

3-1-2020

## **Beyond Books: Evaluating Maker Spaces in Ontario's Municipal Library Systems**

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*MPA Major Research Papers*. 197.  
<https://ir.lib.uwo.ca/lgp-mrps/197>

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## **Beyond Books: Evaluating Maker Spaces in Ontario's Municipal Library Systems**

Subject keywords: Libraries, Information Technology (IT), Performance Management, Performance Measurement, Strategic Management, Public Administration

Geographical keywords: Brant County, City of Burlington, City of Chatham-Kent, Municipality of Clarington, Town of Grimsby, Haliburton County, Lambton County, City of London, Middlesex County, City of Mississauga, Town of Newmarket, City of Ottawa, Prince Edward County, Township of Russell, City of Sault Ste. Marie, City of St. Catharines, City of St. Thomas, City of Temiskaming Shores, City of Toronto, City of Vaughan, City of Welland, Wellington County

MPA Research Report  
Submitted to:  
The Local Government Program  
Department of Political Science  
The University of Western Ontario

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March 31, 2020

## ABSTRACT

This exploratory research paper looks at how Ontario's municipal library systems evaluate their maker spaces and programming. The literature review provides context on the purpose and value of libraries, the structure and agency of municipal libraries in Ontario and academic and applied studies of program evaluation. The research seeks to answer four questions: What municipal libraries have maker spaces and what are their characteristics? How have they positioned this service in terms of purpose and value? How have they measured success? What can Ontario's municipal library systems learn from the evaluation of maker spaces to position themselves for the future? An analysis of 2018 statistical data from the Ministry of Ministry of Heritage, Sport, Tourism and Culture Industries in Ontario as well as primary documents from municipal library systems that responded to the research request are used to answer these questions. Ultimately, although outcome based frameworks were found in the literature review, this research finds that few municipal library systems in Ontario consider evaluation of maker spaces beyond participant counts and other inputs. Two examples from Toronto Public Library and Vaughan Public Library were the exceptions in providing promising outcome based frameworks. It is important for municipal library systems to continue to demonstrate their value to their municipal funders through outcome base evaluation, which will ensure they can continue to deliver on the purpose and value of libraries to the communities they serve.

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## INTRODUCTION

Municipal libraries in Ontario, not unlike libraries the world over, are facing an increasingly complex and connected digital future with questions of identity, purpose and how to continue to build on their long history of being a source for community information, access, collaboration and connection. Libraries have been described as creating or having an impact on economic, cultural and social capital as well as civic engagement in their efforts to house, source and facilitate information collection and analysis (Ferguson 2012). It has been suggested that the library as the *physical* space for *physical* books has lost its relevance; at the same time, it has been asserted that the library's importance in critical thinking and information literacy is increasingly necessary.

In 2014, the Royal Society of Canada convened an expert panel on public libraries and archives that produced the report "The Future Now: Canada's Libraries, Archives and Public Memory." On the increasingly digital future, the panel felt that:

...libraries and archives are as vital as ever to Canadian society, and they require additional resources to meet the wide variety of services they are expected to deliver. Equitable societies remove barriers between citizens and the material they need to enrich, inform, and improve their lives. (Demers et al 2014)

The Expert Panel report went on to identify a number of tools and services, including three-dimensional printing, cameras, high definition projectors, software to enable map creation, animation, publishing and even space for viewing large amounts of data, as ways libraries might evolve themselves and their communities for the digital future

beyond the physical books that have been the hallmark of library systems in the past and today. The Panel stated:

The objective of such spaces, which could be designated as a workshop for technological fabrication (known as a FabLabs or makerspaces) is to contribute to the democratisation of digital culture and to aptitudes, even entrepreneurship, which may not have otherwise blossomed. (Demers et al 2014)

Since at least 2015 in Ontario, the Ministry of Heritage, Sport, Tourism and Culture Industries has tracked the numbers of three-dimensional printers and maker spaces and the number of users of these in Ontario library systems. The Ministry's 2018 definitions document defines a three-dimensional printer as "a machine allowing the creation of a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession," while encouraging librarians to take a liberal interpretation of maker space to include things like a "digital media lab, digital learning centre, self-publishing centre, recording studio" (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – definitions). The data shows an increasing uptake of these technologies and related programming. These are programs, as the Expert Panel suggests, that expand the role of the library beyond book-lending while still within the vision of accessibility and educational efforts espoused in their purpose. However, they also represent a departure from the past focus on consumption of information to content production and creation (Nicholson 2019).

What is a maker space and what would you find in one? Based on research on Ontario's municipal library systems that report having a maker space, it can include

some or all of the following resources, tools or attributes: computers (often with design and editing software for audio and visual projects or specialized programming or robotics equipment); recording equipment (such as cameras and microphones); fabrication equipment (such as three-dimensional printers, button makers and embroidery machines); meeting space; and a range of other do-it-yourself equipment such as large bed scanners and printers and green screens.<sup>1</sup> In 2018, 134 municipal library systems in total reported having a maker space or three-dimensional printer. As three-dimensional printers are often considered part of a maker space, this data was combined for research purposes (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries - statistics 2018).

There are costs associated with these technologies, not just in purchasing and maintaining equipment but also in staff time, specialized training and space. Given the increasing pressures on municipal tax bases, the decreasing funding for libraries from the province as a percentage of total expenditure (Federation of Ontario Public Libraries 2018) and the need to ensure effective delivery of service, it is important to both municipalities and their residents (many of them property tax payers) to ensure that library programming achieves its objectives and meets the ongoing purpose of libraries for the communities they serve (Irwin and Silk 2017). Maker spaces are some of the newest manifestations of efforts to go beyond physical books and into experiential learning as a part of the library's mandate. For this reason, research that seeks to

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<sup>1</sup> This list is based on information from the primary sources in the Reference List.

describe what municipal libraries provide maker spaces and programming, how they are using these and evaluating their implementation, is relevant as libraries consider how to adapt to meet the changing needs of their users and communities, as well as funders.

This inductive, interpretivist review of the use of maker spaces in municipal library systems in Ontario seeks to answer a number of questions:

- Which municipal libraries have maker space programming in Ontario and what are their characteristics in terms of demographics, spending and users?
- How have municipal libraries positioned these programs in terms of the purpose and value of the library? How does this relate to the literature on the purpose and value of libraries?
- How have libraries measured the success of these programs?
- What can Ontario's municipal library systems learn from the evaluation of maker spaces to position themselves for the future?

Prior to seeking answers to these questions, the literature on library purpose and value, structure and agency and program evaluation provides context for understanding the use and evaluation of maker spaces in the setting of Ontario municipal library systems.

## **LITERATURE REVIEW**

### LIBRARY PURPOSE AND VALUE

In order to understand how a particular program or service fits into the aspirational goals and objectives of a library, it is important to start with a review of the role of the library in



our communities and how this has evolved over time. This is especially relevant as it can give a sense of what success is to be measured against in program evaluation.

