

# Algorithms and technologies of training translators and interpreters for the Industry 4.0 economy

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# Shift in the Paradigm of Translator/Interpreter Training: why?

The training of a translator/interpreter has changed a lot since the end of the 20th century. Translators used to sit in the library for days on end and study dictionaries and encyclopedias. In the 21st century, libraries have been replaced by a computer, and the search for information has become much simpler. This has also led to a much greater popularity of the translation profession due to the increased number of tasks required of a translator/interpreter and, as a result, to an increase in its status.

# 1985 and 2019: preparation for the conferences



# Pandemic 2020: translators and interpreters

- The 2020 pandemic, after we have overcome its initial shock, further outlined new trends - now very often a translator/interpreter does not need to leave home at all to carry out his or her work: both preparation and translation/interpretation itself can be performed remotely.



# Pandemic 2020: teachers

But while the translator/interpreter managed to relatively quickly adapt to the “new reality”, translation/interpretation teachers at universities had a much more difficult time. University professors had other challenges to deal with: they were supposed to be efficient multitaskers: organize an online lesson, conduct it, check assignments, ensure that mistakes are corrected, come up with new ways to keep in touch with students, as well as maintain their interest when out of traditional classrooms.



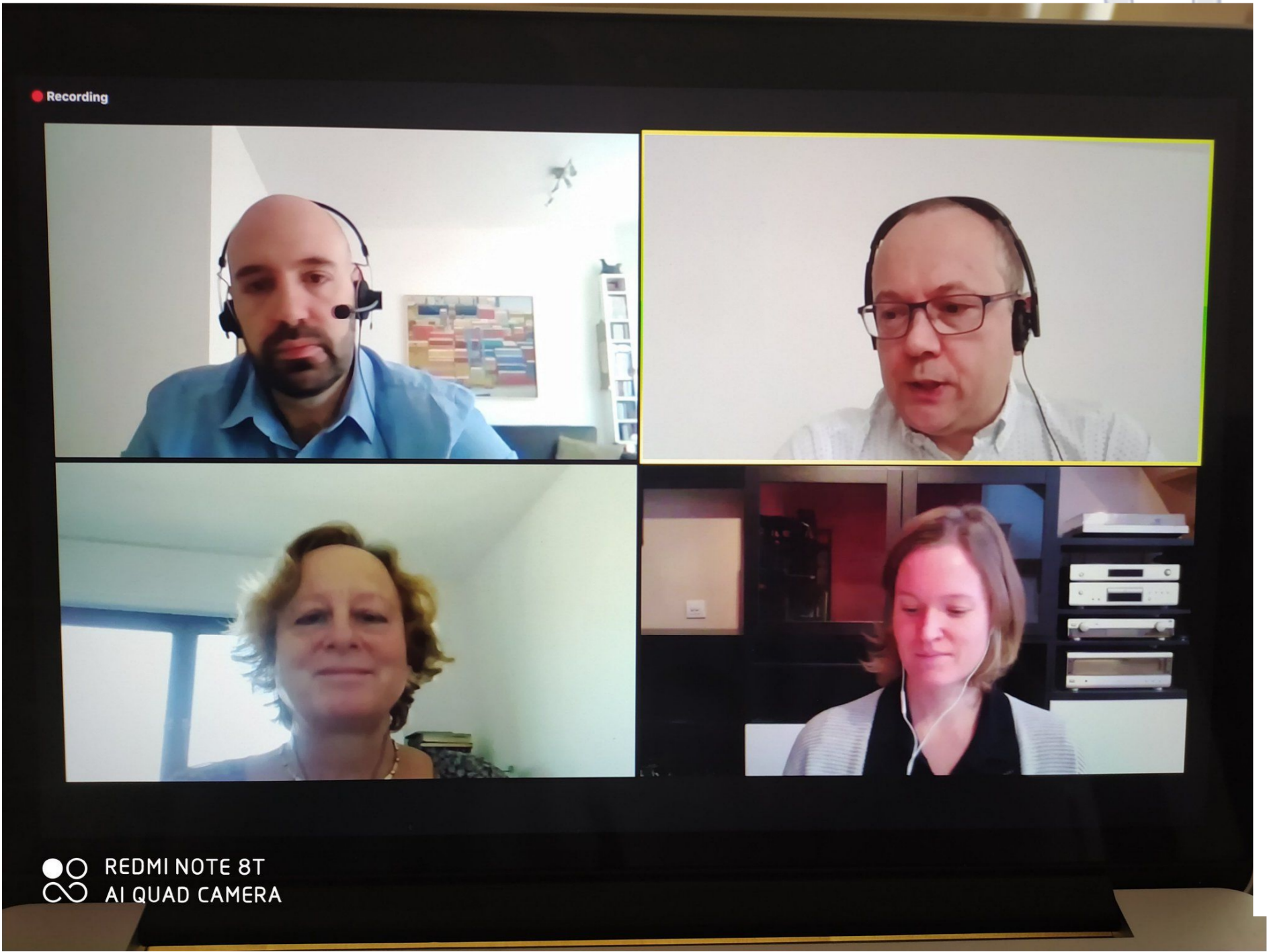
# Pandemic 2020: challenges and opportunities

