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Usability of web-based MT post-editing environments for screen reader users



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Advocacy for TEnT accessible design



But why





❖ Potential **social impact**

- The inaccessible design of popular TEnTs prevents qualified translators with visual and motor impairments from accessing the job market

“Translation tools: help or hindrance?” (Owton & Mileto 2011)

- Translator-Computer Interaction based on:
 - Keyboard-only input
 - Text-to-speech and/or text-to-Braille output
- Other interaction modes: not practical, too time consuming
 - Use of mouse simulation commands
 - Scripting
 - Collaboration with sighted assistant/colleague



❖ Recent research interest on **user-centred factors in translation technology** design and evaluation

- Usability-UX
 - Involvement of end users at design stage (Bota et al. 2013)
 - Usability of FOSS CAT (Veiga Díaz & García González 2015)
 - CAT usability modelling (Krüger 2016)
 - User Interface needs of **post-editors** (Moorkens & O'Brien 2017)
- Multimodal TEnT
 - Mobile **post-editing app** (Torres Hostench et al. 2017)
 - Interactive Translation Dictation (Zapata 2016)
- Ergonomics (Teixeira 2015)

Motivation



Request for Proposal (RFP)
“Computer-Assisted Translation
(CAT) Tool for facilitating the
provision of reference and
translation services”

February 2017

Food and Agriculture
Organization of the United
Nations (FAO)

Accessibility as part of
evaluation criteria



n) Ergonomics

0120 – Available keyboard shortcuts: Some keyboard shortcuts are available.

0121 – Customisable shortcuts: The keyboard shortcuts are customisable.

0122 – Interface Customisation: Whether users are able to customise the interface. Please specify how and to what extent (e.g. size, location, arrangement, background colours of windows, fonts and letter size of menus and of the text displayed in the editor, contents and location of toolbars, etc.) this can be achieved. The software should work on dual screens; in particular, it should be possible to undock panes, if any, and move them to a second screen.

0123 – Learning Curve: As we deal with a number of external translators/revisers experienced with existing Cat Tools, we expect a low learning curve for rapid adoption of a new CAT tool.

0124 - Accessibility: accessibility features are available for people with disabilities.

0125 - OCR features and speech recognition: OCR features exist and some speech recognition software is compatible with the software.



❖ STILL: Scarcity of translation technology research focusing on **end-users with special needs**

- Exploratory Single Case Studies (Rodríguez Vázquez & Mileto, 2016)
 - Blind user interaction with different versions of SDL Studio
- Questionnaire for blind and visually impaired translators (Rodríguez Vázquez & Mileto, 2016)
 - Low levels of satisfaction with current state-of-the-art desktop CAT
 - Poor interaction CAT-AT (assistive technology)
 - Lack of comprehensive technical support
 - User guides: incomplete + inaccessible
 - *Fluency Now*: Most popular MT-integrated TEnT among users, not necessarily among LSP

No research work found on accessibility of translation tools and MT/post-editing



Goal: Explore the potential of **web-based MT-integrated TEnT** as a more suitable solution for blind translators



Selection Criteria

- Integration of MT
- Free access
- All main components, including post-editing environment, are web-based
- The basic accessibility requirements to enable exploration of the following pages are met: sign up, log in, project creation, post-editing environment

Tools chosen for study:





❖ Classic usability study approach

- Task + questions about user experience
- Summative evaluation
- Remote, asynchronous usability evaluation (Petrie et al. 2006, Murphy et al. 2016)

❖ Snowball sampling

- The Round Table mailing list (approx. 150 subscribers)

<http://lists.screenreview.org/listinfo.cgi/theroundtable-screenreview.org>

INSTRUCTIONS

1. Conduct a simple **post-editing exercise** with each tool
2. Report every problem encountered via a **frustration experience form** (Lazar et al. 2007, Ceaparu et al. 2004)
3. Fill in a **post-task questionnaire** after each exercise
 - Based on Computer System Usability Questionnaire (CSUQ) (Lewis 1995)

Participants - Profile



16 blind translators agreed to participate (consent form)



