

Computer-assisted interpreting systems in the education of simultaneous interpreters

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Abstract. The article deals with the analysis of the potential of existing terminology support systems for simultaneous interpreting and the experience of their use in universities. Based on the study the possibilities of their use in the educational process of domestic institutions of higher education in the training of interpreters were identified. It is proposed to choose the software products InterpretBank, Interplex, Interpreter's Help for training simultaneous interpreters. It has been found that the proposed programmes contribute to the students' ability to create their own glossaries on specific subjects, fill them in in different ways and use them directly when interpreting. The feasibility of practising CAI tools in a specialised simultaneous interpreting laboratory has been proved.

1 Introduction

The increase in the number of international contacts at various levels, the growing cooperation of multilingual partners, the growth of multinational companies and the intensification of their common discussions of topical issues make it necessary to provide interpretation for many international events – conferences, negotiations, meetings, etc. Interpreters, in particular those who provide simultaneous interpreting, play a key role in these events, as interpretation activities have recently shifted towards simultaneous interpreting.

Universities that train interpreters clearly respond to the needs of the interpretation market and increase their focus on their training by increasing the number of training places, offering new study programmes, modifying existing programmes and implementing new modules and subjects. Many of the adjustments to the content of interpreter training are related to the latest developments in information technologies, which are aimed specifically at meeting interpreter needs. Therefore, it is relevant to investigate the issues concerning the implementation of world experience in the educational process of Ukrainian and Chinese higher education institutions that train interpreters.

The purpose of this article is to analyse the potential of terminology support systems for simultaneous interpreting and the experience of their use in universities and to identify the possibilities of their use in the educational process

of domestic institutions of higher education in the training of interpreters.

2 Literature review

Recently, there has been a significant increase in the attention of scholars and practitioners to the use of computer-assisted interpreting (CAI) for terminological support of interpreting, in particular simultaneous interpreting. The urgent need to provide simultaneous interpreters with modern tools is convincingly demonstrated by the results of a survey conducted by Corpas Pastor and Fern, supported by representatives of London Imperial College and the University of Wolverhampton. Based on responses from respondents belonging to more than 40 translation associations in America and beyond, the authors reached the following conclusion: “In general we can clearly state that technology tools shed a whole new light on the profession and constitute a whole new range of possibilities for interpreters” [1]. A similar view on the importance of the impact and promise of CAI tools is expressed by Fantinuoli, noting that “computer-assisted interpreting is slowly changing the interpreting landscape and the statements of some scholars are very clear with regards to the potentiality of CAI tools” [2]. Concretising the potential of CAI to support interpreters, Fantinuoli sees it both in computer-assisted preparation in conference interpreting [3], and during the translation process itself [4]. Rütten [5] highlighted the features of some of the tools that can be useful for interpreters. The view that it is impossible to do without them in the present situation has been consistently defended in the papers of Corpas Pastor [6], Ro-

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dríguez et al. [7], Sandrelli [8, 9] justifies the relevance of interpreters' use of information technologies by their efficiency. Given the importance of new realities in the work of translators, Krüger suggests rethinking the essence of translation competence with a focus on the technological component [10].

At the same time, it can be stated that in the last five years publications have appeared which not only point to the need for changes in curricula and training programmes for translators in terms of implementing or enhancing the acquisition of modern interpreting tools, but also propose concrete ways of implementing these changes. In particular, Rodríguez-Castro considers that the environment in which translation takes place is changing rapidly, and therefore the traditional translation curriculum needs to be refined to include additional translator competencies to bridge the gap between the learning process and industry practice, which is developing [11]. Suggestions for changes in curricula made by other researchers relate to modifications in the technological training of interpreters [12], developing multimedia models to study CAI tools [13, 14], innovations in mastering the specificities of terminology resource management [15], incorporating CAT tools and ICT in the translation and interpreting training at the undergraduate level [16], and even integrating computer-assisted translation tools into language learning [17].

3 Result and discussion

3.1 Research on computer-assisted interpreting systems in the universities

Given the increasing use of computer-assisted interpreting systems during simultaneous interpreting, in particular at conferences, the question arises of how interpreters can be trained to use these systems during their university studies. In order to consider this aspect of interpreter training, we have looked at the experience of universities. A summary of the research carried out on the software products studied at these universities is presented in table 1.

