

# The Tsadra Lotsawa Workbench: Collaborative Lexicographical Tools for the Translation of Tibetan Buddhist Texts

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 sadra Lotsawa Workbench is a suite of lexicographical resources for translators and researchers engaging in Tibetan Buddhist literature, canonical or autochthonous. This knowledge base includes a set of corpus-driven solutions. It is embedded in a website designed to facilitate a collaborative approach to the development of lexicographical resources for the Tibetan language. In order to support the translators' and researchers' work, the Workbench is structured according to the translation workflow. The initial phase of the project consists in linking available resources to the collaborative platform to support the activities of translators and researchers interested in Tibetan Buddhist Literature. Possible areas for future development include mapping complex semantic relations, integrating other languages, collaborating to develop curated spaces and educational tools.

## *1. Introduction*

### *Project Overview*

The Lotsawa Workbench<sup>1</sup> is an initiative of the Tsadra Foundation research department. On the most basic level, the Workbench is a suite of practical lexicographical tools for translators and researchers reading Tibetan Buddhist literature, canonical or autochthonous. The main components of the Workbench are dictionaries (Tibetan-Tibetan, Tibetan-Sanskrit, Tibetan-English) and glossaries (Tibetan-English).

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<sup>1</sup> [https://rywiki.tsadra.org/index.php/Main\\_Page](https://rywiki.tsadra.org/index.php/Main_Page). Accessed on September 22, 2021. I would like to thank Marcus Perman and Jeremi Plazas at Tsadra Foundation for their wonderful collaboration. My gratitude also goes to Jonathan Silk and Ralf Felbur (Open Philology - University of Leiden) and to Ngawang Trinley and Tenzin Topjor (Open Pecha Project - Esukhia) for their comments and suggestions.

These resources are complemented by a set of corpus-driven tools that are embedded on each term page, which allows (1) active collaboration to further develop the available resources and (2) easy navigation to access the available information. Through this corpus-driven lexicological approach, the Lotsawa Workbench complements traditional philological methods and offers practical solutions to challenges translators and researchers encounter in their work.

A modified MediaWiki platform represents the backbone of the user interface, while the content is mainly produced through data aggregation.<sup>2</sup> In order to support the translators' work, the Workbench was designed as a knowledge base structured according to the translation workflow. This environment makes full use of the power of this open source software through the implementation of links to datasets from collaborators as well as content hosted on the site itself, while providing opportunities for collaborative editing and open data sharing. Through intelligent design and use of detailed forms for adding to term pages, a balance is being struck between allowing for editing and contributions from authorized persons and the spirit of open collaboration inherent in the MediaWiki platform.

In addition to glossaries and dictionaries, other tools are also made available to assist the translation process, such as corpus exploration, word usage data, and so on. These added functionalities together with the collaborative nature of the platform aim at providing practical solutions to translators and researchers in their quest to better understand the semantic complexity of specialized terminology or rare words, when existing lexicographical resources do not allow for a quick resolution of a translation problem.

This approach is made possible by the digitization of Tibetan texts and the availability of Tibetan corpora that include the variety of Tibetan Buddhist textual environments translators and researchers engage in. Additional resources related to secondary sources and specialized scholarship are linked to dictionary headwords. Through the Lotsawa Workbench, translators and researchers have immediate access to a wealth of lexicographical resources, philological data, and existing scholarship on the search term they want to know more about.

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<sup>2</sup> For examples of online dictionaries based on data aggregation, see: <https://www.thefreedictionary.com/>, <https://www.lexilogos.com/index.htm>, <https://dictionnaire.reverso.net/>. Accessed on June 14, 2021. Another interesting project in the field is the Sambhota Dictionary Search in which Tibetan lexicographical resources are also aggregated. See <https://dict.dharma-treasure.org/>. Accessed on January 31, 2022.

*Project Development*

In 2005, an open collaborative website was created by Eric Colombel, President of Tsadra Foundation to host Erik Pema Kunsang's Rangjung Yeshe Dharma Dictionary.<sup>3</sup> This dictionary includes entries by several translators and scholars, including Ives Waldo, Erik Pema Kunsang, Jim Valby, Richard Barron, Gyurme Dorje, Matthieu Ricard, Cortland Dahl, Richard Babcock, and Jeffrey Hopkins.

In 2006, Erik Pema Kunsang wrote a letter to invite translators and scholars to further develop the website to include "lineage histories, short biographies of our teachers and their teachers, descriptions of texts, what has been and has yet to be translated, the locations and descriptions of sacred places, indices, notes and other backmatter from you published books that you want to share."<sup>4</sup> Erik Pema Kunsang's vision was to turn what was essentially at the time a glossary into a full-fledged knowledge base containing all the information translators would need to accomplish their task. His appeal did not go unheard. Over the course of more than twenty years, other translators contributed to the continuous growth of the Dharma Dictionary to the point where it now includes roughly 182,500 entries.<sup>5</sup> In addition to specialized glossaries such as Gyurme Dorje's Glossary to Tibetan Elemental Divination Paintings catalogues or Matthieu Ricard's Geographical Glossary, it also includes Tibetan texts and catalogues (e.g., Andreas Doctor's Catalogue of the New Treasures of Chokgyur Lingpa).

In 2021, as Erik Pema Kunsang expressed his wish to further develop the Dharma Dictionary, Eric Colombel asked the Tsadra research department to reflect on the evolution of the website. Over the past twenty years there has been an exponential rise in the number of resources and tools that are available for the translation of Tibetan texts produced by academic research initiatives and independent organizations such as BDRC. This major change in the field of Tibetan Buddhist Studies led the Tsadra team to develop the idea of a Lotsawa Workbench in which a broad scope of translation tools would be made available from one location.

*What Are Translators' and Researchers' Needs?*

The Tsadra research team took great care to define the user group of the Workbench during the inception of the project.<sup>6</sup> "Translators"

<sup>3</sup> See [http://rywiki.tsadra.org/index.php/Main\\_Page](http://rywiki.tsadra.org/index.php/Main_Page). Accessed on June 6, 2021.

<sup>4</sup> See [http://rywiki.tsadra.org/index.php/invitation\\_letter](http://rywiki.tsadra.org/index.php/invitation_letter). Accessed on June 6, 2021.

<sup>5</sup> As of July 3, 2021.

<sup>6</sup> For a discussion of various methodological approaches and important issues to

refers to a broad range of persons reading Tibetan texts and transferring their meaning to a target culture. These persons include scholars, academics, Dharma translators, Himalayan teachers, and Tibetan language students. Beyond the practical benefits a reliable bilingual Tibetan-English Dictionary can offer, one of the main aims of the Workbench is to contribute to the transmission of knowledge across generations of scholars, translators, and Dharma practitioners.

Practically, Tibetan Studies researchers and Dharma translators as a user group need reliable and comprehensive resources to unravel the web of semantic meaning through which textual composition is made possible. On the most concrete level, translators have to find answers to some basic questions while translating a Tibetan Buddhist text, such as:

- What does this word mean in this passage? Is it a technical term?
- Is this word always used in that sense in canonical texts?
- What does the word usage of this term in native Tibetan works reveal about its meaning?
- Is the occurrence of the term in question part of a typical grammatical construction?
- Is this group of words a common collocation for a stock phrase, a Sanskrit compound, or a technical term?
- Did anyone publish anything on this technical term?

While designing the contours of the Lotsawa Workbench, special attention was given to the capacity the platform should have to find answers to these questions in the shortest possible amount of time. To achieve this, it quickly became clear that the Workbench could not just be a Tibetan-English glossary. It should also contain or link to an extensive array of information to cover the entirety of the translation task, particularly when the searched words could not be documented by existing lexicographical resources. From the perspective of practical lexicography,<sup>7</sup> the following list of fields commonly found in bilingual dictionaries provided a template for the information the Workbench should either contain or link to:

- Word meaning in context and across semantic fields including Tibetan definitions, sense description, subsense, polysemy,

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consider with regard to the dictionary-making process, see *inter alia* Atkins and Rundell 2008, Fontenelle 2010, Sterkenburg 2006, Yong and Peng 2007.

<sup>7</sup> For a detailed presentation of the methods, tools, and objectives of practical lexicography, see *inter alia* Atkins 2008 and Fontenelle 2010.