Any crisis can give rise to both challenges and opportunities. The pandemic is no exception. The obvious challenge is the fact that the teacher is much more tired, spends much more time organizing classes. But the pandemic can also be an opportunity for the teacher to learn new things and change the paradigm and methods of teaching.

We saw "a marriage between adaptation and cooperation". Trainers adapted to the situation. We have understood, that we need:

- more efforts to create conditions for active work of students - their involvement;
- new virtual communities of students and teachers and active use of existing ones

# Post-COVID era



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# Pandemic 2020: Challenges and opportunities

“New normal” is a great catalyst of changes. All already actively ongoing processes have simply intensified and become even more active.

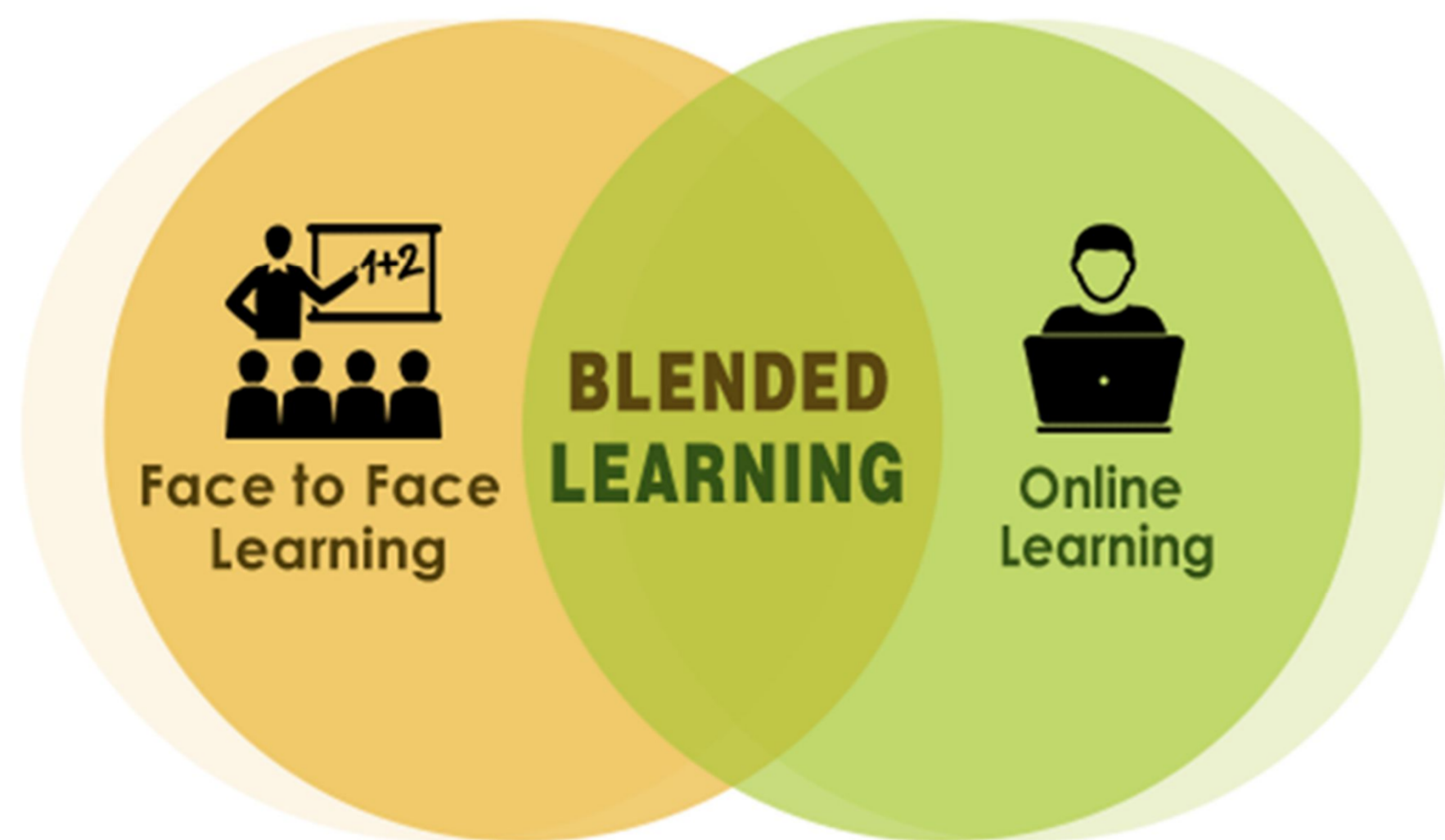
Positive shifts: greater cooperation between teachers and students - we solved technical problems together and helped each other, we became much closer to each other;