Looking at the list of software products to support interpreting, we noticed that some of them are not only used in the teaching process at universities, but have also been developed by university academics. In particular, Claudio Fantinuoli, who teaches the course "Interpreting and Translation Technologies" at Johannes Gutenberg-Universität Mainz (Germany), is the developer of the software product InterpretBank. In fact, InterpretBank is a start-up based on a university project of the University of Mainz. This software development is now becoming increasingly widespread among users, including globally. It is worth noting that it is used by an organisation such as the Organisation for Economic Cooperation and Development (OECD). It is therefore not surprising that, apart from the University of Mainz, a number of universities around the world are interested in InterpretBank. This is a logical step on their part, since the programme has already been implemented in the educational process, tested and proven to be

effective. As shown in tables 1, InterpretBank is the programme studied in number of universities worldwide.

The developers of Interpreter's Help are not university staff, but also offer an academic subscription for students and teachers that enables them to create their own glossaries. This programme is therefore appropriate for use in students' self-study or autonomous learning. Obviously, this focus of the programme accounts for its less widespread implementation in interpreter training.

It is worth drawing attention to the wide range of software products with which the University of Heidelberg familiarises its students. These include, among others, the following programmes: Interpretbank, Interpreter's Help, Intragloss, Interplex, LookUp Pro, HeidelTerm CCT Maps. Understandably, they are not all studied by students with the same level of detail, but this list provides them with information about the availability of programmes on the market and the possibility of applying them in their future careers. Interestingly, the University of Heidelberg is also developing The Heidelberg Conference Interpreting Corpus (HeiCIC), which covers material in eight languages. This corpus has a visionary purpose, as the collected materials can be used to create glossaries, for use in CAI, etc. Students are also involved in the HeiCIC project and this gives them the opportunity to gain practical skills in the use of resources for computer-assisted interpreting systems in cooperation with experienced interpreters involved in the project.

We also note that some universities (Chinese University of Hong Kong (Shenzhen) (China), New Bulgarian University (Bulgaria)) do not specify in their curricula and programmes of courses for interpreters the software products they offer for study, meaning them only in general terms – Interpreting (CAI) tools. In our opinion, these universities obviously leave room for a wide choice of available software products, which can be made by both students and teachers. One limiting factor is the pricing policy of the developers and owners of the software products, because they are not free. However, as mentioned above, academic programmes are offered, a discount for students, and a discount for former students who continue to use the chosen product in their future careers as well.

Taking into account the existing experience of universities, the availability of software products based on the academic offer and the easy navigation, it can be concluded that three software products are the most preferred choice for students to study, namely: InterpretBank, Interplex, Interpreter's Help.

3.2 Development of the content of the module "Terminology Support Systems for Simultaneous Interpreting" and its implementation

The module "Terminology Support Systems for Simultaneous Interpreting" has been developed and implemented within the course "Basics of Creating Specific Glossaries". This choice of course and the name of the module was primarily due to the fact that the interpreter's main work in training for simultaneous interpreting with the use of CAI

Table 1. Computer-Assisted Interpreting tools in the universities.

University	Simultaneous interpreting technology / Software products
<i>Europe</i>	
Johannes Gutenberg-Universität Mainz/Germersheim (Germany)	InterpretBank
TH Köln (Germany)	InterpretBank Interpreter's Help
University of Heidelberg (Germany)	Interpretbank Interpreter's Help Intragloss Interplex LookUp Pro HeidelTerm CCT Maps (upcoming)
Universität Leipzig (Germany)	InterpretBank
University Surrey (Great Britain)	InterpretBank
University of Essex (Great Britain)	InterpretBank
Zürcher Hochschule für Angewandte Wissenschaften (Switzerland)	InterpretBank
Universiteit Gent (Netherlands)	InterpretBank
Universiteit Leuven (Netherlands)	InterpretBank
Universität Wien (Austria)	InterpretBank
Leopold-Franzens-Universität Innsbruck (Austria)	InterpretBank
The Josip Juraj Strossmayer University of Osijek (Croatia)	InterpretBank
Univerzitet u Tuzli (Bosnia and Herzegovina)	InterpretBank
Università degli Studi Internazionali di Roma (UNINT) (Italy)	InterpretBank
University of Bologna/Forlì (Italy)	InterpretBank
New Bulgarian University (Bulgaria)	Interpreting (CAI) tools
<i>Asia</i>	
İstanbul Yeni Yüzyıl University (Turkey)	InterpretBank
Hacettepe Üniversitesi (Turkey)	InterpretBank
Chinese University of Hong Kong (Shenzhen) (China)	Interpreting (CAI) tools
<i>North America</i>	
The University of North Carolina at Charlotte (USA)	InterpretBank
The Middlebury Institute of International Studies at Monterey (USA)	InterpretBank
Bellevue College Washington (USA)	InterpretBank
University Ottawa (Canada)	InterpretBank
<i>Latin America</i>	
Universidad Autónoma de Baja California (Mexico)	InterpretBank
The University of the West Indies (Trinidad and Tobago)	InterpretBank

systems consists precisely in the making of special glossaries. Such glossaries, which are formed on the basis of source material for interpretation or closely related material, saved in specialised formats, form the basis for the operation of these systems and are directly linked to the general concepts for their creation in the structure of the course.