- semantic clusters, synonyms and near-synonyms, antonyms, semantic fields, diachronic semantic evolution
- Grammatical information (part of speech) and lexical information (cognates, etymological relations, diachronic and dialectal phonetic or morphological variations)
  - Sanskrit, Chinese, and English equivalents (plus other languages as a future development)
  - Corpus attestation in historical texts (Mahāvvyutpatti, sūtras, etc.), corpus frequency
  - Relational word usage (collocations, stock phrases, technical terminology, proverbs, idioms, Sanskrit compounds, etc.)
  - Dictionary examples illustrating general patterns with regard to word usage (citations, words in context)
  - Word sketches: corpus-driven summaries of a word's grammatical and collocational behavior complemented by concordance tables
  - Relevant scholarship (articles, dissertations, monographs)

As the Tsadra team listed the amount and type of information the Lot-sawa Workbench should ideally offer, we realized that corpus-driven datasets produced from Tibetan corpora of text would be of paramount importance to provide the quality of lexicographical information we wanted to offer through the Workbench.<sup>8</sup>

## 2. Challenges

As explained by Ligeia Lugli,<sup>9</sup> “lexicography requires titanic efforts and enormous resources.”<sup>10</sup> The most significant Tibetan lexicographic work in a European language at the moment is the *Wörterbuch der tibetischen Schriftsprache*, a Tibetan-German dictionary project at the Bavarian Academy of Science (Munich, Germany). So far six volumes of the dictionary containing forty-six fascicles have been published in

<sup>8</sup> One of our main concerns was to provide a tool that would be detailed but also practical and efficient. We thus tried to pay attention to efficiency criteria and looked at reviews of online dictionaries. Some online reviews were useful in defining these criteria, see for example the webpage *Comparative review of dictionaries for English learners* by Tomasz p. Szynalski: <http://www.anti-moon.com/how/learners-dictionaries-review.htm>. Accessed June 14, 2021.

<sup>9</sup> Ligeia Lugli together with her team at Mangalam Research Center has been working on the development on the Buddhist Translators Workbench, a digital dictionary of Buddhist Sanskrit. She published several seminal articles on Buddhist lexicography (see bibliography).

<sup>10</sup> Lugli 2019, 198.

paper by the Verlag der Bayerischen Akademie der Wissenschaften.<sup>11</sup> Apart from this notable exception, Tibetan has long been a low-resource language for which the availability of computational and human resources was quite limited.<sup>12</sup>

One of the problems in the development of the Workbench is inherent to the fact that the macrostructure of the Dharma Dictionary was derived from various glossaries throughout time, mainly due to the lack of available resources to produce a dictionary according to lexicographical methods. The headwords of these glossaries did not follow any pre-established structure. Each semantic unit would be listed independently of any lemma or other headword. As a consequence, collocations including lemmas appearing as entries would not appear as sub-entries of these lemmas but as headwords. This feature of the Dharma Dictionary explains the fairly high number of entries it contains. This point is problematic insofar as related headwords might remain invisible to users when they consult a specific entry for which a number of related collocational headwords are available.

In addition, with regard to the microstructure of the Dharma Dictionary, no distinction is made between words and technical terms. In the absence of any standardized Dharma terminology for the translation of Buddhist texts, English equivalents have thus been lumped into dictionary entries without any additional definition of the term. From a practical standpoint, this might be an issue since technical terminology requires translation consistency whereas translational equivalents are irrelevant in the case of words that do not express a well-defined (and often technical) concept.<sup>13</sup>

To conclude on this point, it is important to acknowledge the fact that the original dataset is problematic in terms of structure, but also with regard to content itself in the absence of any review process at the time when the dictionary was produced. At the level of the dictionary microstructure, the definitions of the Dharma Dictionary are simply given in the form of unstructured data in which word meanings are usually not organized in categories according to senses. In some rare cases, the quality of entries suffers from orthographic issues at the level of the headword or the definition. As a consequence of all these issues pertaining to the structure, format, and content of the original dataset, one should not underestimate the serious challenges we are facing to develop the Workbench on the basis of the Dharma Dictionary.

<sup>11</sup> <https://wts.badw.de/en/the-dictionary/faszikel.html>. Accessed on June 14, 2021. For the online dictionary, see <https://wts.badw.de/en/dictionary-database.html#c16560>. Accessed on June 14, 2021. Only headwords with the root letter *d* have been made accessible on the online dictionary database.

<sup>12</sup> For a definition of “low-resource language,” see Lugli 2019, 199.

<sup>13</sup> On this topic, see Lugli 2021.

It therefore appeared more realistic in the present case to rely on available corpus-driven datasets while suggesting a template for the envisioned microstructure, at least as a first step. In the context of Tibetan studies, a computational corpus-driven approach to lexicography has simply not yet been applied to the dictionary-making process.<sup>14</sup> The lack of annotated datasets in the form of tagged corpora has long represented an obstacle to the implementation of corpus-driven lexicographic methods. Although such corpora have become available and made possible the automatization of some of the tasks incumbent to lexicographers, human supervision and curation remain a necessity. As Lugli suggests, “ambitious microstructures” can delay the production of lexicographic resources, whereas the availability of annotated resources can quickly produce annotated databases that can be used as “proto-dictionaries.”<sup>15</sup>

A practical approach in the present case is to suggest a relatively simple microstructure that could be actualized through a wiki-based collaborative approach to the writing of dictionary entries. While this may sound overly optimistic, one should keep in mind that we might not have a choice in this matter. For some of the most complex words or terms, we simply need the input of “specialists” to clarify rare forms or specialized Buddhist terminology. It is doubtful that trained lexicographers will necessarily be conversant in a variety of Himalayan dialects or trained in the abundance of doctrines and practices of the many Tibetan Buddhist lineages and schools. From this perspective, collaboration with scholars and Himalayan teachers is a must in the case of obscure lemmas for which translators actually need lexicographic resources the most.

The task at hand is in a sense formidable. To penetrate the web of meaning of interrelated concepts, one needs to have an overview of an entire semantic space, often across several literary genres or language

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<sup>14</sup> Markus Viehbeck gives a detailed account of Tibetan dictionaries based on an alphabetical macrostructure in an article on the scholarly networks that produced them (Viehbeck 2016). For an exhaustive list of Tibetan monolingual and bilingual dictionaries, see Walter 2006. This article is in the form of an annotated bibliography.

<sup>15</sup> See Lugli 2019, 199–200. As someone whose PhD thesis focused on the concept of *zung ’jug* (*yuganaddha*) in the works of Mipham, I became quite aware of the amount of work involved on the level of lexicography. I used word embeddings for the semantic mapping of Mipham’s understanding of important terms he uses in the contexts of Madhyamaka and Dzogchen to clarify the meaning of technical terms. In this process, I realized that task automatization through algorithms does not necessarily lead to faster translation as the resulting insights can add new layers to the complexity of the original problem the researcher wished to solve. As paradoxical as it may sound, this operation can actually increase the amount of information one has to consider to come to a “provisionally definite” conclusion. See Forgues t.p.

registers. In addition to this, a methodological back and forth between the macro and micro level of language, between the general and the specific levels of word usage, is necessary to understand the various conceptual levels a lemma can refer to. One of the main challenges to producing a good dictionary entry is therefore to have a sense of both general patterns in the sense of regularities and idiosyncrasies as irregularities.<sup>16</sup> While lexicographers trained in corpus-linguistic methods would have a good understanding of how to document the former, philologists and Dharma translators could have some valuable insights to share regarding the latter, particularly in the case of terminology related to specific doctrinal content and practices.<sup>17</sup>

The question thus remains: What should a collaborative lexicographic platform for the translation of Tibetan Buddhist texts look like?

### *3. Exploring New Possibilities For Collaborative Lexicography*

#### *The Lotsawa Workbench As A Means To An End*

As noted by Miloš Jakubíček, dictionaries have become “tools to be used while doing something else.”<sup>18</sup> For publishers of print dictionaries, this might be seen as a negative evolution. However, this change opens new perspectives for the development of online lexicographic resources conceived as support tools within the broader context of a specific activity, such as translating. In the case of the Lotsawa Workbench, the Tsadra team’s objective is clearly identified. We would like to provide a knowledge base to help solve actual translation problems in the shortest possible amount of time. It is possible that computer-aided translation (CAT) tools will be efficient to the degree that consulting Tibetan-English dictionaries will become less of a necessity. However, the efficiency of these CAT tools will be dependent on the data they rely upon. This data will have to be structured and reliable. From this standpoint, the Workbench represents a step forward, even in the advent of machine translation.