Questions:

- Do we want to set aside the "hybrid" approach now that we're back in the classroom?
- Is it necessary to change curricula, introduce new subjects related to the development of new technologies and translation/interpretation conditions?

# Blended learning

There are no clear answers to those questions yet. But one thing is certain: **blended learning** will stay with us for a long time. It used to be a simple combination of traditional classroom learning and online learning (both for students and advanced training for practicing translators). Now it should be understood differently: it is a combination of training in interpretation and translation; a combination of traditional interpreting training and remote interpreting training; a combination of training in conference interpreting and conference management. That means, there is a demand for communication professionals **with a broader set of skills**, well-versed in modern media and social networks, versed in cultural and regional specifics.



# Blended profession

Blended learning is to help our graduates become more competitive and flexible in the current market conditions.

It also gives ways to understand and embrace the changing paradigm of teaching a new generation of translators/interpreters!

The modern market demands communication professionals with a broader skill set, knowledge of modern media and social media, cultural and regional awareness.

So in the near future people with a blended profession will be in demand.



# New type of translator/interpreter

To meet current requirements, universities have no choice but train "new kind" of translators and interpreters:

- multifunctional;
- multitasking;
- flexible,
- trained to change in connection with market changes;
- who have a whole range of additional/soft skills and are ready to change career path;
- apt to show the employer that he/she can take on new tasks.

They need to prepare for very fast market changes; different possibilities; changing requirements of employers; situational analysis and quick decision-making skills. Of course, all this goes in addition to professional knowledge of the working languages, different types of translation, work with the most necessary software and more...

# New type of translator/interpreter

Examples of the blended profession: translator/interpreter and IT translator/interpreter and petroleum engineer; translator/interpreter and diplomat; translator/interpreter and teacher; translator/interpreter and blogger; translator/interpreter and streamer; translator/interpreter and journalist; translator/interpreter and make-up artist etc.



# Main focus of training

Who should we rely on in building hypotheses and analyzing the current situation?

- On large international professional organizations, associations and agencies (AIIC, FIT, CIUTI);
- On the UN, European institutions (European Parliament, European Commission) and other global employers;
- On international translation companies and businesses employing translators and interpreters.

