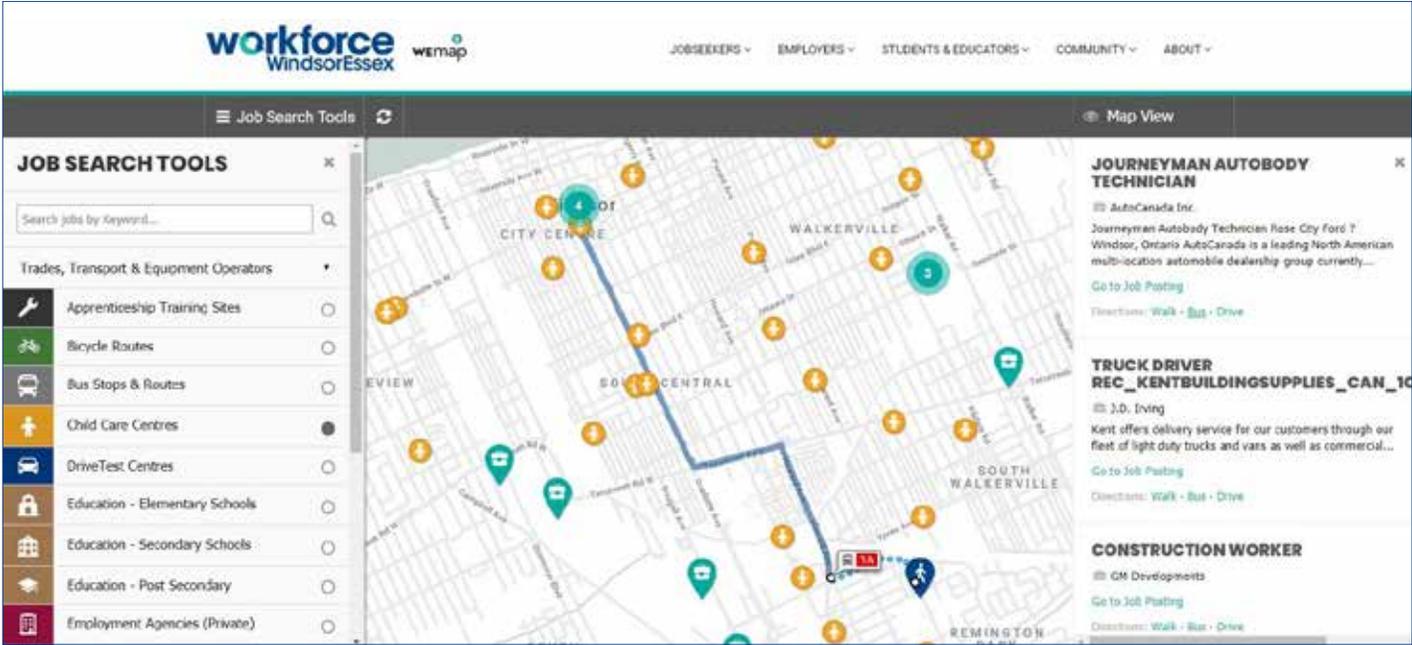


What we learned...

For our WEmap tools, we aimed to deliver a place-based, innovative mapping tool with capacities to display job opportunities, the location of services and transit routes for jobseekers, and labour market information in a comprehensive and interactive online format. We also wanted to create a comfortable online experience to encourage jobseekers, businesses, and social service providers to use our tools in order to have an impact in facilitating employment and workforce development in Windsor-Essex.

Our approach was to create two completely new online regional mapping tools with the support of a developer. Building on the experience and lessons learned from developing the original WEmap tool (first developed by Splice Digital), WEmap jobs and WEmap census were developed by Jason Pomerleau (jasonpomerleau.com) using a combination of different developer softwares. Our developer created the WordPress plug-ins that host the tools and manage spatial data. The display of spatial data and locations is supported by Google Maps Platform APIs.

As online tools intended for public use, our WEmap programs handle mostly data that is available to the public in other formats. However, the data and coding for the online tools themselves are protected from unauthorized access through firewall technologies and WordPress security functions. The database which hosts all the job postings that populates WEmap jobs is also protected in its design by only accepting requests for modifications from specific IP addresses.



WEmap jobs displaying a bus route from user's current location to a job opportunity and all childcare centres in Windsor-Essex.

Enlisting the Support of a Developer

Depending on what your users need the tool to do, and depending on the budget and resources you have allocated to your mapping tool project, you may wish to hire a developer to create your mapping tool. Developers can create software and write code that fill specific needs for simple and innovative interfaces for public online mapping tools, or complex analysis and display functions for internal business mapping tools. To find a developer, you can reach out to individual developers, or launch a call for proposals.

