

Moving Towards Value-Added Digital Repatriation in Lexicography for Indigenous Languages in Canada

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Abstract

The field of documentary linguistics has developed rapidly over the past several decades, with the identification of a range of best practices covering nearly every step in the process from community consultation, to methods for gathering data, to standards for metadata, to proper archiving of the finished corpus. Significantly less attention has been paid to the steps which could – and should – come after the depositing of materials in an archive. In this paper, we explore the question of the value-added digital repatriation of the data collected by fieldworkers. By this, we mean not just providing community members with access to the materials through a well-designed and properly safeguarded archive, but the use of those data to create resources which can directly support the maintenance, revitalization, and long-term sustainability of the language.

We will explore this topic within the domain of electronic lexicography by reporting on a comprehensive survey of the state-of-the-art in online dictionaries for Indigenous languages in Canada. Lexicographic resources have been a core product of linguistic fieldwork since the earliest days of the field, and dictionaries are among the most sought-after resources by learners and teachers of endangered languages. Nonetheless, our survey shows that online lexicographic resources for Indigenous languages in Canada vary widely across a wide range of dimensions, including their scope, their structure, their incorporation of multimedia, their provision of grammatical information, and their integration with corpora, among many others.

We propose that learners and teachers of endangered languages would benefit most from a multimedia online resource which is not strictly lexicographic in the traditional sense, but which integrates lexical information with grammatical information and contextualized usage examples – in other words, a digitally-integrated Boasian trilogy. To date, very few of the online resources for Indigenous languages in Canada begin to approach this ideal. In most cases, this is not due to a lack of existing linguistic documentation or even of published linguistic resources for these languages (which in some cases are quite voluminous and comprehensive). Rather, the problem lies with the lack of a framework for integrating the large amounts of lexical, grammatical, and textual information which linguists have already collected over the past century, and presenting it in a manner which is accessible and interpretable by community members seeking to use, teach, and learn the language.

Our paper concludes by identifying and describing some of the online resources which have come closest to realizing this integration of texts, grammar, and lexicon, and how they can serve as a model for the development of further such resources by tapping into the documentation already available for most Indigenous languages in Canada. We also identify some of the challenges to meeting this goal, including the need for expanded training opportunities for both field linguists and community language activists in the creation, deployment, and use of such next-generation online resources.

Introduction

The physical repatriation of both human remains and cultural artifacts from museums to the Indigenous communities from which they were originally taken has been an important and ongoing part of the reconciliation process between academics and the communities where they work. Repatriation is often challenging and time-consuming, fraught with a wide range of legal and ethical concerns. One of the frequently encountered practical concerns is the proper curation of rare and irreplaceable items of cultural heritage, especially for

communities that may lack the facilities and resources needed to ensure their safe-keeping.

In recent years, the practice of digital repatriation has garnered attention as one possible solution to this problem. Digital repatriation involves producing digital documents (photos, sound files, etc.) of cultural heritage items and supplying the communities from which the items were originally taken with those files. The items themselves, however, remain in possession of the museum for long-term professional curation.

In this paper, we borrow this term from museum studies and adapt it to the domain of under-resourced and

endangered languages. In this context, digital repatriation refers to making linguistic resources available to community members in a digital format. Specifically, these are resources that have typically been gathered and developed by outside researchers.

A basic level of digital repatriation is achieved when documentary and descriptive resources are placed in an archive where community members may discover them. Such resources might include unedited audio files from a dictionary session, a transcribed text of a traditional story, or a sketch of a reference grammar, among numerous others.

This type of digital repatriation is becoming ever more common nowadays, so in this paper we will focus on the next steps in digital repatriation. These steps involve adding value to the digitally-repatriated object, making it more useful to community members than the original documentary or descriptive resources would have been on their own.