Specialized high-quality platforms supporting translation as an activity through an encyclopedic and philological approach already

<sup>16</sup> See also Lugli 2019: 201 on this point.

<sup>17</sup> To further build the case for collaboration, one simply has to look at Étienne Lamotte’s excellent translation of the *Śaṃdhinirmocana Sūtra*. In the Maitreya Chapter on meditation, it is obvious that Lamotte was not conversant with Buddhist methods of contemplation. His choice of terminology comes in the way of understanding the topic dealt with in this chapter. This shows, I believe, why a collaborative approach can increase the quality of translations.

<sup>18</sup> Jakubíček 2017, 14.

exist, for example, Paratext, Accordance, or Logos for Bible studies.<sup>19</sup> Looking at such knowledge bases, one cannot help think that there is definitely a need for more sophisticated translation tools in the field of Tibetan and Buddhist Studies. An important project aiming at bridging this gap is the Buddhist Translators Workbench (BTW) at the Mangalam Research Center, which focuses on developing Buddhist Hybrid Sanskrit lexicographic resources.<sup>20</sup> The approach of the BTW is quite ambitious as one of its objectives is to offer users the option to query the lemma database on the basis of word-senses and to display results in a visual way. The BTW represents a significant contribution to Buddhist lexicology and it will be interesting to follow its development in the coming years, as there will certainly be much to learn from the technological environment the project team is building up.

Unfortunately, there is currently no such one-stop platform for translators working on Tibetan Buddhist literature. While our vision is more modest than that of the BTW team, we agree with Jakubíček's remark: Online lexicographic resources make sense only as components of a larger project. In the present case, if translation remains the main objective, it follows that the Lotsawa Workbench should not just be an online dictionary, but a suite of tools providing practical solutions to concrete problems one encounters while performing translation activities. Some of these problems evade the scope of simple glossaries or dictionaries. They might include issues regarding word usage in relation to syntax, registers of speech, or religious contexts depending on a specific interpretation of doctrines and practices. In this case, corpus-driven solutions are particularly relevant and should be included in the Workbench.

### *The Centrality Of Corpus-driven Lexicography And Related Methods*

Arguments have been made in favor of corpus-driven lexicography on more than one occasion. While there are obvious limits to what these methods can bring, there is no debate any longer about the efficiency of information technology to identify common lexical and syntactic patterns across vast corpora of texts.<sup>21</sup> Large repositories of Tibetan texts in a digital format are now available, making the use of corpus-linguistic tools possible.<sup>22</sup> Some tasks that would have taken weeks or

<sup>19</sup> See the following links: <https://www.accordancebible.com/>; <https://paratext.org/>; <https://www.logos.com/product/195537/logos-9-academic-professional#overview>. Accessed on June 6, 2021.

<sup>20</sup> See Lugli 2015, 2019.

<sup>21</sup> For a presentation of the impact of corpus-driven methods on lexicography, see for example Hanks 2012.

<sup>22</sup> See the following online databases: Resources for Kanjur & Tanjur Studies (rKTs -

months can now be automated in order to provide an overview of regularities and continuities at the macro level of language. From this perspective, it has become easier to adduce linguistic evidence in support of translation choices. According to this methodological approach, the Workbench should include tools to support a better understanding of what constitutes a linguistic pattern in contradistinction to a discontinuity. In the case of highly technical Tibetan texts, translators could undeniably benefit from accessing large corpora of relevant literature to make sense of the linguistic context of a complex term or to refine their terminological choices.

This corpus-driven approach to lexicography produced ambitious methods to maximize the use of resources through automatizing some of the lexicographer's tasks. Tools, such as GDEX, are now available to accomplish specific tasks, such as producing typical dictionary examples for a given lemma,<sup>23</sup> while others are designed to draft complete dictionary entries.<sup>24</sup> The emerging field of post-editing lexicography embraces this technological development whose benefit is essentially to automatically pre-populate the lexicographic database with suggested word sense clusters, definitions, or examples, before editing dictionaries entries "manually" through human intervention.<sup>25</sup>

In the case of the Workbench, having access to corpus-driven information is essential to improve the translator's work. However, insofar as dictionary drafting still requires human intervention, a collaborative approach appears to be useful to tap into another rare commodity: the expertise in the doctrines and practices of Tibetan Buddhism.

*The Benefits Of A Mediawiki Platform For Data Aggregation  
And Information Retrieval*

Tsadra Foundation has extensive experience using the open source MediaWiki platform<sup>26</sup> with Semantic MediaWiki<sup>27</sup> to manage several

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University of Vienna) <https://www.istb.univie.ac.at/kanjur/rktsneu/sub/index.php>, Buddhanexus (University of Hamburg) <https://buddhanexus.net/>, Buddhist Digital Resource Center (BDRC) <https://library.bdrc.io/>, Thesaurus Literaturae Buddhicae (TLB - University of Oslo) <https://www2.hf.uio.no/polyglotta/index.php?page=library&bid=2>. Accessed on June 14, 2021.

<sup>23</sup> See Kilgariff et al. 2008.

<sup>24</sup> See the tools developed by the European program Elexis, such as the OneClick Dictionary: <https://elex.is/tools-and-services/>; <https://github.com/elexis-eu/ocd>. Accessed June 14, 2021.

<sup>25</sup> To measure the fast-paced evolution of lexicography as well as related challenges, opportunities, and academic debates, see for example, Bergenholtz et al. 2009, Caruso 2013.

<sup>26</sup> <https://www.mediawiki.org/wiki/MediaWiki>. Accessed on June 14, 2021.

<sup>27</sup> [https://www.semantic-mediawiki.org/wiki/Semantic\\_MediaWiki](https://www.semantic-mediawiki.org/wiki/Semantic_MediaWiki). Accessed on June 14, 2021.

knowledge bases available online.<sup>28</sup> Wikis are well-known for the collaborative framework they offer, but, from the perspective of the Lotsawa Workbench, they also represent an ideal and powerful solution for data management through features facilitating interlinked data, data aggregation, and data analysis through semantic queries.

Some practical problems related to the lack of structured data in the available datasets of the digital dictionaries and glossaries can be solved by linking wiki pages to establish a network of cross-references throughout the entire wiki. This feature can solve the problem of the lack of well-defined macrostructure of the original Dharma Dictionary in which both lemmas and related lexemes (including collocational and compound lexemes) are headwords. In the Lotsawa Workbench, each headword has hyperlinks to related entries, which enables in the context of a specific query to obtain an overview of entries that are related to the one headword in question. For example, on the page for the headword *dgongs pa*, all headwords containing this semantic unit are listed, such as *dgongs pa zang thal*, and hyperlinks will take users to the corresponding wiki page.

With regard to the microstructure of the Workbench, the use of semantic MediaWiki enables a “remodeling” of the available lexicographic information in the form of a more structured knowledge base through data aggregation. Information drawn from Tibetan-Tibetan dictionaries can be found in the field *Tibetan Definition(s)*, likewise with Tibetan-Sanskrit datasets or examples taken from translation memories to illustrate word usage. Since corpora of Tibetan texts are available online in a digital format, linking headwords to corpus evidence becomes easy.<sup>29</sup> Evaluating whether a term is attested in a specific corpus (e.g., Kanjur) or can be found in a source text is facilitated by linking headwords with the wealth of available corpora, catalogues, and scholarship that can be found online. An additional benefit of the wiki approach is the powerful search function this environment offers through the extension Semantic Mediawiki, which enables translators and researchers to query the entire database and quickly gain access to linguistic and textual evidence.

<sup>28</sup> In addition to the Dharma Dictionary and Lotsawa Workbench, Tsadra’s wikis include the Digital Research Library ([https://library.tsadra.org/index.php/Main\\_Page](https://library.tsadra.org/index.php/Main_Page)), the Tsadra Wiki Commons ([https://commons.tsadra.org/index.php/Main\\_Page](https://commons.tsadra.org/index.php/Main_Page)), Buddha Nature ([https://buddhanature.tsadra.org/index.php/Main\\_Page](https://buddhanature.tsadra.org/index.php/Main_Page)), Śāntideva (<https://shantideva.tsadra.org/>), the Damngak Rinpoché Dzö ([https://gdamsngagmdzod.tsadra.org/index.php/Main\\_Page](https://gdamsngagmdzod.tsadra.org/index.php/Main_Page)), Rinchen Terdzö Chenmo ([https://rtz.tsadra.org/index.php/Main\\_Page](https://rtz.tsadra.org/index.php/Main_Page)). Accessed on June 14, 2021.