If you are considering enlisting the support of a developer, think about the following:

Does the mapping tool or function already exist in a free or for-purchase system, or in a system in-use by another organization? Do a scan of other organizations who might be using mapping systems similar to the one you are conceiving. Your search might reveal online or desktop software that fulfills your desired function, either for purchase or even for free.

Are there more cost-effective options? Once you have a list of potential options to create your tool (developers, software, internal staff time), consider whether contracting a developer is the best option within your budget. Will the developer be able to create something more valuable for you than an existing tool for the same financial resources? Will you get more value if you enlist the support of a developer to customize your tool? Can you employ the computer programming or GIS skills of staff on your team, or is it worthwhile (given the scope of your project) to employ another team member with these skills to develop and maintain your tool?

Is the developer you are considering familiar with your business type? The value of a developer's work is also tied to their experience working with businesses, organizations, or agencies like yours, and their experience developing tools like the one you are requesting. Being able to trust that your developer can deliver what you are looking for is immensely valuable.



What we learned...

For Wemap jobs and Wemap census, we wanted tools with several customized functions, and with an interface and aesthetic that was simple to use and in-line with the functionality and aesthetic of other existing tools we have developed for job-seekers. To develop both new Wemap tools, we enlisted the support of an independent developer, Jason Pomerleau (jasonpomerleau.com).

We made our decision to contract this developer's service because we had worked with him previously as our website developer, and our stakeholders responded positively to other tools he had created, including WExplore. Beyond the existing relationship and knowledge of our organization's work, his quote was fairly priced.

The innovative value and programming skill of our developer was integral to the development of a tool that fit our expectations. For example, for Wemap jobs, our developer created a set of interacting programs that leads to display jobs and jobseeker services by geography.

As much as your organization relies on a developer's technical knowledge, skills, and abilities to execute your mapping project, the best developers rely on your staff's subject matter expertise to help guide the creation of the tool. Finding a developer who can work with your staff and apply their expertise to the mapping tool is a winning combination.

OTHER TIPS

- If you need to develop a new program to achieve the objectives of your tool, but don't have the budget for a professional developer, explore if you can partner with computer science students at a local university or college.
- If you are working with multiple softwares, hardwares, and online platforms, professional developers can help your organization integrate these components and maximize the efficiency of your data management and analysis activities.

DEVELOPERS IN WINDSOR-ESSEX

If you're looking for a developer in Windsor-Essex, you may want to consult with technology associations/cooperatives such as WEtech Alliance or Hackforge. Below is a list of local developers known to our staff:

- AlphaKor
- P42 Systems
- Splice Digital
- jasonpomerleau.com
- Red Piston
- Next Dimension

User Experience

A digital mapping tool for spatial data should fit within the skills of its users. If you are incorporating a GIS software for your internal work, ensure that the staff who will be working with the tool will be able to carry out its functions with the skills they already have, or with training they can receive in order to use the tool effectively. Since internal tools are often used for analysis of data that leads to service and business decisions, it is valuable to include features that expedite this process, such as the generation of automatic, downloadable data reports.

If you are creating an online tool for the general public, it should be simple and intuitive enough for a novice internet user, and it should be pleasing enough to look at and use that it encourages regular use of the tool. An online tool for the general public should:

Run quickly on average operating systems: How quickly does your mapping tool load? Efficient programming and low data loads promote fast load times and pleasant user experiences. Ensuring your tool runs quickly on a variety of operating systems will ensure that it is accessible to your target audience, and that they have a pleasant experience with the tool.

Display digestible quantities of information at once: Overload of information prevents your users from finding the information they need, and impedes a positive user experience. One way to personalize the experience of users is to include features that optimize the presentation of relevant information to the user, such as user-defined logins.

Be pleasing to the eye: Mapping tools meet their goals if they are able to effectively highlight information relevant to users. Colours, symbology, and other aesthetic elements can help serve this purpose. To indicate key information or locations, use colours that will stand out. Ensure that colours used to indicate locations are consistent with any external brand colours, and be sure to also use colours, icons, and fonts generally that are in-line with your own brand strategy.

Be simple and intuitive: When users interact with the tool, does it do what they expect? An online tool for the public should be simple enough that its use feels natural and intuitive. Testing the tool will reveal what aspects you will need to modify to meet this standard.