Although focused on central libraries only, Leckie and Hopkins work on the Toronto Reference Library and the Vancouver Public Library Central Branch provides background on the meaning and role of these institutions in the cities they serve. The authors trace the evolution of the library in North America having begun with private, subscription-based services to the current landscape, with public libraries “firmly entrenched in municipalities” and asks “What is the role that is imagined for these libraries and how do they fit into the changing character of contemporary North American cities?” (Leckie et al 2002). This work acknowledges the dramatic change in the type of spaces libraries provide and how they are used in the recent decades, though the essentially public nature of the library as a place has not changed. The library remains a place where one does not have to be a customer or consumer to take up space, which would not be the case for a privately owned shopping complex, for example (Leckie et al 2002).

Though much has changed with respect to technology and society’s relationship to it since their work, their findings that place digital services and information technology in the context of the purpose of the library are worth considering for this research. Using a number of information collection methods, including a review of local news articles, academic journals, a written patron survey, face-to-face patron interviews and observational “seating sweeps,” the researchers collected information about how

patrons were using the libraries over a set period of time at regular intervals. They found that about 40% of respondents used electronic resources at the library. Other uses related to learning English or other activities as part of an immigration experience and transition, as well as activities related to employment. Supplementing the latter were those that were “involving serious projects and pursuits that could not be characterized as merely recreational” but could relate to the development of skills for future sources of income (Leckie et al 2002). These are considerations for how the ongoing purpose of the municipal library can best be expressed in programming that meets the needs of communities and its subsequent evaluation. Notably, the researchers go on to suggest that while information technology is often perceived as a threat to the traditional value proposition of the library, it is actually the incursion of private commercial activity, necessary to fund information technology in an era of decreasing public sector funding that presents the greatest threat to the library as it presents an impact to its “place identity” (Leckie et al 2002).

Taking Leckie and Hopkins work further, several other researchers have identified the library’s value as a generator of social capital, which is “strongly associated with concepts such as civic virtue, participative democracy and lifelong learning” (Ferguson 2012). Interviews with Quebec City Councillors in Gazo’s 2010 article point to the library’s role in education, culture, information, entertainment and literacy (Gazo 2010). These purposes can be as applicable to maker space activities as they are to traditional library services, and are touchpoints from which to consider potential outcomes of newer program activities. For example, many maker space resources are geared

toward facilitating “do-it-yourself” culture, which corresponds to both technological literacy and education as well as the creation of economic and social capital in terms of culture, community and sustainability. In their description of the role of libraries, North America’s Urban Libraries Council further links this to the economic capital and vitality of a city by positioning it to “make the transition from manufacturing and service economies to high tech and information economies” because of their “open structure, combined with the power of new digital collections, technology and training” (Kemp 2008).

The library’s historical position, supporting the economic and social vitality of a community by providing access and opportunity for a range of information and self-development opportunities is important to consider as it provides the context for which program and service decisions are made. How and whether programs and services meet these purposes are key to how evaluation might be meaningfully done in a way that considers the outcomes libraries aim to achieve.

### LIBRARY STRUCTURE AND AGENCY

As an underpinning to program evaluation in Ontario municipal libraries, it is important to understand the structure and agency they have to create, maintain, fund and evaluate programming. Wilson’s overview of public libraries in Canada provides this in broad strokes, including the legislative context for libraries in Ontario, which exist under the *Public Libraries Act*. She explains the structure of library operation as existing between the set legislative responsibilities to a library board, while, in most cases, being

almost entirely financially supported by municipal councils and their budgets. Municipal libraries in Ontario are within the purview of the Ministry of Culture (now Ministry of Heritage, Sport, Tourism and Culture Industries), delivering programs to libraries through the Northern and Southern Ontario Library Services, and supplemented with operating grants. This article identifies the significant challenge of funding, noting “as governments at all levels look to save money” they “often deem libraries as less essential.” Study, analysis and communication of the value of library services is therefore a critical component of municipal library services (Wilson 2008).

Because of their link to municipalities, Ontario’s municipal library systems have been subject to the vagaries of municipal boundary changes and amalgamations, structural initiatives that can have an impact on the value proposition to their communities and in turn how they evaluate the success of their programs and offerings. A municipal library with a high population density can become part of a larger system with low population density, causing a shift in focus from resources to access. In the case of the creation of Metropolitan Toronto in 1953, the library system started with a two-tier approach where “establishing priorities was an urgent need: should equalization of services across Metro be a central need or should information needs be addressed first?” Chatham-Kent, a single-tier municipality that was the result of municipal restructuring in 1998 merged ten smaller library systems into one in 1999 that served a number of smaller urban and a larger rural area but benefitted from transitional funding that mitigated the challenge of ameliorating service levels. Kawartha Lakes, also a creation of municipal restructuring in the same era amalgamated existing libraries and extended library service to areas

that had previously been without it. While savings and economies of scale was often the rationale behind these initiatives, Bruce notes that “often larger units of service and an expanded role in developing library services were determined by local reviews.” In other words, municipal restructuring has often led to a reconsideration of the purpose, role and scope of municipal libraries, which likely expanded the expectations of the service (Bruce 2010).

### LIBRARY PROGRAM EVALUATION

In their collection of work on library evaluation, Irwin and Silk make the case for the logic model approach to library program evaluation and call for a “transition from transactional measures to transformational measures” using it (Irwin and Silk 2017). As will be discussed later in this paper, evaluation of municipal library systems in Ontario is largely focused on the collection of input data collected by the province, such as the number of library cardholders and particular types of programming uptake. Using a logic model to consider how best to evaluate library programming, it is clear that inputs such as these only consider the effort put into a service, not what is actually delivered (outputs), what it means to users or participants and the larger impact it has on society, both outcomes (Irwin and Silk 2017).

With the current approach to evaluation being based on volume of patrons or participants, the research from Shepherd et al on quantifying patron time-use of a public library is useful in that it extends this to using library services (in this case books and digital video discs) to outside of the physical library. Both the original and a follow up

study confirmed the result that 90 per cent of all library use is private and takes place offsite (Shepherd et al 2015). This is an interesting finding as it could lead one to believe that evaluation of three-dimensional printing and maker spaces may be easier, as it can include on-site observation. However, it also confirms the assumption that these services are a departure from the nature of existing programming, and therefore worthy of study as materially different for evaluation purposes. To conclude that evaluation of maker spaces would be similar to book lending would be to ignore this on/off site divide.

Closter's retrospective descriptive research on public library evaluation reviews what frameworks for library systems evaluation can be used to inform the creation of a program to measure and understand its achievements in relation to the Free Library of Philadelphia's strategic plan. This work provides a foundational understanding of library evaluation using other journal articles and primary documents to draw a subjective interpretation of past experiences and hypotheses. Although it provides an American viewpoint, it draws connections between the economic constraints on municipalities (in a general sense, not specific to American local government powers and structures) and municipal funding of libraries and the value this achieves, making it relevant to the Ontario local government context (Closter 2015).