Taking into account the experience of universities in studying CAI systems, the possibility to access functional versions of this software, the results of own experience with different systems, three systems were included in the developed module, namely: InterpretBank, Interplex, Interpreter's Help. The content of the module was structured in such a way as to focus the future interpreters' attention on the creation of the main type of terminology resource – glossaries in each of the programmes, on the one hand, and to give them the opportunity to test the usability and efficiency of their use in a simultaneous interpretation lab-

oratory environment, on the other hand. In addition, emphasis was placed on the specific features of each system, which provided additional advantages in their use.

When familiarising students with the InterpretBank system, it was primarily the opinion that it is a software for interpreters to search for information during simultaneous interpreting sessions and to prepare for conferences in a systematic way. InterpretBank has a modular structure. Each module is an independent software fragment designed to solve a specific task of the simultaneous interpretation workflow. However, these modules are inter-linked and work seamlessly together as a coherent tool. InterpretBank's structure consists of four modules, in particular: the preparation module, the terminology editor, the memorisation module and the search module. It is the terminology editor and the search module that have been the focus of most attention, while the information about the other modules has been of a more general nature.

An important step in mastering the terminology editor was the creation of a system of glossaries (figure 1), which should ensure that terms are structured according to certain characteristics in order to be used effectively in all phases of the preparation and execution of simultaneous interpreting. Of course, either it is advisable to structure the terminology entries within the glossaries by sector, by the name of the event or by another feature, that ensures their identification.

Since considerable efficiency in filling glossaries and sub-glossaries in InterpretBank can be achieved by importing entries, a separate part of the practical exercises was included in the module structure to acquire such skills. This is also used to practise the use of the system's tools, which allow the import of terminology entries, appropriately structured and saved in *xlsx*, *xls*, *ods*, *docx*, *doc*, *odt*, *tbx* files.

A created glossary or sub-glossary is the basis for working with InterpretBank not only during simultaneous interpreting, but also during the preparatory phase for the event. In particular, a separate module in the system (memorisation module) makes it possible to support the interpreters in learning the terms, which will be used during the conference and concentrated in the respective glossaries. The students learned the terms through this module in two modes: manual and automatic.

As mentioned above, considerable attention was given to the search module, since this is what provides terminology support for the interpreter directly during simultaneous interpreting at the workplace. In particular, the students were taught how to set up a term search in the languages, where among the options one can select all at once or individually defined ones. Depending on the letters of the query entered, the system generates a list of terms found in the glossary. The entered query is stored in the search box for up to three seconds, and the search results are displayed in the window that opens until the query is changed. Considering these features of the system encouraged students to develop qualities such as concentration, focus, instant decision making, etc. Such exercises had a particular effect when the relevant modules of the system were used, when the students were directly in the interpreter's booth at the workplace where the simultaneous interpreting session was simulated (figure 2).

The inclusion of the Interplex system in the structure of the training module was largely because it allows an extremely efficient search for words and expressions, even when the interpreter is working in an interpreting booth. The advantages of the system are the ability to search for queries in a large number of glossaries, which can be concentrated in the form of a terminology base. As Interplex has been developed primarily for the purpose of terminological support for simultaneous interpreting, it has concentrated on the creation and use of terminology bases and glossaries. These have been the focus of future interpreters. Interplex provides the possibility to create multiple termbases with many glossaries in each termbase, allowing for the concentration of terminology data according to different criteria.

It is possible to add to the created termbase by entering terms directly in the structure of the Interplex window or by importing structured entries from files in *txt*, *xlsx*, *docx* formats. It was quite logical that the students learned such skills quite easily, as they already had the skills to structure terminology data in such formats.

With a terminology database prepared and open in the Interplex structure, this system can be used as an effective tool for terminological support for simultaneous interpreting (figure 3). During the lab sessions the students practiced the search for translation of terms by full matching of the queries entered in the search box with the available entries in the terminology database, by partial matching, search in all glossaries of the open terminology database, in certain glossaries of the termbase, etc.

Unlike the two previous systems in the structure of the module "Terminology Support Systems for Simultaneous Interpreting", the Interpreter's Help system is different in that it is a cloud-based system. Since the work with this system is based on the use of terminology databases, it was logical to first train future interpreters to create and use them (figure 4). It took a fair amount of time to learn how to create the termbases, as the system allows to do this in three ways: by entering terms manually; by importing terminology records from a file (importing is possible from *docx*, *xls*, *xlsx*, *csv* files); by extracting terms from texts.