# FIT view

FIT published a position paper with its view how to train the future generation of translators and interpreters.

Setting: the growing demand for Machine learning, Artificial intelligence and general cost-efficiency:

Goal: to train professionals fit for the modern market. This means a more diversified role of a translator/interpreter (blended profession), a shift in certain areas (in some the human being can be replaced, in some he/she remains indispensable (transcreation projects);

- Training methods: the specialist should be familiarised with all areas of translation (conventional translation, transcreation, localisation) + "skills of the trade" + soft skills;
- Role of training institutions: should seek to reduce any mismatch between curriculum content and market needs, endeavouring to speed up the reform of curricula. It is recommended that teachers should gain industry experience as this is lacking in quite a few cases;
- Role of associations: as most graduates become freelancers, associations can play an important part by offering seminars/webinars/courses on customer relations, financial management and soft skills not covered by the training institutes.

# Translation/interpreting training in the world

According to FIT (International Federation of Translators), translation and interpreting is now taught in at least 195 universities in 72 countries around the world (inconclusive figures).

Geographically it is Europe, North America, South America, Asia, Australia, Oceania, Africa.

*Data from the project carried out by the FIT Translation Training and Professional Development Committee*

# Flaws in university programs

Online translation journal inTRAlinea research concerning the inclusion of technologies (CAI, CAT etc) in the educational programs:

- Of the 85 CIUTI interpreter training institutions contacted, 25 questionnaires were returned from 15 countries.
- New technologies are covered in educational programs of 60% of the institutions (15 said yes, 10 said no);
- Computer-assisted interpreting (CAI) tools are part of the curriculum of 52% of the institutions (13 answered yes, 12 answered no).

The reasons for such answers: two respondents pointed to the **trainers' expertise as a decisive factor** for the integration of CAI in the curriculum (many trainers don't have such expertise). In one case, there is "**a lack of lecturers able to teach them**". In the other, the inclusion of CAI in training is left to the **trainer's personal initiative**. Another difficulty is the difficulty of altering the curriculum to **officially include CAI training**.

# What skills a modern translation/interpreter trainer must possess

The new digital era, which coming was largely accelerated by the pandemic, forced the trainers to update their skills. They include:

- Knowledge of CAI, CAT, Machine learning tools not only to teach students, but also to modify the existing educational programmes and to train their colleagues, so that the university can scale up teaching of the new programs;
- On-hand experience with the above mentioned tools, which requires using the tools in the translation and interpreting practice. Only on-hand experience can provide insights about the new face of the profession and be the basis for real case studies, which will help to train better specialists;
- Constant improvements of one's digital literacy: it will help to switch between traditional and online formats in case of emergency (like COVID-19), adapt different courses to online format, diversify the tools used during the training.

# Online programs

To answer the challenges online programmes were created. Many international universities have already created and are implementing online courses and programs in various areas, including translation/interpreting:

## University of Geneva:

- Consecutive Interpreter Training;
- Simultaneous Interpreter Training;
- Technologies in translation: translation memory, post-editing, terminology management (Technologies de la traduction: Mémoires de traduction, post-édition, gestion de la terminologie).

## University of Birmingham:

- Translation Studies (MA Translation Studies);
- Teaching English as a foreign language (Teaching English to Speakers of Other Languages).

## University Paris III New Sorbonne:

- Master's programs in Linguodidactics (Master 1 didactique des langues, du FLE et du FLS)

# Interdisciplinary approach

Many leading universities in Europe, America, Asia and other regions of the world have been developing new interdisciplinary training programs (including in a blended or fully digital format):

- Digital Humanities (a program that studies the interaction of new technologies and the humanities in virtual reality; students learn to analyze the context using new technologies and platforms, create digital content, study the role of new media, big data);
- Controlling Big Data (developing the skills of working with large data sets, the basics of economics, statistics, searching, collecting and managing information using new technologies, monitoring and creating digital archives);

# Interdisciplinary approach

- Intercultural digital strategy (creating scripts for mobile applications, learning language features in a digital environment, contract law, business vocabulary);
- Linguist-lawyer - double diploma, cooperation between linguistic/translation and law faculties (legal communication, legal translation, distinction of world legal systems);
- Computer Linguistics (study algorithms for processing human language by a machine, the principle of machine translation, the basics of psycholinguistics and neurolinguistics);
- Translatology/Digital Linguistics (translation + strategies for effectively receiving and transmitting information, creating technical documentation, terminology databases, modern technologies in translation).