Closter's work also acknowledges a recent evolution in thinking of library performance measurement from the documentation of data like the volume and nature of the collection, to the value it brings to the community, with the consideration of the role of

strategic planning in setting up the parameters of what needs to be measured. Evaluations are characterized as measuring effectiveness (or values) and outcomes (how the values are recognized). Effectiveness has evolved from an input measurement to service-oriented models which consider social impacts, interdependency and stakeholder satisfaction. Outcomes, in contrast focus on needs assessments and changes in conditions toward strategic goals, such as the one of integration of newcomers and how newcomer-oriented programming impacts the community. The author acknowledges that outcome measures are often difficult to obtain and link directly to library programming in a complex environment. Overall this work makes the case for the connection between strategic planning and understanding goals and community needs with how measurement can be implemented, anticipated to be a key nexus for this research (Closter 2015).

Moorefield-Lang's article describes the implementation of three-dimensional printers and maker spaces in a variety of libraries and library systems with the goal of helping librarians understand success factors and considerations for application in other settings. Seeing the growth in use of three-dimensional printing and maker spaces in libraries, the author saw an opportunity to help other libraries who are implementing or considering implementing these services understand how best to achieve success with their programs. This objective is comparable to the goal of the research in this proposal. Six case studies were used to inform the findings, selected by convenience sampling, specifically librarians who volunteered after a wider call for participants. The result is an overrepresentation within the six cases of school and university libraries, with just two

public libraries and therefore has limited application for municipal library practitioners in Ontario. Participants were asked general information about the existence of maker spaces in their libraries, training techniques, funding and successes. The identified areas for improvement are twofold: the need to train library staff as well as patrons on how the technology can be used as well as funding and planning for maker spaces (including repair and replacement, as well as staff support). Although not assessed in this study, the findings go the core of how librarians and municipalities can ensure value, as without a planned approach it is unlikely that any goals expected can be achieved and measured well. Indeed, Moorefield-Lang's research suggests that within the six case studies there was no clear goal in mind when these programs began to measure success against (Moorefield-Lang 2014).

Cun et al have a design research aim in the development of assessment tools to evaluate the success of library maker spaces, focusing on one case, a central library in an unnamed "mid-sized, east coast city in the United States." Based on this and other characterizations of maker space programming in the text, one might assume that this library was chosen as it has a number of features of maker spaces that may be used in other libraries, including three-dimensional printing, virtual reality technology, media production, and others. The authors set out an assessment matrix that was designed based on a literature review, input from librarians and the data collection itself, however they found that this approach had too many variables to be useful in that it did not consider the spectrum of objectives and levels of prior knowledge of users, and the difficulty in predicting when and for how long users would attend the maker space. The



resulting redesigned matrix presented is complex as it tries to facilitate an understanding of the varying expectations of maker space participants (seeking basic to mastery level knowledge), the categories of participants (adult, child, native English speaker or not) as well as whether visits to the maker space were new or returning patrons and the type of maker space activity. Of particular note, the matrix identifies the assessment needs of the library in terms of the success or impact of the program. These include willingness to come back, change in library use (increase or decrease in participants' use of other library services) and skills mastery. Suggested tools to gather this data are visitor logs, surveys both before and after use, learning self-assessments and librarian observation (Cun et al 2019).

The challenge of this matrix may be its complexity of application in a library environment. While any evaluation of a particular program would need to consider multiple variables to be useful, this matrix might necessitate a level of expertise or resourcing in program evaluation and data collection that is not feasible for some library systems (Cun et al 2019).

For a more applied practitioner approach, Applegate provides framework options in her *Practical Evaluation Techniques for Libraries*. Library Operations Evaluation Plans (LOEPS), which set out how to measure success of daily operations (as opposed to capital projects, for example) suggests a grounding in a mission statement or strategic plan, creating a hierarchy of goals -> objectives -> measures. Measures should be chosen to ensure both coverage (to ensure that even if a measure is used to collect

many points of data related to different activities, it clearly reflects the particular activity being measured) as well as efficiency (in that it measures more than just a number of inputs but also how well a service was delivered). This is often expressed as a balanced scorecard, where fiscal, efficiency, customer and innovation measures are presented together to provide a sense of accountability to a board, funder or patron in a way that considers both the quality and quantity of a service beyond simply cost. Therefore, the measures on a balanced scorecard could include a cost of a service per capita, but also customer satisfaction rates, time to reshelve/reset equipment to be ready for another user, grant funding received for that service and employee training and turnover in that service area (Applegate 2013).

As with Applegate's framework, other literature on evaluation of library services geared toward library professionals does not specifically address how to evaluate the success of maker space programs, or, more generally, programs where the purpose relates to applied physical learning and building. However, an interesting angle to approach such efforts would be through the evaluation of the economic impact of libraries. In the book *Measuring for Results: The Dimensions of Public Library Effectiveness*, Matthews considers the economic impact of technology and employment information provided by the library. However, he proposes measures of inputs only, such as users of technology or employment information, rather than the quality of skills upgrades or new literacies, noting that, in the case of employment, "it is difficult to assert a causal link between the use of such materials and an individual being hired for a job or reduced unemployment in the community" (Matthews 2004). This is an important point to consider, as

community-level indicators such as reduced unemployment have a number of inputs, only one of which may be library programming. A library can only hope to measure the impact on direct users of its service and claim ownership of the outcome, and even then, it would be difficult to isolate all other inputs to evaluate the success of library services alone.

Taking the approach of the link between maker spaces and entrepreneurship, Eric van Holm published a 2017 study to understand perceptions of the impact of maker spaces on economic development in the American state of Georgia. Though looking at maker space clubs and not specifically resources in the library environment, he notes that “makerspaces have yet to produce substantial or tangible outputs that researchers can use to measure their contributions, such as the number of jobs produced or patents filed” (van Holm 2017). He highlights three hypotheses of how maker spaces may contribute to economic development: the generation of new entrepreneurs, especially accidental ones; increased individual innovation; and educating a region’s workforce, specifically in the mechanical arts. The results of the study indicate that there is limited evidence of maker spaces delivering on these goals. Participants lacked confidence in their creations and showed a resistance to commercializing their efforts (van Holm 2017). Although this moves into a discussion on the results of evaluation, it may also indicate the challenge of meaningful evaluation itself.

In relation to retraining and employment opportunities, van Holm noted that:

“Although (maker space) members did discuss having learned new skills and machine techniques while in the space, none expressed that it had led to a new career or field of work. At present then, workforce training is largely aspirational.”(van Holm 2017)

While the research method used by van Holm is replicable in a municipal library system – surveys of perceptions of delivering on program goals – his results may indicate that the specific successes of library maker spaces in terms of individual outcomes are difficult to isolate, and perhaps even in question.

While this review of the academic and practitioner literature on library program evaluation shows what frameworks might be applied in the Ontario municipal library setting, it doesn't describe whether or how evaluation of library programs, specifically maker spaces, is undertaken in Ontario's municipal library systems. For this, outreach to these library systems was required, as detailed in the research design.

## **RESEARCH DESIGN**

In order to understand how municipal library systems in Ontario evaluate maker spaces, information on what systems have maker spaces or three-dimensional printers was obtained from information collected and made public by the Ontario, the Ministry of Heritage, Sport, Tourism and Culture Industries on their website. This Ministry is responsible for administering funding for library systems from the Province of Ontario. The total number of library systems in the Ministry's dataset is 310. This includes not only libraries connected with lower-tier municipalities, which is the more common structure in Ontario, but also those connected with upper-tier municipalities, as well as

municipal library systems that offer contract library services to populations outside the municipal boundaries. The dataset does not include academic libraries, or library systems within school boards, unless they are part of a partnership agreement with a municipal library system. While the Ministry collects data on First Nations library systems, information on the prevalence and use of maker spaces in these libraries was excluded from this research as these systems are funded by separate provincial grants and use different governance models (Ontario Library Association n.d.). They would therefore be expected to have limited relevance to the findings or future recommendations for municipal library systems.