<sup>29</sup> See the following online databases mentioned above: Resources for Kanjur & Tanjur Studies (University of Vienna), Buddhanexus (University of Hamburg), Buddhist Digital Resource Center.

Another objective of the project is to increase the content of lexicographic information both in quantity and quality. Integrating 84000's translation memories (TMs) and glossaries to the wiki would be the most efficient way to integrate quality data to the Workbench. The content of these datasets has been reviewed by 84000 editors. It is of much higher quality than available translators' glossaries that did not go through a peer-review process.<sup>30</sup> To contribute to the development of the Workbench, Tsadra Foundation also decided to produce tmx files by aligning the many translations the foundation supported over the years with their respective Tibetan source text.<sup>31</sup> The first Tsadra TM will be based on Jamgön Kongtrül Lodrö Thayé's Treasury of Knowledge (*Shes bya mdzod*), an encyclopedic work on the main doctrines and practices of Tibetan Buddhism.<sup>32</sup> Since 84000's translations are based on canonical texts and Tsadra's on Tibetan autochthonous literature, the TMs integrated to the Workbench will cover a broad scope of genres and works.

*A Case For The Wiki-based Collaborative Approach  
And "Relational Lexicography"*

The idea behind data aggregation and post-editing lexicography is to embrace the present digital evolution of the field in order to maximize the use of our limited resources. In this spirit, we designed the Workbench to facilitate human supervision and intervention through a wiki-based collaborative approach. Different user groups can access the database, some of them having the possibility to edit the data by means of user-friendly interfaces and forms. Several online encyclopedia or dictionary projects have been successfully developed in the course of time.<sup>33</sup> The notion of open access online dictionaries has been a topic for elaborated academic discussions in the past decade.<sup>34</sup> We are aware that there are pros and cons to having a community-based approach to lexicography, but we believe that by structuring data input and information as explained above and accepting high-quality contributions, we will be in a position to benefit from the best of both worlds: (1) peer-reviewed or academic information; (2) users' expertise in specialized areas of Tibetan Buddhism.

<sup>30</sup> <https://github.com/84000>. Accessed on June 14, 2021.

<sup>31</sup> Tmx files are computer files in the tmx format in which bilingual segments of texts are stored. For a complete list of Tsadra publications, see [https://research.tsadra.org/index.php/Tsadra\\_Publications\\_List](https://research.tsadra.org/index.php/Tsadra_Publications_List). Accessed on June 14, 2021.

<sup>32</sup> 'jam mgon kong sprul blo gros mtha' yas, 1813–1899.

<sup>33</sup> <https://www.wiktionary.org/>; [http://www.omegawiki.org/Meta:Main\\_Page](http://www.omegawiki.org/Meta:Main_Page); <https://www.wikipedia.org/>. Accessed on June 6, 2021.

<sup>34</sup> See for example Abel and Meyer 2013.

The quality of the collaborative content is indeed a major concern for the Workbench project team. The Workbench contributors will be members of the academic community, Himalayan scholars, and senior translators. This approach is essential to guarantee the quality of users' contributions, a central point in collaborative projects. In addition, to ensure that these contributions can be evaluated and discussed, there will be a space for discussion for each headword. This will allow users to share comments and improvement suggestions.

We have no doubt that under these conditions collaborative platforms have many benefits. To illustrate this point, on account of the diversity of registers and usages in Tibetan (vernacular, religious, regional, and diachronic), it seems hardly possible to imagine that a team of just a few lexicographers could account for all possible linguistic forms translators and researchers face in their work. The growth of knowledge is cumulative. By integrating layers of specialized knowledge in a way that is evolutive and traceable, the Lotsawa Workbench provides a solution to the transmission of quality information. Fuertes Olivera makes a distinction between "institutional Internet reference works" and "collective free multiple-language Internet reference works."<sup>35</sup> The former are compiled by professional lexicographers and usually accessible online through an institution for a fee. The latter are the work of non-professional lexicographers and are in free access. The ambition of the Lotsawa Workbench is to combine these two models by making quality content accessible to all through a collaborative approach involving scholars and translators of Tibetan Buddhist literature.

Another factor that pleads for a wiki-based solution is that there is simply no central authority to decide upon definitions and standard translations as was the case in Imperial Tibet, even regarding highly technical Buddhist terms. In the present post-colonial era, it is important to offer living communities, Buddhist or academic, the possibility to document and preserve their understanding of meanings in relation to concepts without superimposing unnecessary restrictions. By making both curation and participation possible, the Lotsawa Workbench preserves translation choices produced through academic research or through social conventions and interactions within Buddhist communities for which texts are translated. A similar wiki-based knowledge base is developed by the project "Relational Lexicography" at the University of British Columbia (UBC) whose aim is to provide lexicographical resources to speakers and researchers of indigenous languages in Canada:

Traditional lexicography was established by speakers of dominant

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<sup>35</sup> See Fuertes-Oliveira 2010: 196.

languages. Our project will develop approaches to dictionary-making that are focused on the needs of under-resourced languages. Working together, speakers, learners, teachers and researchers of Indigenous languages need guidelines that address the specific requirements and goals of community-informed lexicography.<sup>36</sup>

There is some merit in the present context for what the UBC project team calls a “relationally-engaged lexicography” given that Buddhist terminology is used by living and practicing communities.<sup>37</sup> These communities make their own terminological choices in relation to Buddhist doctrines and practices they engage in on a daily basis. The Lotsawa Workbench aims at integrating this important and often neglected aspect of Tibetan Buddhist lexicology in the English language. As stressed above, though, guidelines are necessary to produce quality content. This is why the Tsadra research team will offer user-friendly forms to help users add information to the knowledge base.

#### 4. Workbench Description

One of the main advantages of a wiki-based platform is that datasets can be interconnected through hyperlinks. The first step to implement this approach is to restructure the available datasets with the idea of improving user experience. Then, by building bridges across the available lexicographic resources, the various datasets can be integrated into the Workbench in a way that mirrors the translator’s workflow.

A dictionary entry should include a broad range of information translators and researchers need in the course of their work:

- Headword (Wylie transliteration/Unicode Tibetan script)
- Semantic information (semantic fields, definition in English and Tibetan if available, synonyms/near-synonyms, etc.)
- Grammatical information (POS)
- Lexical information (etymology, forms, verb forms if applicable)
- Sanskrit and Chinese corresponding word(s)

On the Lotsawa Workbench, this information is accessed by clicking on tabs located at the top of the wiki page (Fig. 1):

<sup>36</sup> Regarding the project “Relational Lexicography” at the University of British Columbia (UBC), see <https://dictionaries.arts.ubc.ca/> and [https://wiki.ubc.ca/Relational Lexicography Knowledgebase](https://wiki.ubc.ca/Relational_Lexicography_Knowledgebase). Accessed on June 14, 2021.

<sup>37</sup> On this important notion of relational lexicography, see <https://dictionaries.arts.ubc.ca/our-goals/>. Accessed on June 14, 2021.



Fig. 1 – *Lotsawa Workbench tabs*

Tabs are the most practical way to display all this information in a user-friendly way. They allow the Workbench users to easily find the type of information they need without being overwhelmed by the amount of data. The list of Workbench tabs include:

- Dictionaries
- Sanskrit
- Chinese
- Glossaries
- Translation Memories
- Related
- Usage
- Textual Attestation
- Scholarship
- Proper nouns
- Notes

Most lexical queries are quite simple and the information displayed on the first tab should be more than enough. However, in the case of more complex, technical, or rare expressions, users might want to check the vast scope of information available in the knowledge base. More complex components of the dictionary microstructure (e.g., synonyms, word usage, dictionary examples, textual attestation) are therefore included in the tabs mentioned above.

Moreover, if users want to contribute to the content of the Workbench, they will have immediate and complete access to all the information they need to write a dictionary entry. Each tab displays or leads to available resources related to the headword through an array of hyperlinks, so that users do not have to type in any query. This aspect of the Workbench makes possible and relatively easy deep searches about complex Tibetan semantic units across a large number of resources.