# Example of a consortium project

A consortium of the University of Wolverhampton, UK (the Coordinator); University of Malaga, Spain; New Bulgarian University, Bulgaria and Ghent University, Belgium, embodies the aim to deliver a cohesive, integrated European Master programme: **Master of Arts in Technology for Translation and Interpreting**.

The European Master's in Technology for Translation and Interpreting (EM-TTI) addresses the need for a new generation of translators and interpreters. Students study one year at Ghent University and one year at one of the partner universities. EM-TTI will produce specialists in translation and interpreting who are up-to-date with the latest digital applications which support their daily work, as well as future developers of such applications.

Apart from pure translation/interpreter study the programme includes such programmes as: Python programming, Project management, Computer tools for translation, Language technologies for machine translation, Translation software, Terminological resources of EU etc.

# University Projects of the “new realities”

Many of the world's leading universities (University of Cordoba (Spain), University of Geneva (Switzerland), Beijing University of International Affairs (China), Middlebury Institute of International Studies in Monterey (USA)) have found solutions to the numerous challenges of the pandemic and post-pandemic period. For example, the successful experience of conducting interpreting classes with the involvement of experts from international organizations was as follows: virtual tools provided students with online master classes on interpreting from the UN, the European Commission, etc. New remote projects on terminology and filling in various terminology bases by students (WIPO Pearl, etc.) have been actively developed. Online courses and online advanced training from leading international companies and organizations have become popular (for example, courses on intellectual property management from the WIPO Academy). Projects began to be implemented with the collective remote participation of several universities from different countries.

# University Projects of the digital future

The University of Bologna (Italy) offers a master's degree in conference interpreting at its Department of Interpreting and Translation, at Forlì campus. Within the programme, a course on "Methods and technologies for interpretation" is offered. It is a compulsory 40-hour course for all trainee interpreters, 25 hours of which are dedicated to CAI tools. The CAI tools presented to students are InterpretBank, Interplex and Interpreter's Help. In Forlì, interpreting students also learn how to use SDL MultiTerm for conference preparation. During the course, students receive theoretical instruction but also have the opportunity to practice using these tools for conference preparation and in the booth. InterpretBank is also used and tested during events organised at the university, such as conferences or seminars.

# Cooperation with potential employers

An important role in building competitive educational trajectories is played by the constant interaction of universities with international and domestic employers. In this regard, universities should understand what kind of specialists are needed and in demand in the market. Collaboration has become more important than ever.

It is necessary to cooperate with:

- translation companies;
- corporations;
- international organizations;
- event organizers.

# **Demands for new specialists: international organizations**

Many companies and international organizations set high demands for translators and interpreters: translators/interpreters are often engaged not only in translation/interpreting, but also in related activities (editing, reporting, helping to organize events, etc.) - and their functionality has especially shifted/expanded during the pandemic.

- **United Nations:** Language staff of translation services not only translate texts, but also proofread documents written in the relevant language to ensure they are clear, coherent and factually accurate before they are translated into other languages. The staff of the English Translation and Editorial Service also compile official summaries of some of the meetings. Another important responsibility is the standardization of terms in all six official languages. All translation services contribute to the development and improvement of official United Nations terminology and the maintenance of the multilingual UNTERM database, which is publicly available.