Along with the number of maker spaces and three-dimensional printers in each library system, the data also provides contextual information that can inform a discussion of the attributes of library systems that have these services, such as population services, number of active cardholders, holdings and locations, total operating hours and revenues and expenditures.

The province's annual survey invites library systems to share information about how they measure their services. However, a review of responses to the open-ended question "Please provide information if you measure the results, impact and outcomes of your library services including library programs" yielded limited information in general and more specifically on maker spaces (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – results).

As it was anticipated that the annual provincial statistics and document review and analysis may not provide the quality or volume of information necessary for analysis in support of the research in this paper, and the likelihood that more documented information exists beyond what is immediately available on municipal or municipal library websites, a fact-based request for information on three-dimensional printing and maker space programs was sent to libraries identified as having these services from the Provincial data. The names of Chief Librarians or their comparable position for each municipal library system is available as part of the Ontario Ministry of Ministry of Heritage, Sport, Tourism and Culture Industries annual libraries statistics release and using this information, email addresses or, where unavailable, online inquiry forms, were sourced. Both to avoid the potential for bias by individual librarians who may be reluctant to speak to the challenges of three-dimensional printing and maker space programming in an era of austerity, as well as to avoid any research ethics issues, this request was for documents only (such as reports, business cases, budgets), and not for impressions, opinions, or analysis from library staff.

The subset of 2018 Ministry data that included all municipal library systems that reported having a maker space or three-dimensional printer for programming or other use by patrons for at least one location within the system included 134 of the 310 systems. A full list of these 134 library systems is shown in Appendix A. This list of library systems, along with contact names of Chief Librarians for each, was used by the to reach out and request any available reports or documents which describe the purpose and goals of providing maker space and three-dimensional printing

programming and services as well as those that outline how the success of these is measured. The full text of the request is in Appendix B.

At the outset of the research, it was anticipated that the implementation of maker spaces in municipal libraries would be skewed toward the larger and more resourced library systems simply because of the cost of the equipment and the staffing resources required to support programming. The source of information to understand whether this was a correct assumption was to be the annual statistics from the Ontario Ministry Heritage, Sport, Tourism and Culture Industries. Prior to even considering how libraries may evaluate this programming, findings from this would potentially identify what the scope and breadth of the goals of a program might be, based on information about the populations served by municipal library systems with maker spaces.

However, the key part of this research effort was the hope that municipal library systems would have documented, and would share, one or both of the following:

1. Why they chose to provide maker space services and programming in terms which would outline the goals of the service, from which the goal outputs or outcomes could be gleaned for a logic model program evaluation approach as outlined in the literature review; and/or
2. Evaluation summaries or data from libraries on how the success of maker spaces is measured and described. This is the foundation to understanding whether

these services were indeed delivering on their purpose for the municipal library systems, and what could be learned for consideration of other non-traditional collections or services by libraries in the future. The literature review on library evaluation indicated that evaluation of such programming might be a challenge and focus more on inputs and outputs rather than outcomes, and that evaluating these services could be complex, perhaps too complex for smaller, less resourced systems.

It was expected that the degree to which program goals and outcomes were explicitly identified to funders like library boards and municipal councils, as well as the public, may be an indicator of the existence of a robust evaluation framework. Further that in such cases, this evaluation framework would be more likely to be useful when considering how best a library system can evaluate future programs and services to continue the mandate of municipal libraries in Ontario.

## **RESEARCH FINDINGS**

Municipal library systems with maker spaces or three-dimensional printers, identified as numbering 134 of the 310 total 2018 dataset of library systems in Ontario, were contacted requesting documentation of their maker space programs and services, including anything on the strategic goals associated with their implementation, if identified, as well as any evaluation completed of these programs and services. Examples of evaluation provided in the request for information were intended to be explanatory but broad in nature (“such as participation numbers or demographics,



participant feedback, outcome reporting”) to avoid any bias toward a particular type of evaluation.

Of the 134 systems contacted via their Chief Librarian or designate, 45 responded though only 22 were able to provide documents about their maker space as requested. The remaining 23 respondents indicated that they did not have any documents to share or no longer provided maker space or three-dimensional printing, which was a potential challenge given that the most recent data available at the time of the research was from 2018. Some helpful individuals provided anecdotal information about their maker spaces. However, as the goal was to obtain documented information, their feedback, while appreciated, was not included in this research. The full list of the 22 municipal library systems respondents who provided documents is captured in Appendix C. Based on a review of the resulting primary documents, an analysis was done to answer the research questions, as set out in the introduction.

*Which municipal libraries have three-dimensional printing and maker space programming in Ontario and what are their characteristics in terms of demographics, spending and users?*

The Ministry of Heritage, Sport, Tourism and Cultural Industries annual statistics for 2018 provides information on the number of three-dimensional printers and maker spaces for library systems that have these, as well as the number of users of these, active cardholders, number of branches and total local operating funding.

In general, the 2018 annual statistics highlight an 11 per cent increase in the number of programs for maker space, digital media labs and self-publishing (the latter two are often included in maker spaces as defined for this research) in Ontario libraries over 2017 figures in total. However, they also show a 6 per cent decrease in total users of programs. These indicators represent library systems that range in population served (including contracted populations) from St. James Township at 460 to the City of Toronto at 2,929,886. The average population served of municipal library systems with reported maker spaces or three-dimensional printers in 2018 is 91,937, but the median population served is 19,592, indicating that the subset of municipal library systems that have maker spaces may skew toward smaller population bases. However, the larger database of all Ontario library systems shows average population served of 44,970, with a median of 5,982. This indicates that library systems with maker spaces serve larger populations than Ontario libraries overall. (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries – statistics).

This relationship between library systems with and without maker spaces also holds true for the number of active cardholders, though is most starkly different with respect to the local operating funding comparison. On first observation it is evident that while 28 library systems in Ontario operate without any local funding (supported by Provincial grants and other sources), none of these are within the subset of municipal library systems with maker spaces. The 2018 average local operating funding for those library systems with maker spaces as compared to those without is \$2,400,504 larger, which represents a 52 per cent greater average local sourced budget. Clearly, municipalities

with library systems that have maker space programming and services are, as expected, better resourced than those without such offerings. (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics).