### *Dictionaries*

Most dictionary queries are usually about simple Tibetan

expressions. As a consequence, we simplified the display of the first tab to speed up information retrieval and to improve user experience. The essential information displayed on the first tab is divided into five sections to provide a quick overview of the search word:

- Term info
- English resources
- Verb forms
- Tibetan and Sanskrit resources

Term info (Fig. 2) contains information about the headword that will be provided manually by the Workbench editors and collaborators. There is no original dataset for this section as it will be developed as a wiki-based collaborative project. Future English definitions of the headword provided by editors and contributors will thus be included in this section.

Term Info	
དགོངས་པ་	
<b>Wylie</b>	dgongs pa
<b>Part of Speech</b>	n
<b>Semantic Fields</b>	Hermeneutics; Mind
<b>Etymology</b>	v. dgongs

Fig. 2 – The Dictionaries tab - Term info

The second section lists all Tibetan-English dictionaries for which comprehensive datasets are already available (Fig. 3). At the present development stage, this section includes the Rangjung Yeshe Dharma Dictionary, Hopkins & 84000 glossaries, as well as the entries corresponding to Richard Barron's glossary as an example of a dataset based on the work of a translator.

English Resources		
<b>Rangjung Yeshe Dictionary</b>	<b>dgongs pa. dgongs pa. dgongs pa. dgongs pa.</b> <i>dgongs</i> trans. v. (f) Of <i>bsam pa</i> . 1) mind, frame of mind, attitude, intention, thought, consideration, viewpoint, idea. 2) [to emphasize the honorific] enlightened intent, wisdom mind, realization, insight, vision, wisdom, meditation, deep experience. 3) to think, consider, concentrate upon, reflect, understand, give thought to, care for, feel, regard, realize, know, decide, intend. 4) meaning, intent, implication, understanding, cognizance, necessity, intimation, interpretation: <i>kyi dgongs pa</i> enlightened intent behind. 5) implicative, meant for, intended to be. 6) deepest sense, primordial condition, deep structure <i>dgongs pa sangs rgyas kun dang dbyer med par bzhugs</i> his wisdom mind is inseparable from that of all the Buddhas [for Dzogchen] enlightened intention) [for lower approaches] enlightened perspective/ outlook ... <i>kyi dgongs pa</i> - enlightened intention behind/ perspective/ outlook concerning ...	169 fuzzy match(es)
<b>Hopkins Glossary 2015</b>	thought: thinking: thinking of: hidden meaning: intention: notion consideration: exalted consideration: thought: thought behind it: standpoint: intent: perspective	50 fuzzy match(es)
<b>Hopkins Others' English 2015</b>	(C)intent(ion): desire: purpose: attempt: [to hurt]: veiled: indirect: with hidden meaning: grace(?) (C)hidden intent: with hidden meaning	11 fuzzy match(es)
<b>84000 Glossary</b>	No direct match.	2 fuzzy match(es)
<b>Richard Barron's glossary</b>	... <i>kyi dgongs pa</i> - enlightened intention behind/ perspective/ outlook concerning ... (for Dzogchen) enlightened intention) [for lower approaches] enlightened perspective/ outlook	6 fuzzy match(es)

Fig. 3 – The Dictionaries tab - English resources

The next section documents verb forms related to the headword, if relevant. This dataset is drawn from Hill 2010 (*A Lexicon Of Tibetan Verb Stems As Reported By The Grammatical Tradition*). It contains essential information regarding present, past, future, and imperative stems, syntax (e.g., transitivity, ergativity, etc.), meaning, and usage (Fig. 4).

Verb Forms	
Verbinator	
<b>dgongs</b>	<b>Present:</b> <i>dgongs</i> LZ, CD, ND, DK, DS, TC. <b>Past:</b> <i>dgongs</i> LZ, ND, DK, [DS], TC. <b>Future:</b> <i>dgongs</i> LZ, DK, [DS], TC. <b>Imperative:</b> <i>dgongs</i> LZ, DK, TC. <i>Voluntary:</i> TC, (Hoshi 2003). <i>Transitive:</i> DS, TC. <b>Syntax:</b> [Erg, Obl] (Hackett 2003). <b>Characteristic Example:</b> <i>thugs la</i> LZ. <b>Meaning:</b> 1. To think, to reflect, to contemplate, to consider. 2. (usually with terminative of the infinitive) To purpose, intend CD. To think, to reflect, to contemplate.

Fig. 4 – The Dictionaries tab - Verb forms

In addition to this, a Tibetan definition from the Monlam dictionary is displayed in the Tibetan section of the page (Fig. 5). This definition is accompanied by tags in Tibetan regarding the POS and semantic field of the headword.

Tibetan Resources					
སྤོན་ལམ་ཚོག་མཛོད་ཆེན་མོ།					
<p>དགོངས་པ་ ལྷགས། མ་དུ་ཡོག་ དགོངས་པ་ནི་རྣམ་འཕྲོར་གྱི་རྒྱུ་ལ་བྱ་སྤྱ། མན་ངག་ལྷ་ཤིང་གི་འབྲེལ་པ་ལས། དགོངས་པ་ནི་རྣམ་འཕྲོར་གྱི་རྒྱུ་དེ། དེར་གསལ་སྤྱི་དགོངས་པ་མ་ལུས་པའི་གཞི་བཅས་ཏེ་བསྟན་པ་འི་ལྗོངས་ཏེ། འདི་ལྷ་རྩེད་སྤྱི་གསུང་བྲུགས་ཡོན་ཏེན་ཤིན་ལས་རྩམས་ཀྱི་བཀོད་པའི་རྒྱུ་གྱི་དཀྱིལ་འཁོར་མ་ལུས་པ་མཚས་ཅད་ཀྱི་གཞུང་བཟོན་གསུང་ཏེ། རྣམ་འཕྲོར་གྱི་རྒྱུ་ལ་གཙོ་བོར་མཛོད་དུས་སྤྱགས་ཀྱི་ལོག་པ་བཀོད་ཏེ་བསྟན་ཏེ། །ཞེས་གསུངས།</p>	<table border="1"> <tr> <td>Part of Speech</td> <td>མིང་ཚོག་</td> </tr> <tr> <td>Domain</td> <td>རྣམས་ལྷགས།</td> </tr> </table>	Part of Speech	མིང་ཚོག་	Domain	རྣམས་ལྷགས།
Part of Speech	མིང་ཚོག་				
Domain	རྣམས་ལྷགས།				

Fig. 5 – The Dictionaries tab - Tibetan resources

Finally, the first page includes an entry drawn from Negi 1993 showing possible Sanskrit equivalents for the Tibetan headword (Fig.6). The Negi dictionary contains detailed examples with references for each word meaning. These references are easily accessible by hovering over

the abbreviated mention of a source. In addition, it is possible to click on hyperlinks leading to possible Tibetan synonyms displayed in the body of the entry, a useful feature considering that the Lotsawa Workbench contains several hundred thousand wiki pages.

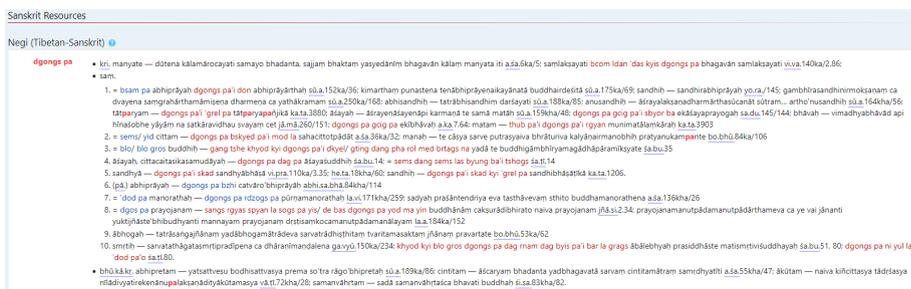


Fig. 6 — The Dictionaries tab - Sanskrit resources

### Tibetan, Sanskrit, Chinese

Reading Tibetan canonical literature requires to “read the Sanskrit behind the Tibetan”, and, occasionally, to refer to Chinese translations to better understand technical or obscure passages in the Tibetan source text. To facilitate this process, we included Sanskrit and Chinese resources to the Lotsawa Workbench.