Each of these ways has its own advantages, which, if their features are used correctly, allow for a maximum acceleration of the process of forming terminological bases. All of them therefore needed to be separately recognised and mastered. A positive effect of this was that a significant number of operations were similar to those already learned when mastering the previous systems. The students did the fastest in mastering the manual entry of terms.

The method of importing terminology entries from a file was not very complicated either. To implement this method of completing the terminology database, the students first need to prepare the terminology records in tabular form and save them in one of the file formats: *docx*, *xls*, *xlsx*, *csv*, *ods*. The structuring of terms is classical, i.e. it involves having columns in a table of how many languages the term will be entered. This approach is fairly unified and its application in Interpreter's Help system has actually replicated what has already been tried and tested in other systems.

The way of filling in terminology bases by extracting terms from texts that originate for translation or are thematically similar has proved to be more difficult for the students. This is due to the fact that suitable tools for such operations are not present in all CAI systems. In the Interpreter's Help system, this function is available and can be implemented at the beginning of the creation of a terminology database (figure 5).

The window structure allows inserting text passages in any language available in the terminology base into the relevant fields. With this tool, the focus of the students was on analysing the text to identify the term and extracting it to the terminology database.

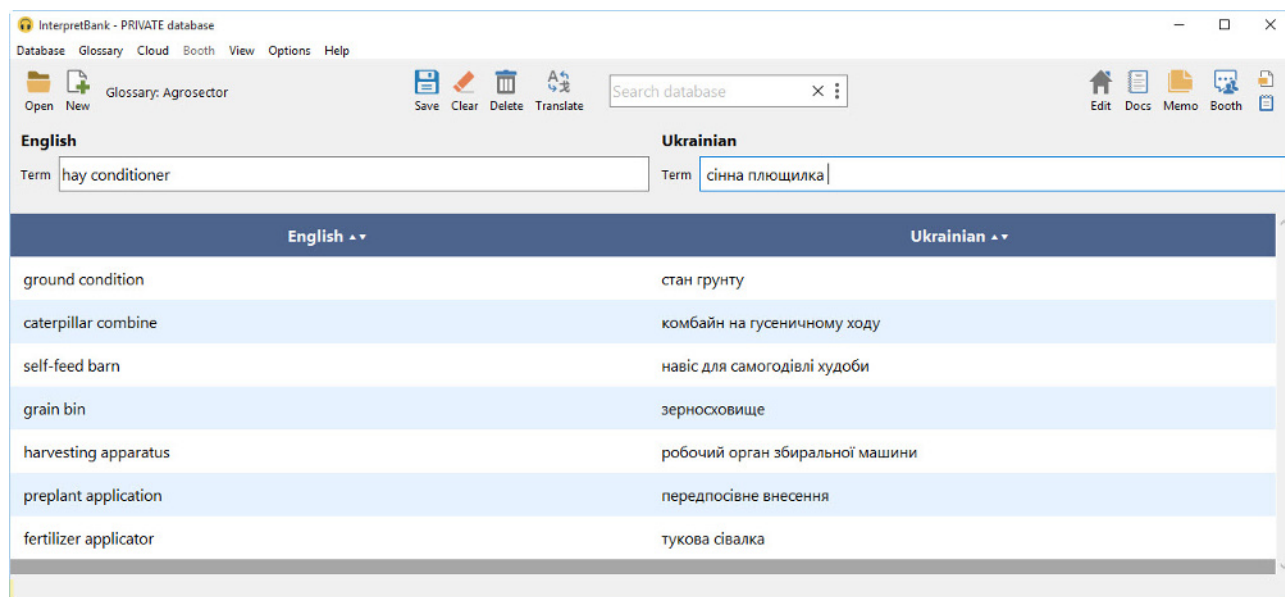


Figure 1. Creating a glossary in the system InterpretBank.



Figure 2. Working with the InterpretBank system in the interpreter's booth.