Allow users to learn more: An online tool has the benefit of being connected to the internet. Incorporating re-directs to external webpages can help your tool achieve its goal of connecting users with the services, businesses, job opportunities, or other information they are looking for.



What we learned...

The two existing WEmap tools are targeted to separate audiences, and their design reflects the needs of these two sets of users.

WEmap jobs is a tool designed for jobseekers looking for opportunities in Windsor-Essex. This target audience is particularly broad, including current residents of Windsor-Essex, prospective residents, newcomers, students, people re-entering the workforce, and those already in the workforce exploring alternate career opportunities. Our audience for this tool informed its design and functionality in many ways:

- We kept the data load low and worked with our developer to ensure that the tool was mobile-friendly.
- We kept the level of language simple, minimizing use of acronyms and technical language so that it was accessible to individuals with varying literacy levels.
- We used recognizable colours and icons to display external organizations on the map, for example we displayed Service Ontario.

WEmap census was designed to be used by social service providers, local businesses and employers, researchers, policy makers, and government agencies. For this tool, it was not necessary to maintain a basic language level, nor was it necessary (or even desirable, due to the high data load) to include mobile-friendly functionalities.

Both tools use colour and design to highlight important information to users, firstly by selecting brighter colours for key locations (i.e. bus routes, community services, census tracts, etc.), and secondly by muting the colours of background information serving to orient users (e.g. roads, waterways, neighbourhood names, etc.). We prioritized the aesthetics of these tools, ensuring that they are pleasing to look at and in-line with our branding strategy.

For both of these tools, we involved several working groups consisting of leaders in education & employment service provision, business, and government in the Windsor-Essex region to provide input in laying the foundation for the tool, and feedback as we were adding data and features to both tools. We included these consultation sessions within our regular meetings with these stakeholders.

Testing your Tool

Before finalizing the development of your mapping tool, testing it along the way with its intended users is a critical step in ensuring it meets its objectives. Leaving ample time for testing your tool will allow you to develop a tool that does not leave your users with questions, or yearning for more information or features that could have been incorporated within your project scope.

If you are working with an internal mapping tool that is based on a for-purchase software, ensure that the staff who will be using the tool can test it before committing to purchasing a license for the software. If you are working with a developer to create an internal tool, take note of feedback from test runs to inform how you and your developer will move forward from there.

If you are creating a tool that is intended to be used by the public, there are a number of ways you can test your tool with your users:

- Have members of your staff who are not involved in the project test your tool and give you feedback.
- Share a demo version with users in a focus group, or with individuals who agree to complete a feedback survey.
- Use an existing group, such as a working or advisory group, to demo the tool and provide feedback.

If you are working with external stakeholders to include their data or data about their services, resources, or locations on your map, be sure to work closely with them along the way, showing how their information is displayed on the map to ensure that there is no misrepresentation.

WEmap jobs displaying information about a job posting on a mobile device.





What we learned...

To test WEmap jobs, we conducted demos with members of our working groups, representing service providers, employers, and educators. We also shared the draft tool with our project funder and key stakeholders to ensure the data being mapped was inclusive and current. By doing this we benefited from the experience of community leaders who are professionally aware of the diverse needs of the tool's users: jobseekers. Over a span of about three months, we continuously collected feedback and made improvements in order to provide the best possible tool for jobseekers. Examples of locations that were included in WEmap jobs as a result of continuously testing the tool and receiving feedback include the locations of Service Canada, Service Ontario locations, drivers licensing and testing centres, apprenticeship training sites, and the locations of elementary and secondary schools.