Specifically, we will examine the notion of value-added digital repatriation as it relates to online lexicographic resources for Indigenous languages in Canada. Within this context, we put forward five levels of digital repatriation: accessibility, basic digital functionality, integration, customizability and community control. Our comments are informed by a recent survey we conducted of 18 current online dictionaries for Indigenous languages in Canada (links to these are provided at the end of the references section), as well as the first author's experience in working on lexicographic projects in several North American Indigenous communities over the past 20 years.

Accessibility

As mentioned above, the most basic level of digital repatriation involves making resources available in a digital format to community members. Great strides have been made in this area over the past two decades, and nearly all language documentation projects now have a data management plan that ensures that community members will have access to all the resources that stem from the project, including both the raw documentation of the language, as well as any secondary descriptive resources that result.

Nonetheless, challenges remain in achieving this basic level of digital repatriation. Common issues involve a time-lag in the archiving of resources, difficulty with meta-data protocols, and concerns over access controls. Moreover, many resources endure from earlier decades – some published, others not – which have great

potential value for community language revitalization efforts, but which remain essentially unavailable in digital format.

In the first author's experience, community language activists, faced with limited access to such resources, have often taken matters into their own hands, scanning these older resources and sharing the resulting PDFs with others in their group. Because they are not the copyright holders, it can be risky for community members to make files of this type easily accessible, and so the material is often passed around on thumbdrives, and made available to individuals on a need-to-know basis.

While achieving the first level of digital repatriation is a time-consuming challenge in and of itself, we discuss four ways in which value can be added to those repatriations below, specifically with respect to lexicographic material.

Basic Digital Functionalities

Despite being established as a field for decades (Burke, 1998), electronic lexicography has struggled to carve out a niche for itself as a distinct sub-discipline, separate from its predecessor: the print dictionary tradition (Prinsloo, 2012; Lew, 2012; Granger, 2012). Critical approaches to current online dictionaries argue that many are little more than digitized print dictionaries. Tremendous advancements are possible using the digital medium that “can radically transform every facet of dictionary design and use” (Granger, 2012:2), if digital lexicographers leave behind the restrictions of print dictionaries and look to the ever-evolving possibilities afforded by the digital medium (Lew, 2012:361).

Key among the basic digital functionalities that one might expect for an online dictionary is information access and retrieval – namely, the ability to look words up. For our discussion below, we divide this process into search methods and search results.

Search Methods

While print dictionaries are almost always organized alphabetically, digital dictionaries typically make use of a search function that allows the user to input a word they would like to find (or, for bilingual dictionaries, its equivalent in translation). Of the 18 online dictionaries of Indigenous languages in Canada examined in our survey, 15 (83%) have a search function; the others simply provide alphabetized lists of words through which the user can scroll.

While the majority of online dictionaries have a search function, the degree of sophistication in the search functionality varies quite a bit. For example, six of the dictionaries offer incremental search, where, as users type in their query in the search box, a menu drops down which suggests possible headwords or search terms with those letters that the user has already typed in (Prinsloo, 2012:136).

Only three of the dictionaries offer fuzzy matching – the ability to guess what the user wanted to see should their search not match one of the dictionary’s existing headwords exactly. The failure to match may be the result of a user’s typographical error, or simply that the word is absent from the dictionary. The advantage of fuzzy matching is that instead of returning a failed search with “zero matches”, the dictionary provides some suggestions for possible matches, which at least gives the user a place from which to start.

Search Results

The second step of the digital search process, information retrieval, also varies widely among the dictionaries in our sample. One key area of variation is the optimization of the list of search results that is returned to the user. Optimized search results help the user find the information for which they are looking more quickly. Typically, this involves prioritizing whole-word matches over partial matches and presenting those first among the search results. Likewise, a match in the headword of an entry would be given preference over a match in the body of the entry (perhaps in an example sentence). Unoptimized search results are typically displayed alphabetically, or in an order that appears random to the user (though it may in fact be based on the order in which the software encountered matches during the search process).