Chart – Municipal Library Systems with Maker Spaces - Key Indicators

Group Description	Number of Municipal Library Systems	Population (includes contracted service populations)	Active Cardholders	Local Operating Funding
		Average Median	Average Median	Average Median
<b>Municipal Library Systems that reported having maker spaces or 3D printers in 2018</b>	134	91,937 19,592	29,836 7,053	\$4,566,630 \$755,745
<b>Municipal Library Systems that responded to a request for information for this research</b>	22	298,342 81,709	96,342 25,513	\$16,017,339 \$3,545,545
<b>All 2018 Reporting Library Systems</b>	310	44,970 5,982	14,637 2,107	\$2,347,898 \$194,940

Source: Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics

Looking at the subgroup of 22 systems who provided documents in response to the research request, their representativeness within the 134 library systems that reported having maker spaces or three-dimensional printers in 2018 is indicated by similar gaps between the average and median indicators demonstrating an indication of some larger systems with more significant resources that skew the average. The average population served of the respondent municipal library systems was 298,342, while the median was 81,709. Similarly, the average number of active cardholders was 95,562, with the

median being 25,513. Perhaps not unexpectedly given these numbers, the average local operating funding for these 22 systems was over sixteen million dollars, though the median local funding was just over three and a half million dollars. (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics).

While these are indicators of the range of communities and available resources for the respondent library systems, this is also useful tool to help discern whether resourcing makes an impact on how maker spaces are envisioned within the library and subsequently measured and evaluated.

*How have municipal libraries positioned these programs in terms of the purpose and value of the library? How does this relate to the literature on the purpose and value of libraries?*

There were 22 Ontario municipal library systems that responded to the request for documentation on their maker space programs and services. Despite the literature available on how to measure and evaluate library programming, the majority of information provided by this group included program guides with short descriptions of classes or workshops, promotional material, including posters and graphics, and links to websites with further information about the types of technology they provide in their maker spaces and not any evaluation data. A smaller number of respondents provided information about the purpose and vision behind the creation of spaces for these

technologies in their libraries. This information took the form of background papers on the development of maker spaces, strategic plan documents and annual reports.

Understanding why libraries have introduced maker space technology and programming is a key part of considering how they could evaluate these efforts. The literature review on library program evaluation proposes consideration of a logic model approach with inputs, outputs and outcomes. A best practice in designing a program would be one where a sense of the outcomes sought was understood from the time of launch of the initiative, or even earlier in the planning stages. These outcomes would be expected in the strategic goal or purpose outlined for the maker space.

While the goals or intended outcomes of the creation and programming of maker space was not often explicitly outlined, it could often be inferred from the documents in how the space was characterized or who was targeted in promotion. The findings regarding the goal or purpose of the maker space fell into three broad, though not mutually exclusive categories: to promote creativity and innovation, especially in youth; to mitigate the socio-economic challenges of access to technology and promote digital literacy and inclusion; and to a lesser extent among the respondents, to promote entrepreneurship or innovation for a larger community-level economic purpose. Of note, these goals match well with the purpose and value of libraries as discussed in the literature review. Maker spaces focus on developing skills and abilities through practical application, which differs from how libraries have promoted learning in the past as being the providers of and access to information. Yet municipal library systems still view

maker space as part of the continuing effort to provide access without a commercial transaction and support the community in terms of recreation, but also other pursuits related to self-betterment. Some examples of statements in the primary documents that either spoke to program and service goals or from which these could be inferred are included below:

- “The County of Brant Public Library provides access to a wide range of knowledge and technology tools so that members of our community can continue their lifelong learning and expand their skills and creativity.” (County of Brant Public Library 2016)
- The goals of the maker space program include “provide patrons with access to digital tools, equipment and experience to explore creativity, innovation and expression; (...) introduce non-library users to ‘new library’ resources pertinent to the modern creative industry, digital literacy and e-resources.”(County of Lambton 2017)
- “Creative space in the context of libraries allows the continuation of a service, which libraries have always done well: empowering their communities by providing information, resources and connections that many individuals are not able to afford or access on their own.” (City of London 2018)
- “The Library’s Strategic Agendas have provided the framework for the development of library services. Key objectives for 2017 included the following: • Expanded Maker and STEM programs for children and teens...” (St. Catharines Public Library 2017)
- “The equipment and space is to encourage community members to become more familiar with technology and to learn to use technology in a creative way instead of simply being consumers of technology.” (City of Temiskaming Shores 2019)
- “Digital Innovation Hubs are learning and creation spaces (...) Located in eight library branches, these spaces provide access to creative tools and free classes to learn new skills.” (Toronto Public Library n.d.)

In a report prepared by Nordicity for the Toronto Public Library entitled “Technology Access in Public Libraries: Outcomes and Impacts for Ontario Communities,” the need for digital literacy and inclusion are highlighted as the purpose of technology, including maker space technology, in Ontario’s public libraries. Specifically, the report notes that “connectivity gaps remain across the province, primarily driven by lack of affordability and choice.” This is increasingly important, as skills in technology are becoming “basic requirements for active involvement in 21st century life, be it personal, civic, social or professional.” (Toronto Public Library 2018), a theme that was found throughout the literature review. Libraries have taken on this technology and provided not only access but also support through workshops and events that help increase digital literacy and skill building. However, given that this link was not made explicit in all but a few primary documents and most notably in this, one provided by the largest municipal library system in Ontario, one could conclude that more significant resources are linked to increased planning for evaluation in maker space programs. The Nordicity research pointed toward how success could be measured in light of this, a subject that will be discussed in the following section.

### *How have libraries measured the success of these programs?*

The Ministry of Heritage, Sport, Tourism and Cultural Industries annual library statistics collect primarily input-driven data on the presence and use of maker spaces in Ontario’s municipal library systems. As previously identified, 134 of the 310 library systems that report are municipal library systems with a maker space or three-dimensional printer. The province’s data also includes the number of users of “maker spaces, digital media

labs, self-publishing centres” but notably, this excludes three-dimensional printers. User numbers for three-dimensional printers are not collected as part of the annual survey. Therefore, although it is an incomplete picture, 102 of the library systems reported an average number of 4,158 maker space users in 2018<sup>2</sup> (Ontario Ministry of Heritage, Sport, Tourism and Cultural Industries 2018 – statistics).

The number of users of a program or service is an evaluation measure of the success of that program or service. As described earlier, the 2018 summary from the Ministry notes an 11 per cent increase in the number of programs for maker space, digital media labs and self-publishing) in Ontario libraries over 2017 figures in total, but with a corresponding 6 per cent decrease in total users over the same period (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics). What does this mean for the success of maker space programming in municipal library systems? As this is a measure of outputs that are a result of inputs like programs offered, it has little meaning beyond stating that people attended programs the library offered. As identified in the literature review, these evaluation measures do not capture the efficacy of the programs or the impact they have had on participants. Though this highlights a decrease in users, it fails to describe whether the participants, albeit in smaller numbers, may have benefitted by achieving one of the outcomes hoped for when the purpose of the maker space initiative was originally set out. In fact, a higher participant

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<sup>2</sup> The denominator here is 102 and not 134, because 32 municipal library systems reported having a three-dimensional printer, often considered part of a maker space so collapsed for consideration in this research, however the annual data collection does not require reporting of users of three-dimensional printers, which are categorized separately than maker spaces (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics).



number could just as easily indicate that the reach of maker space service was broad, but had little impact on participants and the community. It is simply impossible to know from this data.