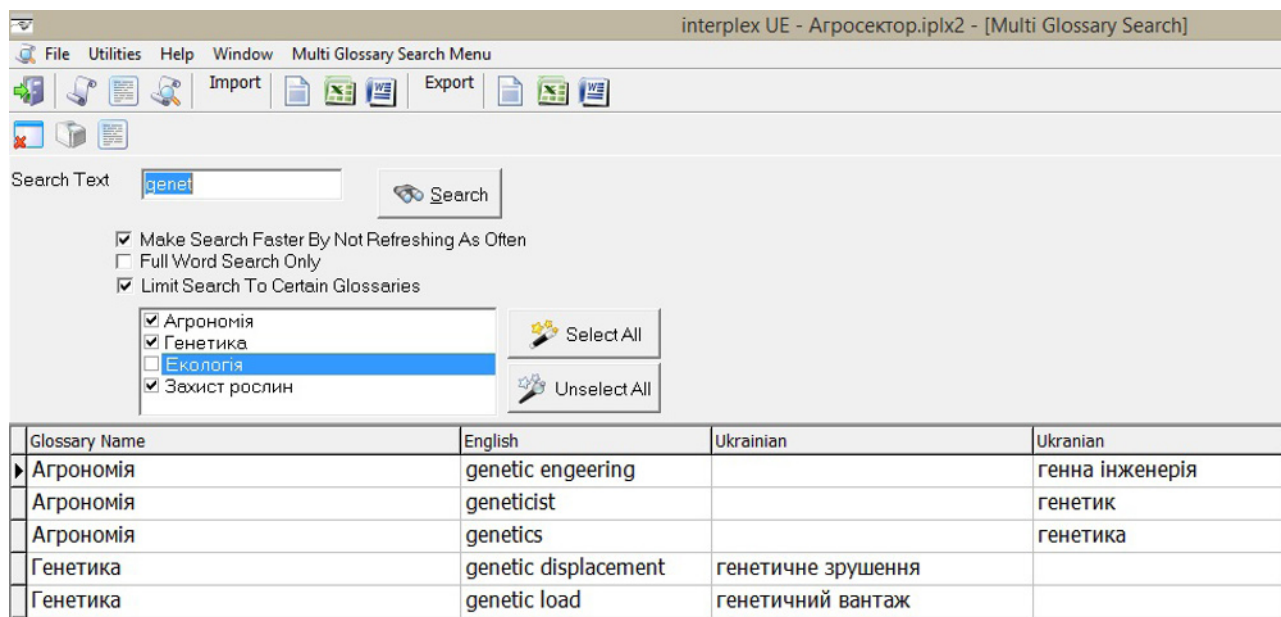


Figure 3. Terminology bases in the Interplex system.

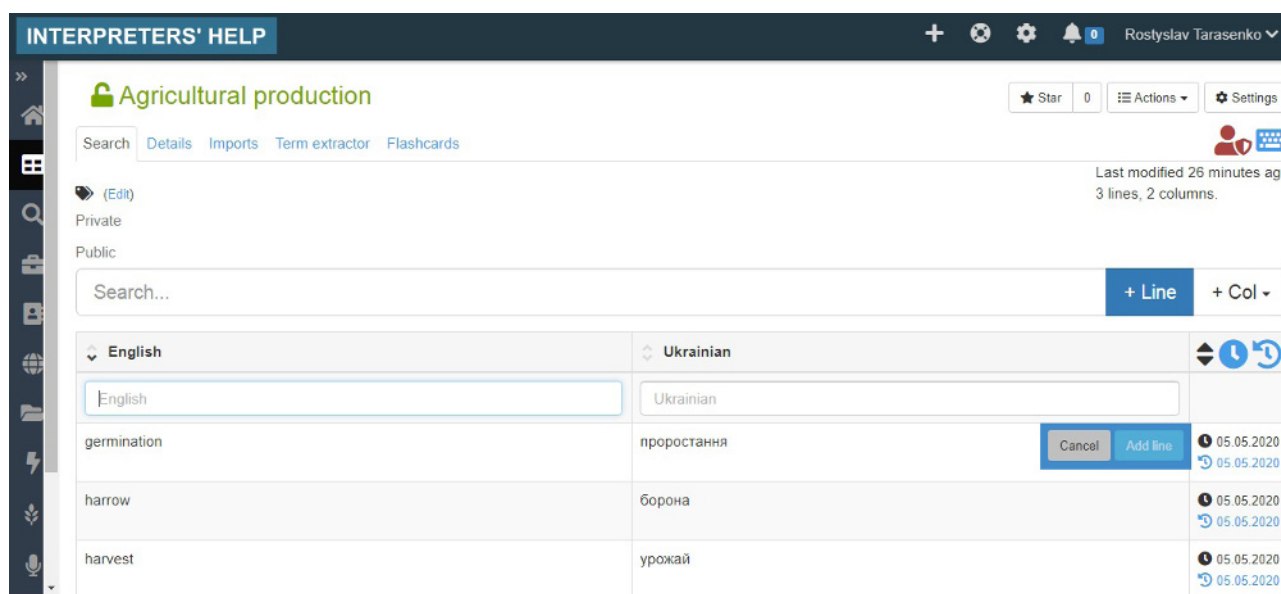


Figure 4. Creating a base in Interpreter's Help system.