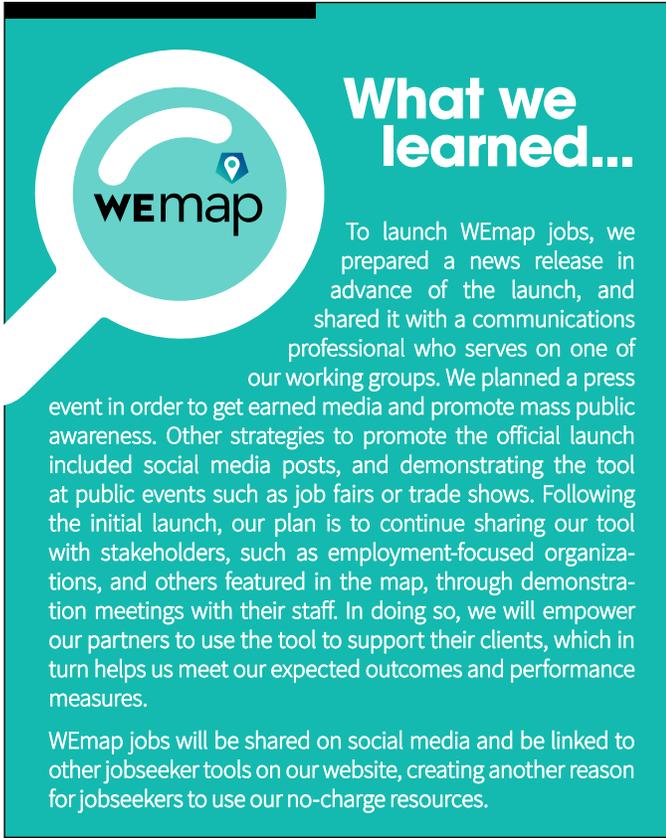
Launching your Tool

Once you have developed, tested, and revised your mapping tool, you are ready to share it with its users. Preparing for a launch for your mapping tool is especially important if you are targeting a public audience, but it is also important when introducing an internal mapping or GIS tool in your workplace.

Here are some key steps and strategies that can be applied prior to and during a public launch for a mapping tool:

- Develop a communications plan for your tool. This can include a news release to set the tone for how the public will understand your tool's utility and significance; a press event to generate mass awareness through earned media; and social media posts with tool highlights or testimonials from members of the public.
- Set up workshops and info-sessions with community stakeholders who work with your targeted users, so they are empowered to share the tool with their clients and other members of the public.
- Demonstrate your tool to members of the public at events where your organization can set up a table.
- Tie your tool in with other services you offer as an organization, business, or agency, so that users can move between related online tools.

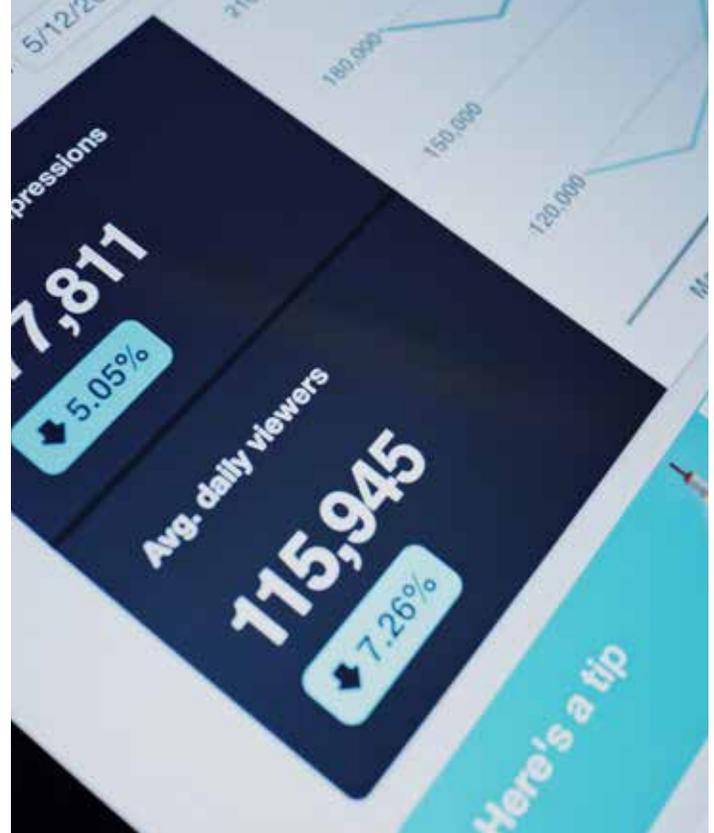
When launching a tool for internal use in your workplace, it is key to ensure that you provide any training necessary to equip staff with the knowledge and skills needed to make the best use of the mapping or GIS tool that you developed or acquired.



What we learned...

To launch WEmap jobs, we prepared a news release in advance of the launch, and shared it with a communications professional who serves on one of our working groups. We planned a press event in order to get earned media and promote mass public awareness. Other strategies to promote the official launch included social media posts, and demonstrating the tool at public events such as job fairs or trade shows. Following the initial launch, our plan is to continue sharing our tool with stakeholders, such as employment-focused organizations, and others featured in the map, through demonstration meetings with their staff. In doing so, we will empower our partners to use the tool to support their clients, which in turn helps us meet our expected outcomes and performance measures.

WEmap jobs will be shared on social media and be linked to other jobseeker tools on our website, creating another reason for jobseekers to use our no-charge resources.