The literature review revealed a number of approaches to evaluation that might be found in Ontario municipal library systems, including the volume of workshops, equipment, participants and attendees who completed a particular program and more outcome based subjective measurement done by pre- and post-experience surveys that sought information on changes to library use, willingness to come back, and knowledge and skill self-assessment and upgrades. There might also be subjective surveys of external communities about the community level impact of maker spaces at the library, though it is understood that direction correlation between these findings and the maker spaces specifically would be inappropriate as all other variables couldn't be controlled. Finally, the literature review indicated we might expect to see evaluation where a specific goal our strategic priority was identified as the reason behind a maker space initiative.

Despite the findings from the literature review, no trend or consistent approach to evaluating maker space programs and services was evident from examining the primary documents collected through the research. This could be for a number of reasons, including that maker spaces are a more recent expansion of library services and not yet the subject of evaluation efforts as a result. However, given that the Ministry's annual statistics are based on input and output models of evaluation, and that little further data

was found via the answers to an open ended question on evaluation, it may be that Ontario's municipal libraries have few evaluation practices or programs. Supporting this is that the majority of documents about maker spaces shared for this research were promotional or regulatory in nature. Promotional documents included posters advertising workshops or policies about the use of maker spaces or three-dimensional printers. The regulatory documents focused on prescribing activities that were not permitted in the maker space, limiting time per participant in order to manage availability or requiring sign off by a user acknowledging adherence to health and safety rules, intellectual property legislation and waiving claims or providing indemnification to the library system. These documents rarely spoke to the purpose or goal of the maker space, nor did they indicate any collection of information from users about the impact of their maker space experience on their lives with respect to creativity, innovation, digital literacy or socio-economic impact and skill building. Several of the promotional documents gave indications about the potential outcomes being sought through maker space programming, but these were broad and lacked detail that would help design evaluation measures on their own. For example, several documents had graphics that would appeal to youth or photos of children directly, which would indicate that a purpose of the maker space was to engage this population of patrons within the library community. However, there was little indication that evaluation of whether these populations had been engaged was completed.

There were a number of municipal library systems that provided documents that highlighted the same input and output data that is traditionally collected by libraries

when evaluating programming. For example, Chatham-Kent Public Library highlighted that in 2018, they offered 30 workshops on three-dimensional printing, which led to 321 patrons certified to use the three-dimensional printer. This led to 223 items have been printed. While it may be helpful to library boards, this type of data does not provide any analysis of what these numbers might mean for library patrons and the community. Even the drop between certifications achieved and actual three-dimensional print projects may not be meaningful, especially if, hypothetically, it represents caregivers accompanying children to the workshops, who may support a three-dimensional design and print, but not undertake something separately. (Chatham-Kent Public Library 2018). Other municipal library systems that shared data on the numbers of workshops and participants in maker space programming in response to the research request were: Lambton, Mississauga, Newmarket, Ottawa, Sault Ste. Marie and Toronto. However, it is possible that many other library systems collect such data, at least in part to comply with Ministry requirements for annual statistics.

Overall, as highlighted, the research revealed that most library systems had a purpose or goal of their maker spaces, even if it was not explicitly stated and had to be inferred. It further found that only seven of the 22 respondents shared data on participant and workshop numbers. However, there were two library systems that provided documentation about taking evaluation to a level where achievement of targeted outcomes was evident: Toronto and Vaughan Public Libraries.

As described earlier, Toronto Public Library commissioned a report in 2018 from Nordicity on outcomes and impacts of technology access in public libraries. The purpose of this report was to “develop a suite of resources designed to support public libraries across Ontario in the provision of technology services,” especially critical as recent survey results of librarians through the Ontario Library Association indicated that most decisions on technology were not based on evidence or evaluation. (Toronto Public Library 2018 – Technology and Final Report).

The result was the Bridge Technology Services Assessment Toolkit (“Bridge Toolkit”), tested through a pilot projects in a number of participating libraries in 2017,<sup>3</sup> which measures availability of technology services, the usage of these services, their outcomes and service delivery. Although the Bridge Toolkit contemplates a wide range of technology that a library could provide, the outcomes in its framework: digital inclusion and literacy (primary outcomes) as well as civic engagement, creativity and innovation, entrepreneurship and business development and workforce development (secondary outcomes) were found in both the literature review on library purpose and program evaluation and the findings from the research on maker space goals. (Toronto Public Library 2018 - Technology).

Through survey tools for participants, the Bridge Toolkit provides a series of key performance indicators for libraries to collect and therefore compare against themselves

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<sup>3</sup> The pilot group included Toronto Public Library, Innisfil Public Library, Kitchener Public Library, Windsor Public Library, Mattawa Public Library, Perth and District Union Public Library and Wikwemikong First Nation Public Library. All but Wikwemikog were included in the original research request for this paper but only Toronto Public Library responded.

year over year, as well as with other systems, to track progress towards the primary and secondary outcomes. The Bridge Toolkit could therefore help librarians consider and record the context of certain aspects of technology like maker spaces. For example, the Toronto Public Library report notes that pilot project libraries measured not just users of technology, but users who would not have otherwise had access to the technology, and further broke this down by patrons who were age 55 or older, or who identified as having a low-income. Another example of a useful outcome evaluation measure would be the finding that 26 per cent of patrons used library technology to “start, manage, or grow their business,” with 93 per cent of those representing small businesses of less than 20 employees. (Toronto Public Library 2018 - Technology). Although Toronto Public Library did not provide documentation of their specific Bridge Toolkit results, their publication of the pilot project assessment would indicate that they are likely users, and making decisions on how to deploy technology and staff resources accordingly, presumably in relation to maker spaces as well. At the very least, they are measuring beyond the traditional inputs and outputs found in most Ontario municipal library settings. Though it is impossible to ignore that Toronto Public Library is also the largest and more significantly locally funded, based on total local operating revenue. This may mean that smaller library systems, having little historical or institutional expertise on outcome evaluations, may have no resources to develop them now for maker spaces (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics).

In response to the research request, Vaughan Public Library shared a summary report of the results of their participation in beta-testing the Bridge Toolkit work in 2019,

completed through surveys of their customers. In their summary they connect their survey results with findings of overall surveys of the public perception of the library system, as well as other library systems' results for benchmarking purposes. For Bridge's primary outcome of digital inclusion, this allowed Vaughan Public Library (VPL) to conclude the following when evaluating their technology services overall (including maker spaces):

“...when comparing to other libraries in Ontario, 49 per cent of customers indicate that VPL provide them with access to technology they don't have, as opposed to 53 per cent. This is expected as the participating libraries include the smaller, more rural areas where customers depend on libraries to access various technology.” (Vaughan Public Library n.d – Bridge)

And on digital literacy, Vaughan Public Library was able to measure the quality of learning by asking patrons about their change in levels of comfort with technology, noting that “more than 50% of the customers have reported that they have become ‘to a greater extent’ or ‘a lot’ more comfortable using digital technologies after using VPL's services.” (Vaughan Public Library n.d – Bridge)

The Bridget Toolkit appears to be still in its infancy, considering it was in beta-testing in 2019 and there were no other municipal library systems that replied with Bridge assessments in response to the research request. However, both as a tool that tries to link use with changes in patron behavior, comfort or skills, as well as something that can be used by all library systems, it has great potential to improve the quality of maker space program evaluation in the next few years as it hopefully builds toward a common usage and a standard to work toward.