11 tested at least 1 tool



9 tested both tools

10 blind translators



10 blind translators

Female



72%

N=8

Male



27%

N=3

- **Age:** 18-24 (N=2), 25-34 (N=6), 35-44 (N=3)
- **Nationality:** Austria (N=3), Germany (N=2), Italy (N=2), Canada (N=1), Egypt (N=1), Poland (N=1), UK (N=1)
- **Education:** Translation background; university degree (BA/MA) (completed N=9; ongoing N=2)
- **Current occupation:** translator (N=6), public administration (N=1), web analyst (N=1), transcription service manager (N=1)
- **Computer skills** (*self-assessment, 5-point scale*): Adequate (N=1), Good (N=5), Excellent (N=5)

Participants – Use of user agents



<i>Operating System</i>	Windows	Windows
<i>Browser*</i> <i>*(2 participants used 2 different browsers)</i>	Google Chrome (N=3) Mozilla Firefox (N=8) IE (N=1)	Google Chrome
<i>Assistive technology[†]</i> <i>†(3 participants used 2 different screen readers)</i>	Screen reader only (N=2), screen reader & Braille refreshable display (N=8), per tool <i>Screen reader: 8 participants used JAWS, 4 participants used NVDA</i>	

CSUQ – Measurement of usability



Overall Usability

System Usefulness

Information Quality

Fit for purpose

ITEM	
1	Overall, I am satisfied with how easy it is to use this system
2	It was simple to use this system
3	I can effectively complete my work using this system
4	I am able to complete my work quickly using this system
5	I am able to efficiently complete my work using this system
6	I feel comfortable using this system
7	It was easy to learn to use this system
8	I believe I can become productive quickly using this system
9	I felt confident using the system
10	The system gives error messages that clearly tell me how to fix problems
11	Whenever I make a mistake using the system, I recover easily and quickly
12	The information (such as online help, messages, and other documentation) provided with this system is clear
13	It is easy to find the information I needed
14	The information provided with the system is easy to understand
15	The information is effective in helping me complete the tasks and scenarios
16	The organization of information on the system screens is clear
17	I found the various functions in this system were well integrated
18	This system has all the functions and capabilities I expect it to have
19	Overall, I am satisfied with this system

Overall satisfaction

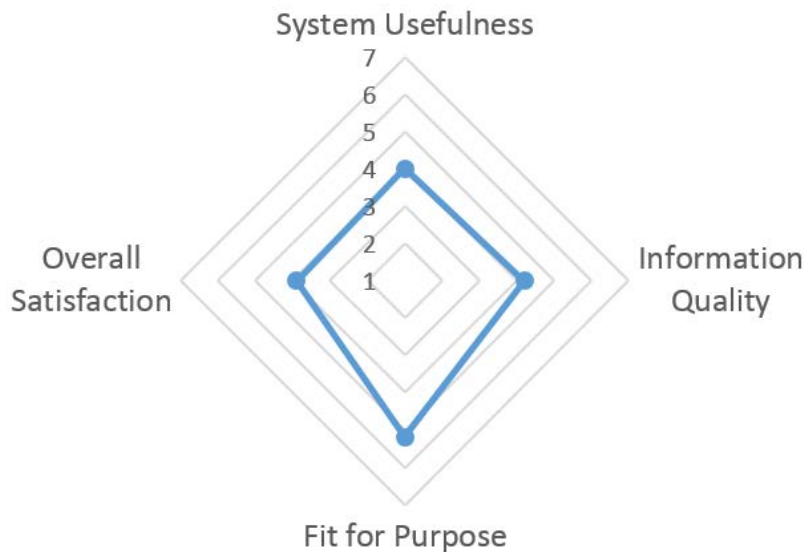
CSUQ Scores (I)