In our survey, only seven dictionaries of 15 (47%) had their search results optimized to place the best matches first in the search results list. With the others, users are obliged to sort through a potentially long list of entries to find the best fit for their search.

In summary, while basic levels of search functionality were available for nearly all of the dictionaries in our survey, there is still room to add greater value to many of the resources in terms of more sophisticated search methods and optimization of the search results.

Integration

Beyond creating an online dictionary with basic digital functionalities, further value can be added to the resource through integration with other resources. We discuss three major types of integration below: documentary, cultural, and pedagogical integration.

Types of Integration

Documentary Integration The first type of integration is documentary in nature, by which we mean that an online dictionary exists not simply on its own as a lexicographic resource, but that it is deeply integrated with other documentary resources, ideally both a grammatical description and a text corpus. In terms of integration with a grammatical resource, entries in the dictionary cross-reference appropriate sections in the grammar, providing richer information on the word in which the user is interested (e.g. discussions of the derivational morphology, tables of inflectional paradigms, descriptions of relevant morphophonemic alternations, etc.). With respect to the corpus, the entries contain contextualized usage examples from texts of various sorts. In this way, the dictionary, grammar and corpus act together as a unified digital integration of the Boasian trilogy (Rice, 2011:192).

Cultural Integration A second type of integration can be termed “cultural integration”. Here, the online dictionary is linked in with other encyclopaedic resources which provide relevant information on the traditional and modern cultural practices of the community. This could include images of material culture, maps of traditional land use areas, audio files of songs, and descriptions of various cultural events. While some of these elements are commonly found in more extended online dictionary entries, the idea here is that this information would actually be housed as a separate resource of its own (as an online cultural encyclopaedia, for instance), with which the online dictionary is connected.

Pedagogical Integration A third type of integration may be termed pedagogical integration. This is the case where the dictionary is integrated with online language lessons or a computer-assisted language-learning (CALL) application (Granger, 2012:5).

The Value of Integration

The concept of integration is of particular importance for under-resourced languages, as any lexicographic resource must act in some sense as an all-in-one tool (Prinsloo, 2012:127). Where there is a plethora of resources, as for many majority languages, users can

shop around and choose from a variety of options that best suit their needs. However, for under-resourced languages, this is not an option, and so it behoves the developers of resources that could work together to integrate them in the ways imagined above, and thereby improve their efficacy in supporting language maintenance, revitalization, and sustainability.

Online dictionaries are uniquely suited to meet these goals of integration, given their capacity for nearly unlimited information, along with cross-referencing and retrieval of this information. And yet, as we mentioned above, current practices in online lexicography still frequently treat the online dictionary as a stand-alone resource, much like a print dictionary. Nonetheless, our survey shows there are some signs of movement in a positive direction.

Survey Results

When we evaluated the level of integration in our sample of 18 dictionaries, we considered additional options that the resource provided for the use of its linguistic information. The two options offered were CALL (available in four dictionaries) and literacy tools (available in one). Examples of rudimentary CALL among these dictionaries are flash cards (in any of Waldayu's dictionaries, the user can bookmark particular words, and then study that set of words with simulated flash cards) and language games (FirstVoices uses the uploaded words in its dictionaries in word searches, hangman, matching games, and others, as well as offering a label maker and flash cards). The literacy tool offered by the one dictionary, *itwêwina* (for Plains Cree), is a reader plug-in. With this plug-in installed on a browser or website, the user can click on a word in Plains Cree appearing on the page, and the word will be deconstructed and its English translation shown in a pop-up window, allowing seamless access to the relevant lexicographic information (Johnson et al. 2013:65).

Six of the 18 dictionaries offered information about the language's grammar, and one was integrated with a corpus. Five of the six dictionaries with grammatical information available display it as separate lessons or documents, rather than being integrated into the dictionary entry. The outlier among these six is again *itwêwina*; because the lexicon is paired with a computational model of Plains Cree morphology, the grammar is effectively integrated into the dictionary itself. *itwêwina* is also the only dictionary in the sample with corpus integration, allowing users to find all the examples of a particular word or lemma directly from

the relevant entry in the dictionary. Other dictionaries do offer short texts on their websites (for example, traditional stories), but corpus integration is a better example of the coupling of texts and the lexicon, because a corpus (even a small one, cf. Prinsloo, 2015) offers greater possibilities for the enrichment of lexicographical resources.