The Tibetan, Sanskrit, and Chinese tabs display (or link to) entries from the following dictionaries:

- Tibetan: *Bod rgya tshig mdzod chen mo, Dung dkar tshig mdzod chen mo, Mon lam tshig mdzod chen mo.*
- Sanskrit: *Bod dan legs sbyar gyi tshig mdzod chen mo (Negi’s Tibetan-Sanskrit dictionary), Buddhist Hybrid Sanskrit Dictionary, Mahāvvyutpatti, Indo-Tibetan Lexical Resource (link to ITLR, University of Hamburg).*
- Chinese: Digital Dictionary of Buddhism.<sup>38</sup>

The entries listed correspond to direct matches (i.e., headwords in the dictionaries that perfectly match the queried expression) or a sample of fuzzy matches (i.e., partial match at the level of the *definiens* or the *definiendum* in the listed dictionaries). Two links to pages where all fuzzy matches are listed are provided (Fig.7). In the case of common

<sup>38</sup> See <http://www.buddhism-dict.net/ddb/>. Accessed on August 14, 2021. Other scholarly resources are currently available online, such as <https://chinesereferenceshelf.brillonline.com/chinese-english>. Accessed on August 14, 2021.

expressions, the number of matches can be quite large.

The screenshot shows the 'Project Glossaries' tab in the Tibetan Workbench. It displays search results for the Tibetan expression 'ལྷན་གཞི་རྒྱལ་ཤེས་རིག་རྒྱུ་ལྡན་པའི་ལྷན་པོ།'. The results are organized into two main sections, each with a 'Part of Speech' and 'Domain' field. The first section lists 'ལྷན་གཞི་རྒྱལ་ཤེས་རིག་རྒྱུ་ལྡན་པའི་ལྷན་པོ།' with a domain of 'ལྷན་པོ།'. The second section lists 'ལྷན་གཞི་རྒྱལ་ཤེས་རིག་རྒྱུ་ལྡན་པའི་ལྷན་པོ།' with a domain of 'ལྷན་པོ།'. At the bottom, there are filters for 'All 2 matches in expression' and 'All 1 matches in definition'.

Fig. 7 — The Tibetan tab

In addition to this, Workbench editors and contributors can manually enter data to add relevant information to these entries through a set of forms.

### Glossaries

The Glossaries tab includes glossaries that are specific to some translation projects or teams. In some of the more structured translation projects, translations have to be approved by a board of editors. Translators might find it useful, in that case, to know what English expression has been used in previous project translations to render a Tibetan word. Each individual entry in this tab is referenced and includes information about the Tibetan word, the Sanskrit equivalent if available, the English rendering, the translator, and the translation reference (see Fig. 8 below).

The screenshot shows the 'Glossaries' tab in the Tibetan Workbench. It displays a table of entries with the following columns: Date, Author/Translator, Book, Wylie, Sanskrit, English, and Definition. The table contains three entries:

Date	Author/Translator	Book	Wylie	Sanskrit	English	Definition
2016	Dorje, G. Chos dbyings stobs ldan rdo rje	The Complete Nyingma Tradition from Sutra to Tantra. Books 15 to 17 Vol. 2	dgongs pa	abhipraya/ sandhi	enlightened intention	
2015	Callahan, E. Karmapa, 3rd Jam mgon kong sprul	The Profound Inner Principles	dgongs pa		understanding intended meaning view meaning thought underlying thought consideration perspective specific intention intentional ambiguity to have in mind	
2014	Charrier, C. Brunnhözl, K. Pawo Rinpoche, 2nd	Au cœur du ciel, Vol. II	dgongs pa	abhisamāpī abhiprīya		

Fig. 8 — The Glossaries tab





Word sketches are provided by SketchEngine.<sup>39</sup> They are extremely detailed corpus-linguistic presentations of lexical and syntactic patterns illustrating the way the headword is used across a corpus. The reference corpus for Tibetan on SketchEngine is The Annotated Corpus of Classical Tibetan (ACTib 2.0).<sup>40</sup> It is POS-tagged and lemmatized, and includes the main genres of Classical Tibetan literature. Word sketches document the grammatical and collocational behavior of words. This information is not relevant in the case of common words, but it is essential to better understand complex terms. Through word sketches, users can quickly get a sense of the lexical and grammatical relationships involving the searched word. This is a very important tool for any serious lexicographical work (see Fig. 12) since it can drastically increase the quality of dictionary entries.

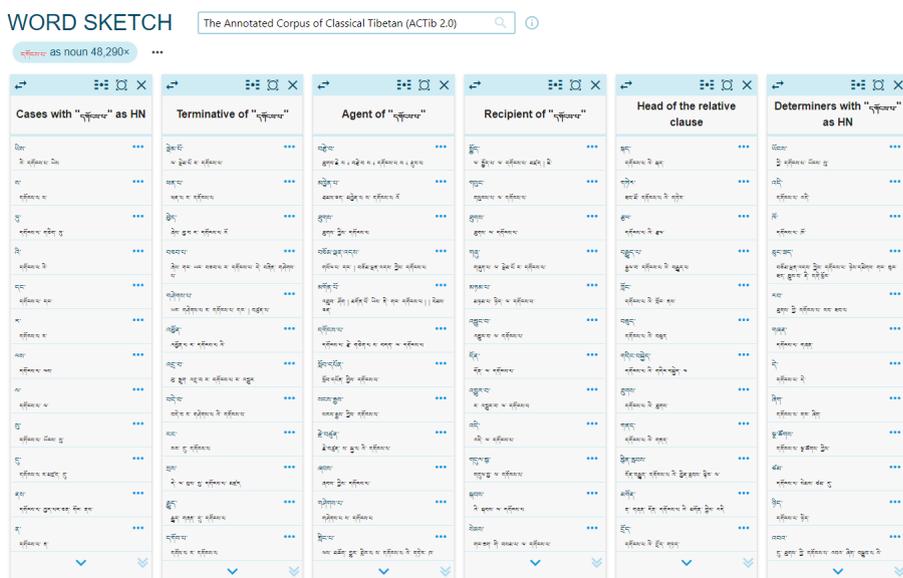


Fig. 12 — Word sketches (SketchEngine)

Dictionaries usually provide “dictionary examples” in the form of short sentences or clauses illustrating a regular pattern typical of the word usage. SketchEngine allows the automatic extraction of good dictionary examples (GDEX), a feature that we are considering to implement in the future. Until then, examples found in available datasets (e.g., Hopkins - Examples) will be integrated into this tab.

The wiki-based collaborative approach at the core of the Lotsawa Workbench also allows users to add their own examples if they wish

<sup>39</sup> <https://www.sketchengine.eu/>. Accessed on June 14, 2021.

<sup>40</sup> See Meelen, Roux, and Hill t.p.

to illustrate any idiosyncratic or noteworthy usage of the headword. This part of the tab will include collocations and stock phrases, specialized usage, proverbs, and idioms.

### *Textual Attestation*

In the many exchanges we had while developing the Workbench, several translators expressed the wish to look at texts in which the headword occurs to get a sense of the register and genre of some complex expressions. This feature is particularly useful when the source language is specific to a topic or a time period. We designed this tab in order to facilitate this kind of textual analysis (see Fig. 13).



Fig. 13 — *The Textual Attestation tab*

The hyperlinks on this page automatically take users to repositories where they can have a look at the headword in its own textual environment.<sup>41</sup> The rKTs is one of the best resources online for Tibetan canonical literature. The query performed through the hyperlink immediately gives a sense of the type of literature the searched expression belongs to (e.g., *sūtra*, *tantra*, *śāstra*, etc.).

The TLB can provide equivalent expressions in Chinese and Sanskrit for Tibetan words. It is a massive translation memory including central Buddhist texts. When the Tibetan source text is unclear, the TLB can provide the Sanskrit, if extant, or a Chinese translation that can help unravel the meaning of the Tibetan text. Buddhanexus is an invaluable resource to detect underlying intertextual patterns. This tool is thus very interesting when translating a versified root text that is elucidated in various commentaries. Through Buddhanexus, users can for example quickly identify texts that gloss the meaning of a

<sup>41</sup> See links and abbreviations in footnote 22 above.

technical term. Although BDRC etexts cover canonical and non-canonical texts, its repository of Tibetan autochthonous digital texts is unparalleled. The UI includes the possibility to filter results by author, time period, or genre. This feature is extremely useful for a diachronic analysis of a semantic unit.

It is obvious that such sophisticated queries are not necessary when dealing with common Tibetan words. However, they are important resources to understand and document complex multi-word semantic units, a task users should be able to perform if they translate difficult passages or write dictionary entries.