To directly search for a term in the termbase, a skill the students practised in a simultaneous interpreting lab environment, it is necessary to enter it in the search bar. When entering even the initial letters of a term, the system automatically starts suggesting the entire list of entries in which the entered combination occurs. It is highlighted in yellow (figure 6). Further actions can be directed either to select a term from the suggested list or to create a more complete query to get more relevant search results.

3.3 Analysis of the difficulties of implementing the module “Terminology Support Systems for Simultaneous Interpreting”

After the students had studied the module “Terminological Support Systems for Simultaneous Interpretation”, we conducted a survey to identify the skills that need more attention during practical training in order to correct the relevant aspects of the module. Forty-two students took part in the survey and were asked to indicate the skills that caused them the most difficulties during their studies. The results are presented in table 2.

According to the survey data, the students found it easiest to learn how to create a subglossary, which makes

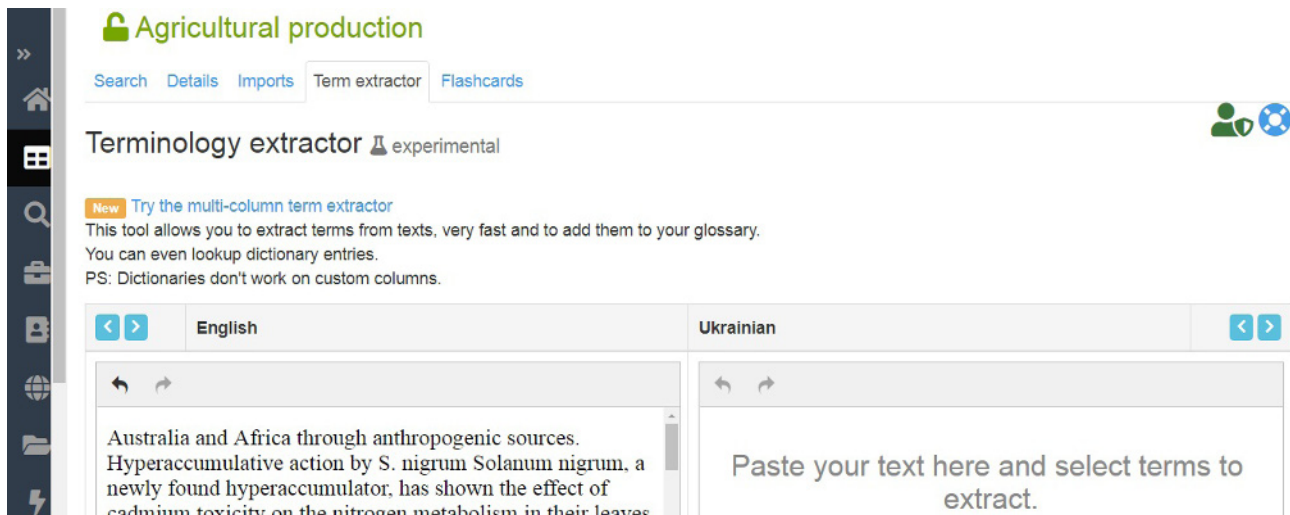


Figure 5. Extracting in Interpreter’s Help system.

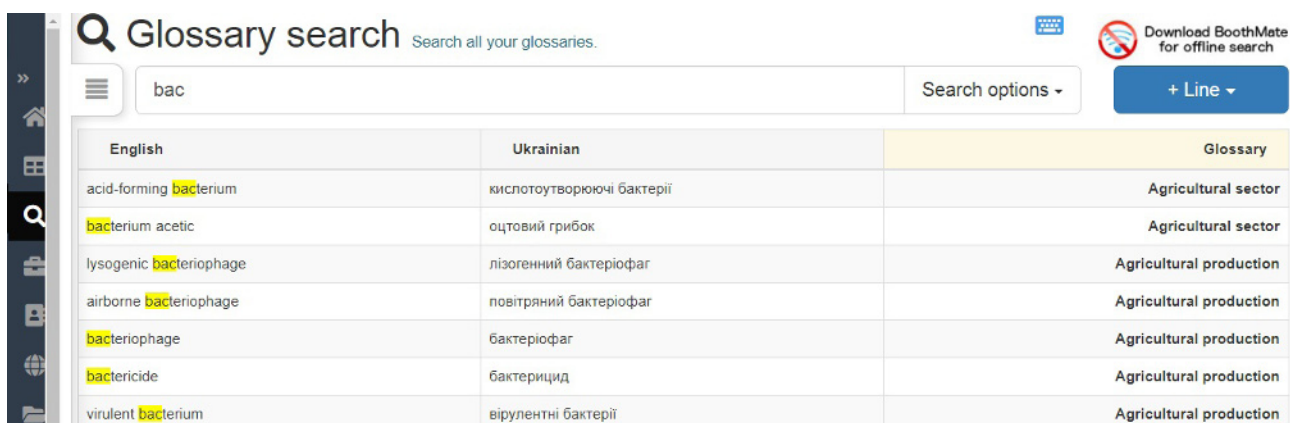


Figure 6. Search for terms in the Interpreter’s Help glossary.