The creation of a fully integrated resource of the type imagined here would clearly be a monumental project for any individual language (let alone all of the 60+ Indigenous languages in Canada), and it is unlikely that any would ever spring forth fully-formed. Rather, they are likely to develop incrementally over time, as new component resources are created and integrated. While for many languages it is fair to say that all of the relevant grammatical, textual, lexicographic, and cultural information has not even been collected yet, let alone processed into an integrated digital resource, for many other languages a significant part of that work has already been accomplished by current and previous generations of researchers (e.g. the series of comprehensive print dictionaries of Iroquoian languages published by University of Toronto Press, to take just one example among many). For these languages, the challenge is not a dearth of information, but rather finding ways to integrate and present the vast quantities of linguistic and cultural knowledge that is already available in one form or another.

Customizability

Dictionaries "are considered to be good if they serve as an appropriate tool for specific users in specific usage situations" (Müller-Spitzer, 2014:2). This is, of course, a challenge, given that the needs of different types of users in different usage situations vary quite a bit. One way that online dictionaries can increase their value is to be adaptable to the needs of different users by offering options for customization of the information that the user sees. In our survey, 50% of the dictionaries offer some type of customizability.

At the most basic level, customizability includes the ability for the user to control how the information in the dictionary is presented to them. For instance, expanding and collapsing panels in a dictionary entry – which five of the dictionaries offer – is a relatively superficial and temporary way to customize the available information, but it allows the user to see only what they want to see.

At a more advanced level, customizability allows the user to select the language in which they want to interact with the dictionary. Four dictionaries in our survey allow the user to change the interface language

and/or the orthography in which the Indigenous language is displayed (in the case of languages such as Plains Cree which are written in both Roman and non-Roman scripts). Moreover, one dictionary (The Online Cree Dictionary) allows users to change the number of search results per page, choose whether a new page should open a new window, select the standard or extended view of the dictionary entry, and decide which source(s) the dictionary should draw from. Another dictionary (Waldayu) additionally allows users to choose whether Indigenous-language results of a fuzzy-matched search should be prioritized over English ones.

These examples show that some degree of customizability is becoming available for online dictionaries of Indigenous languages in Canada. However, there are many possible avenues of customizability that remain unexplored. To date, none of the dictionaries in the survey allow customization of entry displays based on the user's status as either a speaker or a learner of the language (e.g. through the creation of a user profile).

It should be noted, however, that more advanced levels of customizability only come into play when there is a large set of richly annotated dictionary entries. For dictionaries that essentially present just a translation equivalent as the body of the dictionary entry, often without any other information, the issue of customizability is of negligible importance. This was the case in many of the dictionaries in the survey. While all of them include a translation equivalent, only 78% of the dictionaries offered part of speech information in their entries. Even rarer was inflectional information, which was found in only 44% of the dictionaries, and least common was further explanation on the meaning and appropriate use of the headword, which was found in only 17% of the dictionaries. Customizability, therefore, is not a pressing concern for most online dictionaries of Indigenous languages in Canada at the moment. However, this will change over time as the resources grow to be richer and more complex.

Training and Control

In previous sections, we have discussed various attributes that online dictionaries may have which can make them more valuable to community language activists seeking to support the maintenance and long-term sustainability of their languages, whether they themselves are fluent speakers, new learners, or somewhere in between. But in the context of Indigenous language revitalization, perhaps the most important

attribute that a resource can have is that it is controlled by the community. For us, the notion of control is intimately connected with the availability of training. We discuss these below.