Continuous Improvement

Mapping tools should aim to be as dynamic as the spaces they represent. Spatial data and locations are not the only aspects of mapping tools in constant flux: the needs of your users, the technologies available to make your tool better, and opportunities to scale your tool also change over time. Reflecting this, creators and curators of mapping tools should strategize to ensure that their tool remains relevant and useful for as long as intended. Below are a few guiding questions for you as you develop your continuous improvement strategy.

How will you update spatial data?

There are two ways you can keep your data up to date: automatic updating and manual updating. Setting up a system for automatic updating will require an upfront investment of time and resources when developing the tool initially. A developer or staff with a computer science background can set up systems to allow your tool to reference datasets that are updated on desktop or online sources.

Updating your tool manually will require you to allocate staff or volunteer resources on an ongoing basis. You will need to identify a custodian for your tool, and determine a schedule for updating your tool based on when spatial data and information is likely to change in order to be proactive. For example, if you are maintaining a tool or map that is based on Canadian census data, then you will only need to

update your tool or map every 5 years. On the other hand, if you are maintaining a mapping tool with information that changes regularly, such as job postings, you will have to set up regular updates in order to keep the tool relevant and useful for users.

How will you evaluate the performance of your tool?

Always keep your original goals in mind: what did you set out to do? What performance measures did you set? Depending on the nature of your mapping tool and your performance measures, you will evaluate success differently. These measures could include webpage traffic for an online tool, the number of links users accessed, or the amount of time saved to run a spatial data analysis.

Feedback from users also ensures that your tool continues to meet their needs. Surveys are one way you could receive feedback continuously or periodically, especially from a public or external audience. For an online tool, you can include a link to a feedback survey on a webpage related to your tool. Otherwise, you could disseminate a survey from time-to-time to determine levels of satisfaction and to receive recommendations for improvement. With either a public audience, a set of users external to your organization, or users internal to your organization, you can set up meetings or focus groups to receive feedback from users and to inform them of updates to your tool.

Staff can also be a driver of continuous improvement. Having your staff continue to think innovatively on how the tool can be improved, how new data sets can be incorporated and what problems you want to help solve will keep your mapping tool relevant and useful.

How will you scale your tool?

It may make sense to start small. Map your neighbourhood, your municipality or your region first before considering a larger geographic area. A successful launch locally, with continuous improvement, may make expansion easier since the data set and mapping tool features will be fine-tuned already. If your tool helpful to users in your region, it may be helpful to users in other areas. If it is scalable, develop your strategy on how you will keep the mapping tool assets current in other geographic areas.



What we learned...

In Wemap jobs, locations of transit routes and jobseeker services will be updated on an ad hoc basis. Our organization works with all of the organizations featured on this mapping tool, which means we are aware of changes to locations as they occur.

The success of Wemap jobs will be evaluated by whether or not it is used by jobseekers. Website analytic tools that our developer helped us create will track user activity, such as on how many users access the tool per day, how long they spend using the tool, and whether they were connected to information about a job opportunity or an employment-related service through the tool. Feedback from our partners, including employment-focused organizations, will also be considered when evaluating the tool's success.

Conclusion

We hope that these insights for developing mapping tools will help guide your organization as you explore potential projects that create value for your business or community through the analysis, management, or display of spatial information. The range and accessibility of applications for mapping tools grows rapidly with technological improvements, and Workforce WindsorEssex will aim to keep up with trends and new best practices as they emerge. We will continue to learn about the possibilities and value of mapping tools through the work of partner organizations, and through our own experiences as we build upon the Wemap tools.

GLOSSARY

Application Programming Interface (API): a software intermediary that defines how different software components will communicate with one another.

Data: consists of raw values, observations, and facts. Data can be expressed in various formats and can be quantitative or qualitative. It can be collected and stored electronically or physically.

Database: A collection of data and datasets stored electronically, usually organized and made accessible by database management systems (DBMSs).

Dataset: A collection of data, for example data stored in an electronic spreadsheet.

ESRI/Esri: an international developer and vendor for geographic information system software.

Geographic Information Systems (GIS): A framework, made up of software, hardware, data, and people, to gather, manage, and analyze spatial data. Esri provides a comprehensive overview of GIS online at the following link: <https://www.esri.com/en-us/what-is-gis/overview>

Geocoding: The process of converting spatial information, such as an address, into geographic coordinates that can be integrated in a GIS database.

Information: consists of data that has been organized and/or analyzed in a context, such that it has meaning and provides useful insights.

Spatial Data: Information about a position in space, usually stored in the database of a GIS software.

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