# **Demands for new specialists: international companies**

TransPerfect (New York) is one of the largest translation companies in the world (Rank 1 CSA in Research): to confirm the level of **translators** in the company, there is a TransPerfect Linguist Certification (TLC) program (specialist certification program) - it involves assessing knowledge of not only the language, but also the area in which the translator will work. Moreover, special attention is paid to the ability to work with machine translation, as well as various CAT tools, including post-editing and translation quality management.

**Interpreter** duties may include: on-site interpretation services (simultaneous, consecutive, whispering, accompaniment), interpretation into American Sign Language (ASL) both in person and via videoconference, assistance for hearing impaired listeners (“assisted listening”), translation of documents for meetings and conferences, coordination at the venue of the event and assistance in organizing meetings, localization of the registration site, audio and video transcription, rental of equipment for interpretation.

# Post/pandemic market of translation and interpreting

Significant changes have taken place in almost all translation/interpreting areas after the pandemic: there has been an increase in the field of telephone interpreting, video remote interpreting, and remote simultaneous interpreting. The decline is observed in the field of on-site interpreting, conference interpreting, interpreting for public services. Conference interpreting suffered quite badly. Since the start of the pandemic, most conferences have either been canceled or rescheduled, so the demand for conference interpreting has dropped to near zero.

In the area of sign language interpreting, there has been a significant increase in the number of agencies looking for VRI solutions for sign language interpreters.

# Industry 4.0

The shift in the paradigm of the translation profession is largely associated with the concept of "Industry 4.0". This concept is associated with the fourth industrial revolution and the digitalization of more and more areas of life. According to the report of the analytical company PwC, "Industry 4.0" is the result of digitalization and integration of vertical and horizontal value chains, digitalization of the offered goods and services and the emergence of new digital business models and customer interaction platforms.

In the modern world, the translator interacts with all this in one way or another. Translation is becoming increasingly automated, with machine translation programs, CAT tools, and so on.

# Industry 4.0

The report\* from the 2017 TAUS Translation Summit states that “the main benefit of automation is, of course, increased productivity. Difficulties will be associated with a change in professional responsibilities, with the need to exchange data, receive information from data and work in cloud systems.”

This report also highlights **six major drivers of change in today's translation industry**: machine learning; machine translation; quality control; data (including speech data); interoperability of instruments; education (training)”.

Machine learning will be applied to translation more and more, especially in the areas of MT and automatic translation of oral speech (S2S, or speech-to-speech translation): it will open up new perspectives for the translation business and raise quality assessment to a new level.

*\*The report is drafted by Nizhny Novgorod Linguistic University*

# Industry 4.0

The next few years are likely to drive even more innovation in the field of translation memory management to make it smarter and to cover different forms of information display, especially phonetic language data, by expanding the potential of metadata. For sure, artificial intelligence and neuro-technologies of the new generation will be involved as well. Their development is facilitated by post-editing, which helps to identify imperfections in the work of automated translation systems. That is why post/editing will be in high demand in the near future.

**The task of the modern translator** is to adapt to changes and integrate technologies into their work, not to resist them. After all, it will take a very, very long time until the translator is completely replaced by a machine, and many experts continue to say that a complete replacement will never happen. A modern translator will be the "competitive survivor" only in case he or she constantly improves his or her skills, masters **related professions (teacher, terminologist, editor etc.)**. This is precisely what the new paradigm of the translation profession will consist of.

# Case: European Central Bank

Rossana Villani, Head of the Language Services Division at the European Central Bank in one of her papers outlines the main changes:

- Target audiences: a strong shift of focus from expert to non-expert audiences;
- Broadening range of text types: new text types were also added with the emergence of new channels of communication, and the digital revolution in communications also broadened the range of file formats that translators are exposed to;
- For the translator, the biggest change of all was to experience how technology slowly crept into and gradually took over their day-to-day work;
- With management style becoming less top-down and more participative, translators were empowered to take on small coordination tasks or manage small projects, which required training in a number of soft skills.

# Case: European Central Bank

The factors driving this complex set of trends are:

- The digital revolution that has reshaped the communication landscape: series of technological inventions and breakthroughs, increased speed of communication, flood of information, which requires new ways of processing.
- Specific for ECB: financial crisis 2007-2009, institutional innovations in the EU (ECB was given the responsibility to supervise large banks operating in the euro area);
- As a result the organization has doubled in size.