### *Scholarship*

This tab includes hyperlinks to Google searches based on the headword. These links are useful to find secondary literature or online scholarship about complex expressions through automatic queries of Google Scholar, Semantic Scholar, Cinii, Academia.edu. The page also offers a few links to specialized knowledge bases or proper nouns, if users are interested in checking names of persons or places containing the headword. In addition to those, various online sites offering useful lexicographical and textual resources are accessible through hyperlinks (see Fig. 14).

The screenshot shows the 'Scholarship' tab selected in the Lotsawa Workbench. The interface has a light blue header with the logo and title 'LOTSAWA WORKBENCH'. Below the header is a navigation bar with tabs: Dictionaries, Curated Content, Project Glossaries, Translation Memories, Collocations, Word Usage, Textual Attestation, and Scholarship. The main content area is divided into four sections:

- Secondary Literature**: A list of six links: Google Book, Google Scholar, Semantic scholar, Academia.edu, Digital Himalaya, and CiNii.
- Proper Name Indices and Databases**: A list of four links: Dan Martin's Tibetosophy, The Treasury of Lives, Sakya Research Center Person Search, and Sakya Research Center Place Search.
- Additional Lexicographical and Textual Resources**: A list of seven links: Nitartha Dictionary, Tshig Mdzod Chen Mo at Nitartha, Monlam Dictionary at Nitartha, Lotsawa House, Tib Shelf, Rigpa Shedra Wiki, and Dzogchen Wiki (French).
- Blogs**: A section with a link to search for རྟོན་སྣམ་ in the blogs of Jean-Luc Achard, Dan Martin, Robert Mayer, Sam van Schaik, and Dorji Wangchuk here.

Fig. 14 — The Textual Attestation tab

### Proper Nouns

The Proper Nouns tab links to online resources such as The Treasury of Lives (TOL) and BDRC (Fig.15) and to the People page within the knowledge base where additional information (e.g., TOL & BDRC identification numbers) about queried proper nouns can be found (Fig.16).

Page	Wylie	Other Names	BDRC	TOL
Lachen Gongpa Rabsel (TOLID 2816)	bla chen dgongs pa rab gsal	<ul style="list-style-type: none"> <li>• dgongs pa rab gsal (Primary Name, Extended Wylie, Tibetan)</li> <li>• Gongpa Rabsel (Primary Title, Library of Congress, English)</li> <li>• Gewa Rabsel (Personal Name, Library of Congress, English)</li> <li>• dge ba rab gsal (Personal Name, Extended Wylie, Tibetan)</li> <li>• mu zugs gsal 'bar (Personal Name, Extended Wylie, Tibetan)</li> <li>• Muzuk Salber (Personal Name, Library of Congress, English)</li> </ul>	<a href="#">BDRC</a>	<a href="#">TOL</a>

Fig. 15 — The Proper Nouns tab

### People/Treasury of Lives/Lachen Gongpa Rabsel (TOLID 2816)

[People](#)

<b>Treasury of Lives ID#</b>	2816 <a href="#">TOL Link</a>
<b>Bdrc RID#</b>	P1523 <a href="#">BDRC Link</a>
<b>Epithet</b>	
<b>Primary Name</b>	Lachen Gongpa Rabsel
<b>Wylie Epithet</b>	
<b>Wylie Name</b>	bla chen dgongs pa rab gsal
<b>Phonetic Display Name</b>	Lachen Gongpa Rabsel
<b>Wylie Display Name</b>	bla chen dgongs pa rab gsal
<b>Name Variants</b>	<ul style="list-style-type: none"> <li>• dgongs pa rab gsal (Primary Name, Extended Wylie, Tibetan)</li> <li>• Gongpa Rabsel (Primary Title, Library of Congress, English)</li> <li>• Gewa Rabsel (Personal Name, Library of Congress, English)</li> <li>• dge ba rab gsal (Personal Name, Extended Wylie, Tibetan)</li> <li>• mu zugs gsal 'bar (Personal Name, Extended Wylie, Tibetan)</li> <li>• Muzuk Salber (Personal Name, Library of Congress, English)</li> </ul>

Categories: [People](#) | [People Pages from Treasury of Lives](#)

Fig. 16 — The People page

### Notes

The last tab displays scholarly notes about the headword. It is

designed to keep track of any information not included in other tabs (Fig.17). This data can be either mass imported from available datasets (e.g., footnotes from Tsadra publications) or manually entered into the knowledge base by editors and contributors.

Submitted Notes		
<a href="#">Add/Edit Notes</a>		
<b>Gregory Fogues</b> The translation of the title of the <i>Saṃdhirnirmocanaśāstra</i> (Tib. <i>dgongs pa nges par 'grel pa zhe'i bya ba theg pa'i chen po'i mdo</i> ) is the object of several discussions among scholars regarding the meaning of the Sanskrit words <i>saṃdhi</i> and <i>nirmocana</i> following Lamotte's first complete translation of the text. Among the various translations into English of this Sanskrit compound, I opted for simplicity and translated the Sanskrit <i>saṃdhirnirmocanaśāstra</i> with "The Sūtra Unraveling the Intent," which I believe renders accurately the meaning and structure of the text. Various interlocutors indeed ask the Buddha repeatedly to explain difficult points in order to clarify the purpose of his seemingly contradictory or complex doctrines on the nature of reality. On this point, see Lamotte 1935, p. 12ff; Ware 1937; Edgerton 1937; Edgerton 1953, p. 558; and later Keenan 1980, p. 126; Powers 1991a, and Powers 1993b, p. 28f.		
Reference Notes from Other Works [i.e. Footnotes/Endnotes]		
Book	Author/Translator	Note
Frameworks of Buddhist Philosophy	Jam mgon kong sprul Callahan, E.	14 This includes such sūtras as the Descent into Lanka Sūtra ( <i>Laṅkāvatārasūtra</i> , Long far gzhag pa'i mdo). Sūtra Unraveling the Intention ( <i>Saṃdhirnirmocanaśāstra</i> , <i>dgongs pa nges par 'grel pa</i> ). Genuine Golden Light Sūtra ( <i>Svomaṃrabhāsottamaśāstra</i> , <i>gSer 'od dam pa'i mdo</i> ). Note that the designations of texts as belonging to one of three turnings of the dharma wheel is thematic rather than based on historical chronology.
Frameworks of Buddhist Philosophy	Jam mgon kong sprul Callahan, E.	280 <i>Thub pa dgongs gsal</i> . This may be <i>Thub pa dgongs pa rab gsal</i> by Sakya Pandita, Kunga Gyatshen (Kun dgor 'gyat mtshan) (1182-1251); however, I was unable to locate this comment in that text.
Frameworks of Buddhist Philosophy	Jam mgon kong sprul Callahan, E.	838 Inherent absence ( <i>nyisvobhava</i> , <i>ngo bo nyid med pa</i> ) is presented in the <i>Sūtra Unraveling the Intention</i> ( <i>Saṃdhirnirmocanaśāstra</i> , <i>dgongs pa nges par 'grel pa</i> ). Chapter 7: see Powers 1995, 98-105. It is also found in Kaṅga's <i>Compendium of Abhidharma</i> , Chapter 4: see Boin-Walsh 2001, 193. This term is also translated as "non-nature," "absence of own-being," or "lack of nature." See also Khengo Tsodrom Gyatso 1986; Mathes 2000, 215-7; Hopkins 2002, 103; and Brunnholt 2004, 470. Imagined characteristics do not exist by way of their own characteristics. The nature that they do not have is to be existent by way of their own characteristics.

Fig. 17 — The Notes tab

## 5. Future Development

The Lotsawa Workbench is a work in progress. The first phase of the project consists in linking available resources to the collaborative wiki platform to support the activities of translators and researchers interested in Tibetan Buddhist Literature. The second phase would be to develop the content of the knowledge base with regard to both quantity and quality on the basis of the information displayed on the Workbench tabs. This next step requires a collaborative approach to write or rewrite entries, if available resources are not entirely satisfactory. This is an ambitious project that will require organizing and training teams of lexicographers in order to improve the current knowledge base over time.

Possible areas for future development therefore include a variety of points that would keep adding value to the Workbench from the perspective of both users and researchers.