On the Notion of Control

In the context of technological resources such as online dictionaries, it is important to draw a distinction between ownership and control. To the extent that the language represented in the online dictionary is the intellectual property of the speech community, and to the extent that the resource was ethically developed in partnership with that community, it can be said that the community has meaningful ownership over the dictionary. However, ownership does not equate to control. If the community does not possess the means to maintain, amend, expand, and further develop the dictionary, in a very important sense the dictionary is not under their control.

In assessing whether a community has the means to exert control over the dictionary, we can begin by making a distinction between financial means and technical know-how. The need for adequate funding to maintain and grow the dictionary is obviously an important issue, and a very real challenge for many communities. Unfortunately, we have no simple solutions to offer here on that front. Rather, we would like to focus on the issue of the technical know-how necessary for control over the dictionary.

Lexicographic Training

On the one hand, knowledge of database management, systems administration and other technical aspects related to the smooth running of any online resource is essential; there is no point in having an online dictionary if your server keeps going down, or if no one can access the database to correct errors or add new entries.

On the other hand, knowledge of the basic principles of lexicography is also important. In order to fully control a resource, communities must be able to make informed choices about what information is included, how it is accessed, and how it is presented to users of various kinds. Without a proper understanding of what online dictionaries can and cannot do, why certain practices are favoured over others, and the amount of time and effort that will be required to develop and maintain the dictionary (whether starting from scratch or adapting an existing print dictionary), communities are not able to

make the informed choices that are necessary in order to assert control over the resource.

This need for an understanding of the basic principles of (digital/online) lexicography can be addressed through training of relevant community members, ideally at or near the start of the project. Programs which offer training to Indigenous language activists have begun to recognize the need for such offerings. For example, the Canadian Indigenous Languages and Literacy Development Institute (CILLDI) has twice offered a course in community-based lexicography during its annual language revitalization summer school. This type of training should be further developed, refined, and made more readily available to all communities that either have, or are planning to develop, online dictionaries.

End-User Training

While training in lexicography is vital for the development and sustainability of an online dictionary, it can be equally important to provide training to the end-user community in how best to make use of the resource once it becomes available.

As noted earlier, for most of the dictionaries in our survey, this type of training is not yet an urgent need, as the dictionaries are simple enough that people can learn to use them effectively with just a few minutes of experimentation. However, as these resources (hopefully) progress to become more robust, integrated, and customizable, they will also naturally become more complex. As this happens, the need for end-user training will increase.

While one can imagine a fairly standard set of training resources that would introduce community language activists to the basic principles of lexicography, the training of end-users of any particular online dictionary will have to be much more customized. Moreover, given the different needs of fluent speakers, teachers, learners and other community members, it may be that the end-user training itself will need to be customized to a certain degree. Fortunately, given the many years that it takes to develop a resource that is rich enough to require end-user training, there should be ample time to incorporate the development of those training materials into the overall project.

Professional Training in Lexicography

While the focus above has been on offering training to community members, we should not overlook the need

for more, better-quality training of academics (typically from outside the language community itself) who want to be engaged in lexicography as part of their professional practice. It is regrettable that so few universities in North America offer training in lexicography as part of their graduate programs in linguistics, especially given the central role that dictionaries play in both the documentation and revitalization of Indigenous languages. Fortunately, through summer programs such as CoLang and the LSA Institute, there is the possibility for graduate students (and faculty members) to seek out additional training in this and other underserved sub-fields of linguistics. Nevertheless, given the increasing emphasis being placed on training students in language documentation and description, and the need for more people to offer training in lexicography to community language activists, it would be wise to advocate for the inclusion of courses in lexicography as part of the graduate training at more universities.

Conclusion

The digital repatriation of linguistic resources to minoritized and Indigenous communities is part of the ethical practices of our field, as well as a cornerstone of a meaningful partnership between outsider academics and local community language activists. However, to fully support community-based efforts in language maintenance, revitalization, and sustainability, digital repatriation in and of itself is insufficient. Rather, the resources need to be value-added if they are going to have the largest possible positive impact.