In the end a new vision was borne through:

- More investment in job coordination (creation of smaller teams with specialized tasks + "team lead" positions filled mostly by former translators with a coordination profile who would bridge the functional gap between translators and management;
- Switched to a more inclusive style of management and involved translators in certain projects and tasks;
- Increased their outsourcing activity especially in the languages heavily involved in banking supervision work.

# Case: European Union

Due to the digital revolution and bigger amount of data the workflow has increased significantly, forcing the European institutions to adapt new technologies.

They didn't replace the interpreter/translator - they simply improved the efficiency of work and made it possible to cope with the increased workflow. New projects were created:

- **Interpreters' Digital Toolbox Project:** put simply, it is a digital interface which will help to identify the most relevant documents for a given meeting, to extract terminology automatically, to draw up event-specific glossaries based on the interpreter's personal profile, and to offer a wide range of information sources. The ultimate objective is an integrated, Al-assisted interface, which could also draw on speech recognition capabilities in the future: interpreters could, for example, immediately check the figures, names or terms used by the speaker.
- **Knowledge Centre on Interpretation:** a digital platform used to manage and exchange knowledge, create synergies and disseminate best practices on conference interpretation and more, designed to connect diverse communities with interests in interpretation, including, for instance, public-service and legal interpreting.

# Video remote interpreting

One of the most important types of interpreting during the pandemic and post-pandemic has become video remote interpreting – a type of interpretation via video. Companies put forward very high requirements for it:

**Janus Worldwide (Russia):** In the new realities of life, the video remote interpreting (VRI) has received a second birth. Video remote interpreting combines the benefits of face-to-face interpreting with the ability to receive instant interpreting over the phone.

**Advantages:** the ability to record conferences and their subsequent transcription by specialists, no logistics costs; ease to use, intuitive user interface of the translation platform; integration with popular office applications for an easy planning of events and sending out invitations.

It often happens, that a freelance interpreter himself provides a platform for video remote interpreting and equipment (microphone, headphones, computer).

# Remote interpreting in the new reality

New communications technologies make interpreting available where it wasn't in the past. We have a once-in-a-generation opportunity to shape the way we will work remotely, because what's going on is game changing and shaking our profession from top to bottom.

Remote interpreting can be viewed as doing two things: replacing existing interpreting models + expanding access to interpreting in new ways and creating more opportunities for interpreters. Remote interpreting is replacing, and will continue to replace, some (not all) face-to-face interpreting in medical, court, and conference settings – it is a fact, we can't stop it. The pressure to reduce costs while increasing access to interpreting will continue. This will lead to the use of remote interpreting in a wider range of areas (medical, court, diplomatic settings etc).

Remote interpreting is ideal for new forms of communication, such as video conferences, audio conferences, webinars, earnings calls, virtual press conferences, and expert network interviews: used in the UN for executive committee meetings, International Federation of Red Cross and Red Crescent Societies convenes an emergency teleconference with simultaneous interpreting, South American nongovernmental organization conducts webinars where a group of panelists from different countries presents the results of their research to a global audience.

# How new reality will work

Many translation service providers have waived registration fees on their remote translation platforms to make the transition as easy and cost-effective as possible for both new and existing clients.

Translation service providers whose core business is on-site interpreting are introducing remote solutions for their clients, for example by offering pre-scheduled VRI calls instead of on-site meetings.

Experts agree that there will be no return to "normality" - the future is sustainable in its new form. In particular, AIIC experts believe that the current crisis is an opportunity to rethink the sector. The conference sector will have to restart after a hiatus and this is a great opportunity to change forever and start organizing more sustainable and future-oriented events.

The sector will adapt by offering hybrid high-level meetings combining online and in-person presence, optimizing the experience for both groups. This will require the provision of high quality interpretation to ensure participation by all (including online participants). Quality requirements for organization of such events will increase.