### *Turning translation memories into an encyclopedic knowledge base*

An interesting development for the Workbench would be to link headwords with longer essays pertaining to a specific topic. For example, some chapters of the Treasury of Knowledge could be used to document Buddhist technical terms such as *rkyen* and *rgyu* by linking Kongtrul's explanation of various doctrines of causality and

dependent arising to these headwords. By integrating into the knowledge base a corpus of short specialized essays by different authors on a variety of key topics, it would be easy to add an encyclopedic component to the Workbench. From a technical perspective, this could be easily achieved if translation memories (TM) of these texts are available. A simple TF/IDF (Term Frequency/Inverse Document Frequency) algorithm run on the Tibetan text of the TM would allow us to evaluate how important a headword is in relation to a text belonging to a corpus. All we would have to do then is to link the headword to all the documents to which the word in question is particularly relevant. This approach would be a fast and reliable way to turn the Workbench into an encyclopedic knowledge base of Buddhist terms according to primary sources. The same process could theoretically also be applied to information retrieval and document clustering of open access secondary sources.

#### *Semantic mapping of complex expressions*

The mapping of words in relation to their semantic environment could contribute to improve sense description at the microstructure level of the dictionary, particularly in the case of more complex expressions. On the most basic level, the semantic distribution of words can be assessed through word clouds. But more sophisticated options exist to achieve this such as word embeddings, or distributional word representations, a powerful way to explore the semantic space of some technical or rare expressions. Through a detailed analysis of relations of synonymy, antonymy, and semantically related lemmas, lexicographers are in a position to produce more accurate information while maximizing their resources. Some word-embedding tools have been recently developed to assist the lexicographer's task with regard to the dictionary-making process. Glossary extraction tools such as MGiza<sup>42</sup> could also be used to provide a simple bilingual alignment from available translation memories to complement the data produced through word embeddings. Computational lexicography as a whole is currently fast evolving. It is an area we intend to explore further in the future.<sup>43</sup>

#### *Definition and citation extraction*

The availability of NLP tools for Tibetan theoretically makes possible the automated extraction of definitions of technical Buddhist terms or

<sup>42</sup> See <https://github.com/moses-smt/mgiza>. Accessed on November 19, 2021.

<sup>43</sup> For an application of word embeddings to investigate a complex term (*zung 'jug* in the works of Mipham), see Forgues t.p.

frequent citations across a corpus. This approach would allow us to automatically populate the Workbench with quality content. Various strategies are possible here. Frequency across a large corpus could be one way to go in the case of important citations, although it could also be interesting to proceed with several specialized corpora (e.g., abhidharma treatises) from which it should be relatively easy to extract core definitions. These citations and definitions could then be included in the relevant entries to increase the content of the dictionary. To achieve this, we would have to train a model on a tagged-corpus or representative work, the idea being to minimize extraction time and post-processing work. Implementing this approach on the basis of a bilingual corpus (Tibetan-English) would offer the additional benefit of having definitions and citations in both languages.

#### *Integration of other languages and resources*

Pali and Sanskrit resources could be integrated into the Workbench. This feature would be particularly useful for translators working on canonical texts. When translating this type of literature, identifying the Indic term from which the Tibetan translation was made significantly increases the quality and accuracy of the English translation. A number of resources are available through the Cologne Sanskrit Dictionaries project. Including them into the wiki platform and linking them to Sanskrit equivalents for Tibetan headwords through hyperlinks would significantly speed up the process of checking the Sanskrit.

Regarding Tibetan words, it would be theoretically possible to integrate multimedia materials by linking to videos or by integrating images to the database. This feature would be extremely useful to document vernacular usages of the language for objects or places, as well as for religious symbols and practices. Furthermore, Tibetan displays some dialectal variations that could be better understood through this functionality. This kind of information would be particularly important for the translation of terms belonging to social or historical aspects of Tibetan culture, as often found in *rnam thars*.

In addition to this, it would be theoretically possible to include more target languages into the Workbench (e.g., French, German, Spanish, Portuguese, Russian, Chinese, etc.).

#### *Collaborations to develop curated spaces*

Another development avenue worth exploring is the collaboration with academic departments or translation teams to work on a specific semantic space or topic. The idea is to provide extensive lexicographic coverage of specialized or obscure terminology. Topics under

consideration include scholastic subjects (e.g., Pramāṇa), teachings (e.g., Dzogchen, Mahāmudrā), Sanskrit-Tibetan literature (e.g., sūtra collections with Leiden University "Open Philology" project).

Collaborations of this kind could be essential to build up curated spaces for which a team of scholars would be in charge of supervising and contributing to the content by adding definitions, information, or even bibliographical resources.

### *The Workbench as an educational tool*

The Workbench can be used as an educational tool to teach how to read Tibetan texts or to train translators. This could be done on the basis of developing curated spaces as mentioned above, or by looking at words that have been chosen for their pedagogical value. The platform structure is based on the various steps translators and researchers have to go through, when working on a text. With the Workbench, it becomes easy to walk students and junior translators through the entire translation process. This can be best done with more complex expressions where some specific issues have to be considered, such as Sanskrit Buddhist terminology or intertextuality. We plan to produce a few videos to explain this workflow for both canonical texts and Tibetan autochthonous compositions.

### *Integration into CAT (computer-aided translation) and AW (augmented writing) tools*

A large number of CAT and AW platforms have been developed that could be used for the translation of Buddhist texts.<sup>44</sup> From this perspective, the Lotsawa Workbench represents an important first step to structure the Tibetan-English lexicographical resources. Many applications could then be derived from this work, such as quick access to word meaning by hovering over words while reading Tibetan unicode texts.

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<sup>44</sup> On the technological innovations of AW tools, see Köhler Simonsen 2020.

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### Tsadra Translation Memories

Below is a list of translations sponsored by Tsadra Foundation that we would like to convert into bilingual alignments (Tibetan-English). These translation memories could be gradually integrated into the Lotsawa Workbench. This broad selection of treatises covers a wide range of specialized topics ranging from Abhidharma to tantric instructions:

Asaṅga, Maitreyaṅgātha, Gzan-phan-chos-kyi-snañ-ba, and Mi-pham-rgya-mtsho. 2014.

*Ornament of the Great Vehicle Sūtras: Maitreya's Mahāyānasūtrālamkāra with commentaries by Khenpo Shenga and Ju Mipham.* Boston: Snow Lion Publications.

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*The Treasury of Knowledge: Myriad Worlds [Book One].* Ithaca: Snow Lion Publications.

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### **Datasets**

We would like to thank the following persons and project teams for having shared with us the data we aggregated into the Lotsawa Workbench or linked to our platform:

Christian Steinert  
<https://dictionary.christian-steinert.de/#home>

84000 - Translating the Words of the Buddha  
<https://84000.co/>

Resources for Kanjur & Tanjur Studies (rKTs, University of Vienna)  
<https://www.istb.univie.ac.at/kanjur/rktsneu/sub/index.php>

Buddhanexus (University of Hamburg)  
<https://buddhanexus.net/>

Buddhist Digital Resource Center (BDRC)  
<https://library.bdrc.io/>

Thesaurus Literaturae Buddhicae (TLB, University of Oslo)  
<https://www2.hf.uio.no/polyglotta/index.php?page=library&bid=2>.

Indo-Tibetan Lexical Resource (ITLR, University of Hamburg)  
<https://www.itlr.net/test.php?md=view>

Cologne Digital Sanskrit Dictionaries (University of Cologne)  
<https://www.sanskrit-lexicon.uni-koeln.de>

Esukhia

<https://github.com/Esukhia>

The idea of developing a platform that would connect relevant knowledge bases in a way that is user friendly for scholars interested in Tibetan literature and translation would have been impossible to implement without all the work accomplished by these projects. We would like to express our gratitude to all the project teams and scholars who are partners of the Tsadra Lotsawa Workbench.

As mentioned above, the Tsadra research team will add new resources to the Lotsawa Workbench, such as specialized translation memories produced from available translations supported by Tsadra Foundation. In addition to the lexicographical data we contributed to produce, we integrated the following datasets to our website:<sup>45</sup>

From Christian Steinert's github repository:<sup>46</sup>

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<sup>45</sup> Some of these datasets might still be in the process of being included in the knowledge base at the time of this publication.

<sup>46</sup> <https://github.com/christiansteinert/tibetan-dictionary>. The online links corresponding to the dataset available on Christian Steinert's github repository are listed here as mentioned on <https://dictionary.christian-steinert.de/#home> (accessed on August 12, 2021).

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<sup>47</sup> This entry includes all related dictionaries and glossaries included in the Rangjung Yeshe Dharma Dictionary.

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