In the context of our survey of online dictionaries for the Indigenous languages of Canada discussed here, we identified several ways in which value can be added to such a resource, including improving basic digital functionalities around information access and retrieval, integrating the dictionary with other digital linguistic, cultural, and pedagogical resources, and offering more options for user customization of their interaction with the dictionary.

Moreover, central to the issue of digital repatriation is the notion of community control over the resource. Without the means – financial, technical, and otherwise – to guard, foster and shape the dictionary, communities cannot be said to be fully in control of it, regardless of their status as intellectual property rights holders or even copyright holders.

The key element to achieving and maintaining control over these and other digital resources is the targeted training of community members in the skills necessary

to actually exert the community's will over the resource. At present, there is a shortage of such opportunities for most community language activists, which can place their communities at a disadvantage when engaging in projects of this nature. This need can and should be addressed by increasing access to the relevant training both through existing Indigenous-focused multi-community training institutes (such as CILLDI, the Northwest Indian Language Institute (NILI), and the American Indian Language Development Institute (AILDI), among others) as well as targeted training offered in community.

In the long term, these value-added resources will have an important role to play in supporting the intergenerational sustainability of minoritized and Indigenous languages. As such, the more work that can be done today to lay the foundation for resources which take full advantage of recent and ongoing technological innovations, the greater the benefit will be for future generations that will pick up and continue the fight to maintain their linguistic heritage.

Acknowledgments

The authors wish to extend their gratitude to the University of Alberta Undergraduate Research Initiative for their support.

References

Arppe, A., Lachler, J., Trosterud, T., Antonsen, L., & Moshagen, S. N. (2016). Basic Language Resource Kits for Endangered Languages: A Case Study of Plains Cree. In *CCURL 2016 Collaboration and Computing for Under-Resourced Languages: Towards an Alliance for Digital Language Diversity* (pp. 1-8).

Beesley, K. R., & Karttunen, L. (2003). *Finite-state morphology: Xerox tools and techniques*. CSLI, Stanford.

Bontogon, M., Arppe, A., Antonsen, L., Thunder, D. & Lachler, J. (forthcoming). Intelligent Computer Assisted Language Learning (ICALL) for Plains Cree: An In-Depth User Experience Evaluation. *Canadian Languages Review (Special Issue on Indigenous Languages)*.

Burke, Sean M (1998). The design of online lexicons. URL: <http://interglacial.com/~sburke/ma/> Accessed July 14, 2017.

Granger, S. (2012). Introduction: Electronic lexicography—from challenge to opportunity. In

Granger, S., & Paquot, M. (Eds.), *Electronic lexicography* (pp. 1-12). Oxford: Oxford University Press.

Johnson, R., Antonsen, L., & Trosterud, T. (2013). Using finite state transducers for making efficient reading comprehension dictionaries. In *Proceedings of the 19th Nordic Conference of Computational Linguistics (NODALIDA 2013); May 22-24; 2013; Oslo University; Norway. NEALT Proceedings Series 16* (No. 085, pp. 59-71). Linköping: Linköping University Electronic Press.

Lew, R. (2012). How can we make electronic dictionaries more effective?. In Granger, S., & Paquot, M. (Eds.), *Electronic lexicography* (pp. 343-361). Oxford: Oxford University Press.

Mackintosh, K. (1998). An empirical study of dictionary use in L2-L1 translation. In Atkins, B. S. (Ed.), *Using dictionaries: Studies of dictionary use by language learners and translators* (Vol. 88) (pp. 123-149). Berlin: Walter de Gruyter.

Müller-Spitzer, C. (2014). Introduction. In Müller-Spitzer, C. (Ed.), *Using online dictionaries* (Vol. 145) (pp. 1-10). Berlin: Walter de Gruyter.