# Terminology: especially relevant

One of the main competencies of any language professional now is the ability to work with terminology. Moreover, this work is not limited to searching and choosing the right term in a dictionary or a thematic glossary. Terminology management is an important stage of translation, which ensures several parameters of text quality, which have critical importance when it comes to large companies, organizations and projects.

Many large companies and organizations create their own terminological databases (UNTERM, WIPO Pearl etc). They use machine learning methods to fill them. They are quite widely used both for term search and for filling databases, including filtering unwanted electronic data, automatic translation, voice recognition, text and images. Translators and terminologists of the new generation must learn to cooperate, and not at all compete with the "machine".

# Sign language interpreting

The attitude towards sign languages in the world has changed a long time ago. Since the policy of inclusion was announced, and then the Sustainable Development Goals were adopted, international organizations and the public began to pay more attention to people with disabilities. This could not but give impetus to the development of sign translation, which is now no less in demand than spoken languages translation.

UN: in 2017, the UN General Assembly adopted a resolution announcing September 23 as the International Day of Sign Languages in order to raise awareness of the importance of sign languages in the full realization of the rights of the deaf. It recognizes the importance of preserving sign languages as an integral element of linguistic and cultural diversity.

# Sign languages in the UN

The UN has adopted its Disability Inclusion Strategy. It plays a key role in enabling the United Nations system to support member states in achieving their sustainable development goals and implementing the Convention on the Rights of Persons with Disabilities. Three basic approaches of the Strategy:

- Two interrelated components: to consider disability as an interdisciplinary problem, and it should be taken into account in all work (first component), to carry out targeted programming (second component).
- Complex nature of issues: factors such as gender, age and place of residence influence the formation of the human personality, including, of course, persons with disabilities.
- Coordination: A coherent and coordinated approach is needed to accelerate progress, learn from lessons learned and ensure the inclusion of persons with disabilities.

# Sign languages in the EU

A wide variety of sign languages are used in EU institutions, with around 500,000 people using sign language as their first language.

In 2012, the EU approved the implementation of sign language legislation, under which member states committed, among other things, to the recognition of sign languages in the national constitutions, the adoption of a separate law on sign languages, a law recognizing the rights of deaf people to use a sign language, an education law that includes rights to use a sign language, a law to provide interpretation from and into a sign language, a law allowing the deaf to access their health information in a sign language. In 2016, the European Parliament adopted a corresponding resolution.

# Case: Institute for Logic, Language and Computation (Netherlands)

Scientists from Institute for Logic, Language and Computation (Amsterdam, Netherlands) created an avatar technology, helping death patients receive sign interpreting during the COVID-19 pandemic. Apart from the obvious technical part (to create a special platform with a digital avatar instead of a real person in the video), a lot of linguistic work has been conducted:

- Through term and speech extraction tools the scientists extracted the most common phrases the doctors used while receiving patients during the pandemic;
- The resulting corpus was then divided into three categories: video-only (emotions, informed consent), avataronly (sentences with many variations differing by only one word or phrase – days of the week, dates etc), and hybrid (not falling in the previous two – both avatars and video remote interpreting are involved).
- After categorising all of the sentences, those from the first and third category were translated into Dutch sign language and recorded by a team consisting of a sign language interpreter and a deaf signer.

# Case: Institute for Logic, Language and Computation (Netherlands)

The main advantage of avatar technology over video translation is that it provides flexibility and scales up more easily. Once a library of animated signs has been created, and a procedure to integrate non-manual grammatical markers has been implemented, translations for many sentences can be generated. A disadvantage, however, of avatar translations is that they can be less natural and more difficult to comprehend. Avatar translation also lacks empathy, which is often required in the medical settings. Thus here mainly video sign language interpreting is used.

The main disadvantage of a video translation system here is its inability to scale up efficiently. All translations have to be recorded separately, even ones that are almost identical. Cutting and pasting video fragments of individual signs to create new sentences does not yield satisfactory results.



# Thank you for your attention!

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