Table 2. Difficulties with the skills of working with systems to support simultaneous interpreting.

Skills	Number of students who indicated them
Creating a glossary	12
Creating a subglossary	5
Creating a terminology base	8
Structuring terms	6
Manual entry of terms into the database	7
Importing terminology entries	8
Extracting terms from texts	11
Search for terms by full match	9
Search for terms by partial match	7
Working in real time	26

sense, because once they have learned how to create glossaries, it is much easier to perform such operations. Practically no difficulties were caused by the manual entry of terms into the termbase. The search for terms was somewhat more difficult to learn, especially when it was done

by full matches. The result of the terminology database survey was not entirely expected, as this is not a simple operation. However, it was by no means the most difficult for the students, due to their prior training in desktop and cloud-based CAT systems such as SDL Trados and Memsource [18]. On the other hand, more than half of the students found real-time work in an interpreter’s booth challenging, as such activity is complex and requires a range of skills to be formed and coordinated, maximum concentration for a certain amount of time, prior preparation from the subject of interpreting, etc.

Based on the students’ responses we have identified the skills that need to be given more time to practise - creating a glossary, extracting terms from texts and searching for terms with full matches. Furthermore, the focus will be primarily on practising the use of the learnt tools in the interpreter’s booth, which can be fully achieved in a specialised simultaneous interpretation laboratory.

4 Conclusions

The market for translation services, and subsequently the translation industry, has recently undergone significant

changes. Most of these are due to the development of information technologies and the constant improvement of specialised software products designed to support translation. Simultaneous interpreting, as a special type of translation, requires additional skills from the interpreter in the aspect of using CAI tools. This, in turn, pre-determines the need for improvement and modification of interpreter training programmes, strengthening their technological component, orienting the content towards learning modern technologies of simultaneous interpreting support. Consideration of the experience of foreign universities, the possibility of accessing functional versions of this software, the results of our own experience with the various systems have shown the advisability of introducing the relevant software products, in particular Interpret-Bank, Interplex, Interpreter's Help, into the content of interpreter training. They can be effectively studied by implementing a separate module in one of the professional courses. A special effect in mastering these software products can be achieved by practising the individual elements in a specialised laboratory in which a real simultaneous interpreting process is simulated. Studying the three systems in parallel strengthens the acquisition of skills in joint basic operations, and mastering specific functions ensures that prospective interpreters are able to choose the best set of tools for different tasks in the preparation and translation process. The practical implementation of the developed module has shown its effectiveness and also made it possible to identify ways to further improve the study of computer assisted simultaneous interpreting systems. The proposed programmes contribute to the students' ability to create their own glossaries on specific subjects, fill them in in different ways and use them directly during interpreting.