Vaughan Public Library also provided an Edge Assessment Report, intended to assist “libraries with aligning their technology resources to community priorities” a key concept in the logic model of program evaluation discussed earlier. (Vaughan Public Library n.d. – Edge). Edge was developed by the Urban Libraries Council in the United States, which also cites Toronto Public Library as a participant on their website. (Urban Libraries Council n.d.). The report references the assessment tool having been used in 30 library systems in Ontario for comparison purposes. It differs from the Bridge Toolkit in its approach as it a framework against which libraries can self-evaluate, rather than by engaging directly with patrons and program participants through surveys. Vaughan Public Library’s Edge Assessment Report highlights how they offer one-on-one technology support at all branch locations and annually update their accessibility goals, as well as conducting an annual community needs assessment. Overall, Vaughan Public Library uses the Edge framework to measure inputs rather than the results or effects of those efforts. (Vaughan Public Library n.d. – Edge). As characterized on the Urban Libraries Council website, Toronto Public Library’s Edge assessment helped to align efforts with overall strategic goals and municipal initiatives. (Urban Libraries Council n.d.). While this approach does not emphasize the focus on outcome indicators of the Bridge Toolkit, it promotes the connection between strategic planning and operational planning that the logic model approach to evaluation promotes.

Again, it is significant to note that among Ontario municipal library systems that responded to the research request for primary documents, itself a group representing

some of the larger, more resourced systems on average, that the two systems who provided information on promising evaluation frameworks were themselves above average in this regard as well (Ontario Ministry of Heritage, Sport, Tourism and Culture Industries 2018 – statistics). Therefore, the conclusion from this research is that there is a correlation between larger municipal library systems with significant local funding and those that have practices for evaluating program outcomes. However, one might hope that if library systems with the resourcing to accommodate evaluation framework development do this, that these frameworks will be available to smaller systems for their use, limiting upfront expenditures for development.

*What can Ontario's municipal library systems learn from the evaluation of maker spaces to position themselves for the future?*

A key finding of this research was that Ontario's municipal library systems rarely evaluate maker space programming and services in order to determine whether they are delivering value and on the goals and outcomes they are intended to achieve. Indeed, it may be that some have created a maker space initiative without consideration of these goals and outcomes, given that in many cases, the research had to infer this purpose from promotional documents. To be fair, this is likely not uncommon for many municipal services, nor is it always possible to resource properly in smaller systems with fewer resources to be able to provide this type of strategic planning. This is a perplexing finding given the significant literature on the library's ability to generate social and economic capital and discussion on how best to measure it. However, given the financial constraints of municipal governments, who are generally experiencing a trend



of downloading of services on to the municipal property tax base with few other revenue tools to offset increased expenditures, evaluation should be a key part of all services as municipal library systems look to the future. This will help to ensure that library funding demonstrably delivers on important strategic goals of the library service and the larger community.

The Bridge Toolkit, having been newly created and tested in the Canadian context, is a good option to for municipal library systems as is an approach where there is potential for libraries in Canada to coalesce – giving a potential added benefit of evaluation, that being benchmarking progress against others to find new and innovative ways to approach technology programming. This comparative information is a valuable mechanism for librarians to communicate value to library boards, and in turn for library boards to communicate the library's value to their ultimate funder, municipal councils who often begin a proposition by asking what others are doing. It can also serve as a mechanism for all municipal libraries to communicate to their stakeholders about their concern on delivering value for tax dollars beyond the number of books on shelves, but more importantly, in terms of relevance to the community.

Based on the research, the Bridge Toolkit is the current best practice in the field for evaluation of technology programs and services for Ontario's municipal library systems, and maker space specifically, as it considers the outcome level measurement missing from other approaches currently being used. This represents a more practical and yet still worthwhile approach than the most thorough evaluation found through the literature

review. The assessment matrix proposed by Cun et al was complex and tested in only one American library setting, putting it at a disadvantage (Cun et al 2019). Given the significant work done to develop the Bridge Toolkit, it is a lost opportunity for Ontario's municipal libraries to pass up this option to demonstrate accountability to funders.

There are three potential challenges facing libraries with maker spaces that provide further pause for reflection on what can be learned from this research as libraries continue to evolve: municipal restructuring, commercialization and privacy. As stated earlier, Bruce noted that municipal restructuring often leads to larger service units and an expanded library service portfolio (Bruce 2010). At the same time, there may be increasing pressure to find other funding sources, especially for programs that require a capital investment in technology. Leckie et al identified that it was the resulting commercialization of the library has an impact to the identity of the library, specifically its societal role in participative democracy and civic engagement (Leckie et al 2002). As municipal library systems move forward in an increasingly digital landscape and with the potential for municipal reorganization a seemingly cyclical issue, it will be important to ensure that a balance can be achieved between the operational imperative and associated financial constraints alongside maintaining a strategic line of sight with the role of the library in its community, in respect to maker space and all programming.

Finally, as an important piece of the library's role in civic life and democracy, libraries should consider how evaluation can be undertaken in a manner that protects the privacy, a tenet of democracy. It may be a challenge to balance the need to collect

information from participants through surveys to understand value and impact (and therefore outcomes) of library programming while managing, or trying not to collect personal information. However, evaluating in a way that does not infringe on patrons interest in protecting their data, whether that be personal identifiers, or as part of aggregating economic impact, will help preserve the ongoing status of libraries as trusted institutions in our communities (Macrina 2019).

## **CONCLUSION**

As Ontario's municipal library systems continue to increase and expand maker space programming and services in their communities, there is a need to ensure that consideration of how these deliver on their promise of increased digital access and literacy, engagement of targeted library demographics and economic impact through innovation and entrepreneurship is measured.

Although the research indicates that maker spaces are in municipal library systems that are, on average, larger and better locally funded than all libraries in Ontario, there was not a clear pattern that would indicate more resourced libraries have better evaluation mechanisms or practices, despite the two outliers, Toronto and Vaughan, who shared more robust practices. Based on information collected from 22 respondent municipal library systems, there is an opportunity to establish a practice of evaluating the successes, and failures, of maker spaces in order to demonstrate value to funders and

continuously improve library services. Initial use of the Bridge Toolkit is a sign that there is a meaningful standard available that is both tailored to the Canadian context and will provide key performance indicators across the industry that will have been consistently collected and applied.

As local governments in Canada face the opportunities and constraints of the future, whether they be financial and resource challenges or expanding expectations in a global and interdependent world, municipal libraries cannot expect to be unaffected. Maker spaces take the services traditionally provided by libraries a step further by enabling an applied aspect to learning beyond the books and documents that have historically been the purview of the municipal library. Historically, Ontario's municipal libraries have measured things like the number of cardholders or program registrants to demonstrate their value in the community. As maker space technology expands in municipal libraries, there is a risk of investing limited funding in the capital requirements and program development resources for maker spaces as part of a passing fad rather than the continuing application of the library's mandate to meet contemporary digital needs. Outcome based evaluation of these programs and services should be a greater focus for Ontario's municipal library systems to ensure that the library, municipal councils and the communities they serve understand and experience its ongoing purpose and value to ensure their long-term viability and support as an institution.