Prinsloo, D. J. (2012). Electronic lexicography for lesser-resourced languages: The South African context. In Granger, S., & Paquot, M. (Eds.), *Electronic lexicography* (pp. 119-143). Oxford: Oxford University Press.

Prinsloo, D. J. (2015). Corpus-based Lexicography for Lesser-resourced Languages—Maximizing the Limited Corpus. *Lexikos*, 25, 285-300.

Rice, K. (2011). Documentary Linguistics and Community Relations. *Language Documentation & Conservation*, 5, 187-207.

Language Resource References

Dakota Dictionary Online. 2009. *Dakota – English online dictionary*. URL: <https://filemaker.cla.umn.edu/dakota/>. Accessed July 14, 2017.

Eastern James Bay Cree Dictionary. 2004. *East Cree – English, East Cree – French online dictionary, supported by the Algonquian Language Project*. URL: <http://dictionary.eastcree.org>. Accessed July 14, 2017.

Gitksan/English Online Dictionary (Beta). 2017. *Gitksan – English online dictionary*. URL: <http://gitdict.nfshost.com/>. Accessed July 14, 2017.

- Hilzaqv. 2016. *Hilzaqv – English online dictionary, supported by Waldayu*. URL: <http://waldayu.org/heiltsuk/index.html>. Accessed July 14, 2017.
- Inuktitut Living Dictionary / Asuilaak. 2000. *Inuktitut – English online dictionary*. URL: <http://www.livingdictionary.com/>. Accessed July 14, 2017.
- itwêwina. 2016. *Intelligent Plains Cree – English online dictionary*. URL: <http://itwêwina.oahpa.no>. Accessed July 14, 2017.
- Mi'kmaq Online. 1997. *Mi'kmaq – English online dictionary*. URL: <https://www.mikmaqonline.org/>. Accessed July 14, 2017.
- Mohawk. 2001. *Mohawk – English online dictionary, supported by Ohwejagekha: Ha'degaenage*. URL: <http://www.ohwejagekha.com/mohawk/>. Accessed July 14, 2017.
- Moose and Swampy Cree Dictionary. 2012. *Moose Cree – English online dictionary*. URL: <http://www.spokencree.org/glossary>. Accessed July 14, 2017.
- Northern **Státimcets**. 2003. *Northern Státimcets – English online dictionary, supported by First Voices*. URL: <http://www.firstvoices.com/en/Northern-Statimcets>. Accessed July 14, 2017.
- Online Cree Dictionary. 2017. *Plains Cree – English online dictionary*. URL: <http://www.creedictionary.com/>. Accessed July 14, 2017.
- Online Tlingit Verb Dictionary. 2016. *Tlingit – English online language resource*. URL: <http://ankn.uaf.edu/~tlingitverbs/>. Accessed July 14, 2017.
- Passamaquoddy-Maliseet Dictionary. 2009. *Passamaquoddy-Maliseet – English online dictionary*. URL: <https://pmportal.org/browse-dictionary>. Accessed July 14, 2017.
- SENĆOŦEN Classified Word List. 1999. *SENĆOŦEN – English online language resource*. URL: <http://www.cas.unt.edu/~montler/Saanich/WordList/>. Accessed July 14, 2017.
- Sm'algyax Living Legacy Talking Dictionary. 2013. *Sm'algyax – English online dictionary*. URL: <http://web.unbc.ca/~smalgyax/>. Accessed July 14, 2017.
- The Algonquin Way Dictionary. 2017. *Algonquin – English, Algonquin – French online dictionary*. URL: <http://www.thealgonquinway.ca/English/dictionary-e.php>. Accessed July 14, 2017.
- The Ojibwe People's Dictionary. 2010. *Ojibwe – English online dictionary*. URL: <http://ojibwe.lib.umn.edu/>. Accessed July 14, 2017.
- Tłichq Yatì** Multimedia Dictionary. 2006. *Tłicho – English online dictionary*. URL: <http://tlichq.ling.uvic.ca>. Accessed July 14, 2017.