References

- [1] G. Corpas Pastor, L.M. Fern, Tech. rep., University of Málaga, Málaga (2016)
- [2] C. Fantinuoli, in *Trends in E-Tools and Resources for Translators and Interpreters*, edited by G.C. Pastor, I. Durán-Muñoz (Brill, Leiden, The Netherlands, 2017), Vol. 45 of *Approaches to Translation Studies*, pp. 153–174, ISBN 9789004351790, https://doi.org/10.1163/9789004351790_009, https://brill.com/view/book/edcoll/9789004351790/B9789004351790_010.xml
- [3] C. Fantinuoli, *The International Journal for Translation and Interpreting Research* **9**, 24 (2017), <http://www.trans-int.org/index.php/transint/article/view/565>
- [4] C. Fantinuoli, *InterpretBank. Redefining computer-assisted interpreting tools*, in *Proceedings of the 38 Conference Translating and the Computer* (Tradulex, Geneva, 2016), pp. 42–52
- [5] A. Rütten, *Terminology management tools for conference interpreters – current tools and how they address the specific needs of interpreters*, in *AsLing – The International Association for Advancement in Language Technology, Proceedings of the 39th Conference Translating and the Computer*, London, UK, November 16-17, 2017 (Tradulex, Geneva, 2017), pp. 98–103, <https://www.asling.org/tc39/wp-content/uploads/TC39-proceedings-final-1Nov-4.20pm.pdf>
- [6] G. Corpas Pastor, *Current Trends in Translation Teaching and Learning E* **5**, 138 (2018), <https://doi.org/10.5281/zenodo.5940648>
- [7] S. Rodríguez, R. Gretter, M. Matassoni, D. Falavigna, Â. Alonso, O. Corcho, M. Rico, in *Translation and Interpreting Technology Online* (2021), pp. 102–109, https://doi.org/10.26615/978-954-452-071-7_012
- [8] A. Sandrelli, J. Hawkins, *From Black Box to the Virtual Interpreting Environment (VIE): Another Step in the Development of Computer Assisted Interpreter Training*, in *The Future of Conference Interpreting: Training, Technology and Research. University of Westminster, 30 June –1 July 2006. London* (2006), https://www.emcinterpreting.org/emci/emci_drupal_data/CAIT%20Sandrelli%20%26%20Hawkins.pdf
- [9] A. Sandrelli, *MonTI. Monografías de Traducción e Interpretación* pp. 111–138 (2016), <https://doi.org/10.6035/MonTI.2015.ne2.4>
- [10] R. Krüger, *Journal of Translation and Technical Communication Research* **11**, 104 (2018), http://www.trans-kom.eu/bd11nr01/trans-kom_11_01_06_Krueger_Tektonik.20180712.pdf
- [11] M. Rodríguez-Castro, *The Interpreter and Translator Trainer* **12**, 355 (2018), <https://doi.org/10.1080/1750399X.2018.1502007>
- [12] R.O. Tarasenko, S.M. Amelina, A.A. Azaryan, *Improving the content of training future translators in the aspect of studying modern CAT tools*, in *Proceedings of the 7th Workshop on Cloud Technologies in Education (CTE 2019), Kryvyi Rih, Ukraine, December 20, 2019*, edited by A.E. Kiv, M.P. Shyshkina (CEUR-WS.org, 2019), Vol. 2643 of *CEUR Workshop Proceedings*, pp. 360–375, <http://ceur-ws.org/Vol-2643/paper21.pdf>
- [13] B. Prandi, *Designing a Multimethod Study on the Use of CAI Tools during Simultaneous Interpreting*, in *Proceedings of the 39th Conference Translating and the Computer*, London, UK, November 16-17 (2017), pp. 76–88, <https://cutt.ly/5KLYdb9>
- [14] F. Saina, *Technology-Augmented Multilingual Communication Models: New Interaction Paradigms, Shifts in the Language Services Industry, and Implications for Training Programs*, in *Proceedings of the 1st Workshop on Automatic Spoken Language Translation in Real-World Settings (ASLTRW)* (Association for Machine Translation in the Americas, Virtual, 2021), pp. 49–59, <https://aclanthology.org/2021.mtsummit-asltrw.5>
- [15] R. Tarasenko, S. Amelina, *A Unification of the Study of Terminological Resource Management in the Automated Translation Systems as an Innovative Element of Technological Training of Translators*, in *Proceedings of the 16th Inter-*

national Conference on ICT in Education, Research and Industrial Applications. Integration, Harmonization and Knowledge Transfer. Volume II: Workshops, Kharkiv, Ukraine, October 06-10, 2020, edited by O. Sokolov, G. Zholtkevych, V. Yakovyna, Y. Tarasich, V. Kharchenko, V. Kobets, O. Burov, S. Semerikov, H. Kravtsov (CEUR-WS.org, 2020), Vol. 2732 of *CEUR Workshop Proceedings*, pp. 1012–1027, <http://ceur-ws.org/Vol-2732/20201012.pdf>

- [16] I. Sikora, M. Walczyński, in *The Translator and the Computer 2. Proceedings of a Conference Held in Wrocław, October 25-26, 2014, organized by the Philological School of Higher Education and C&M Localization Centre*, edited by Ł. Grabowski, T. Piotrowski (Wydawnictwo Wyższej Szkoły Filologicznej we Wrocławiu, Wrocław, 2015), pp. 119–133, <https://tinyurl.com/4tmhnbm>
- [17] M. Fernández-Parra, in *New perspectives on teaching and working with languages in the digital era*, edited by A. Pareja-Lora, C. Calle-Martínez, P. Rodríguez-Arancón (Research-publishing.net, Dublin, 2016), pp. 385–396, <https://doi.org/10.14705/rpnet.2016.tislid2014.450>
- [18] R. Tarasenko, S. Amelina, S. Semerikov, L. Shen, *Educational Technology Quarterly* (2022), <https://doi.org/10.55056/etq.33>