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## Appendix A – 2018 Municipal Library Systems with Maker Spaces and/or Three-Dimensional Printers

Ajax  
Armstrong Twp  
Assiginack Twp  
Aurora  
Barrie  
Belleville  
Blind River  
Bonnechere Union  
Brampton  
Brant County  
Brantford  
Brockville  
Bruce County  
Burk's Falls, Armour & Ryerson Union  
Burlington  
Caledon  
Cambridge  
Centre Hastings  
Chatham-Kent  
Clarington, Municipality of  
Cochrane Public Library Board  
Cornwall  
Dryden  
Ear Falls Twp  
East Ferris  
East Gwillimbury  
Elgin County  
Englehart  
Essa  
Fort Erie  
Fort Frances  
French River  
Gananoque  
Georgina  
Gravenhurst Public Library  
Greater Madawaska Twp  
Greater Sudbury  
Greenstone  
Grey Highlands  
Grimsby  
Guelph  
Haliburton County  
Halton Hills  
Hamilton  
Hastings Highlands Twp  
Hornepayne Twp

Huntsville  
Huron County  
Huron Shores  
Ignace  
Innisfil  
James Twp  
Kapusking  
Kenora City  
King Twp  
Kingston-Frontenac County  
Kirkland Lake  
Kitchener  
Lambton County  
Larder Lake Public Library  
Laurentian Hills  
Lennox and Addington County  
London  
Magnetawan Twp  
Manitouwadge  
Marathon  
Markham  
Markstay-Warren  
Mattawa  
Mattice-Val Cote Twp  
Middlesex County Library  
Midland  
Milton  
Mississauga  
Mississippi Mills  
Moonbeam Twp  
Newmarket  
Niagara Falls  
Niagara-on-the-Lake  
Nipigon Twp  
Norfolk County  
Oakville  
Orillia  
Oshawa  
Ottawa  
Owen Sound & North Grey Union  
Oxford County  
Pembroke  
Penetanguishene  
Perry Twp  
Perth and District Union  
Perth East  
Pickering  
Port Colborne  
Powassan & District Union Public Library  
Prescott  
Prince Edward County

Prince Twp Public Library  
Renfrew  
Richmond Hill  
Russell  
Sault Ste. Marie  
Schreiber Twp  
Sioux Lookout  
Smooth Rock Falls  
South Algonquin Twp  
South River-Machar Union  
St. Catharines  
St. Joseph Twp  
St. Marys Public Library  
St. Thomas  
Stormont, Dundas & Glengarry County  
Stratford  
Sundridge-Strong Union  
Temagami  
Temiskaming Shores  
The Blue Mountains  
Thorold  
Timmins  
Toronto  
Uxbridge Twp  
Val Rita-Harty Twp  
Vaughan  
Wainfleet Twp  
Waterloo City  
Waterloo Region  
Welland  
Wellington County  
West Nipissing  
Whitby  
Whitchurch-Stouffville  
White River Twp  
Whitestone-Hagerman Memorial  
Windsor

Source:

Ontario Ministry of Heritage, Sport, Tourism and Culture Industries. (2018) Ontario Public Library Statistics. <https://www.mtc.gov.on.ca/en/libraries/statistics.shtml>

## Appendix B – Text of Research Request

From: Lise Conde [lconde@uwo.ca](mailto:lconde@uwo.ca)

Sent: February 9, 2020 4:07 PM

To: Lise Conde [lconde@uwo.ca](mailto:lconde@uwo.ca)

Subject: Fw: 3D Printers and Makerspaces

Hello, I am following up on my earlier request for information about 3d printers and makerspaces in your library system (see below). If you have already replied, many thanks for your assistance! If you have anything that you can share, I would greatly appreciate receiving it by Friday, February 14.

Thanks,

Lise

From: Lise Conde [lconde@uwo.ca](mailto:lconde@uwo.ca)

Sent: January 28, 2020 11:05 AM

To: Lise Conde [lconde@uwo.ca](mailto:lconde@uwo.ca)

Subject: 3D Printers and Makerspaces

Good morning:

I am a student in Western University's Master of Public Administration program and am currently doing research on makerspaces and 3D printers in municipal libraries.

According to the Ministry of Heritage, Sport, Tourism and Culture Industries 2018 Library Statistics, your library has one or more maker spaces or 3D printers.

To inform my research, I'm looking for public documents that outline the purpose and goals of providing makerspace and 3D printing programming and services. I am also looking for any documents that outline how you may have measured the success of these initiatives.

I anticipate the kind of information I am looking for would be in, for example:

- Business cases you may have written to seek funding for makerspace and 3D printers
- Promotional material for your makerspace or 3D printing programs that describe their purpose for library patrons
- Annual reports which provide information on your makerspaces and/or 3D printer programming and use.
- Reports to your Library Board, Council or others about the use of your makerspace(s) or 3D printer(s) such as participation numbers or demographics, participant feedback, outcome reporting.

I am happy to receive email attachments or links to online information as it may suit you. Should file size be an issue, please reach out and I will make arrangements.

Please reply to me directly at this email address – no need to reply all.

Thank you in advance for your assistance with this research. Should you have any questions, I can be reached at [lconde@uwo.ca](mailto:lconde@uwo.ca). If you would like to be made aware of the results of this research, please indicate this in your response.

Lise Conde

## Appendix C – Respondents to Research Inquiry – 2018 Library Statistics

<b>Municipal Library System</b>	<b>Population Served</b>	<b>Number of Branches</b>	<b>Active Cardholders</b>	<b>Local Operating Funding</b>
Brant County	30781	5	11051	\$1,984,457.00
City of Burlington	176,120	7	96821	\$10,715,757.00
City of Chatham-Kent	102042	11	31889	\$4,189,519.00
Municipality of Clarington	98550	4	38368	\$3,077,044.00
Town of Grimsby	27314	1	7010	\$889,790.00
Haliburton County	18062	8	8554	\$860,972.00
Lambton County	126638	25	34360	\$6,604,499.00
City of London	387275	16	168344	\$20,263,640.00
Middlesex County	74579	15	20563	\$3,927,053.00
City of Mississauga	775000	18	212366	\$26,550,478.00
Town of Newmarket	88512	1	23645	\$3,244,237.00
City of Ottawa	934243	33	308880	\$45,101,512.00
Prince Edward County	24735	6	6247	\$1,150,156.00
Township of Russell	16520	2	7095	\$608,548.00
City of Sault Ste. Marie	81709	2	18159	\$2,532,209.00
City of St. Catharines	133113	4	62903	\$5,398,960.00
City of St. Thomas	42172	1	14124	\$2,347,431.00
City of Temiskaming Shores	11890	2	2780	\$413,225.00
City of Toronto	2929886	100	912991	\$187,141,406.00
City of Vaughan	334499	10	76371	\$16,817,325.00
City of Welland	52283	3	12456	\$2,131,017.00
Wellington County	97610	14	27381	\$6,432,218.00

Source:

Ontario Ministry of Heritage, Sport, Tourism and Culture Industries. (2018) Ontario Public Library Statistics. <https://www.mtc.gov.on.ca/en/libraries/statistics.shtml>