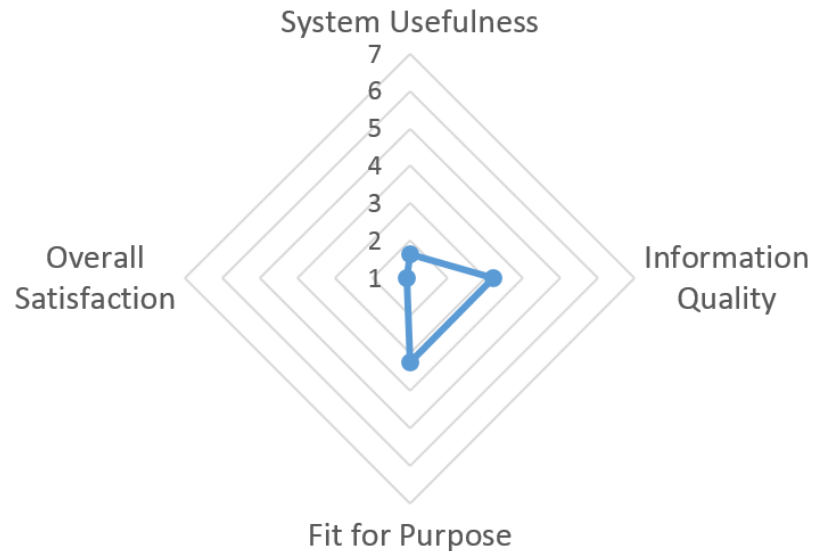
❖ Overall scores



MateCat (CSUQ scores)



Memsorce (CSUQ scores)



CSUQ Scores (II)



❖ Overall scores



Subscale						Overall	
<i>System usefulness</i>		<i>Information quality</i>		<i>Fit for purpose</i>			
<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
1.64	0.635	3.23	1.020	3.25	0.707	2.37	1.134
4.00	0.316	4.21	0.476	5.19	0.441	4.20	0.514

p-value
(t-test)

<0.001

0.051

0.081

<0.001

CSUQ Scores (III)



❖ If we look closer, per item (highlights)



System usefulness			
7. It was easy to learn to use this system		8. I believe I can become productive quickly using this system	
Mean	SD	Mean	SD
3.11	2.315	1.89	1.536
4.40	2.118	3.60	2.458



p-value
(t-test)

0.225

0.086

Confidence in having successfully completed the task

7-point scale, 1 (Not confident at all) and 7 (Very confident)




1 (80%, N=8)
3 (10%, N=1)
5 (10%, N=1)

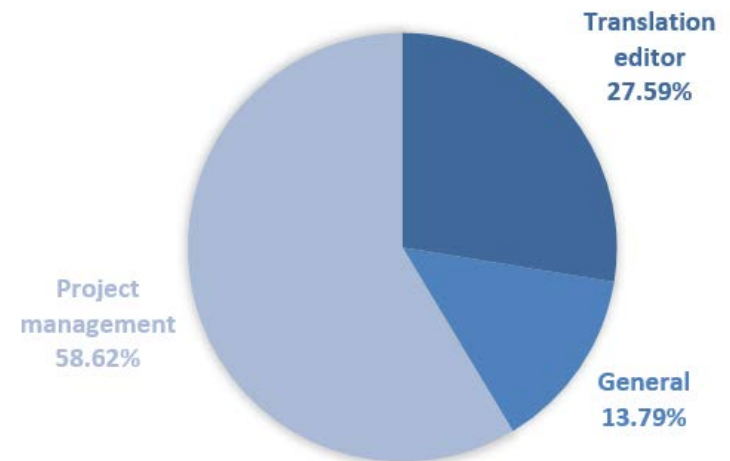


1 (20%, N=2)
4 (10%, N=1)
5 (10%, N=1)
6 (20%, N=2)
7 (40%, N=4)



- Most **problematic steps** during the translation exercise
(“What were you trying to do?”)

	#	%	 (\bar{x} , in min)
Create a new project	9	31.03%	20'
Edit target segment (general)	5	17.24%	37'
Set up the project	5	17.24%	8'
Edit MT suggestions/post-edit	2	6.90%	15'
Upload source file	2	6.90%	30'
Navigate through main menu	2	6.90%	3'
Sign up	2	6.90%	6'
Read translated segments	1	3.45%	2'
Export the target file	1	3.45%	5'





Technical **problem encountered** (*“What happened?”*)

	#	%
Non labelled buttons/fields	10	29.41%
Button not working	6	17.65%
Not possible to read own translated text	5	14.71%
Not possible to post-edit	5	14.71%
Lack of content structure	3	8.82%
Lack of information & feedback	3	8.82%
Cursor got stuck in edit field	1	2.94%
Not possible to export	1	2.94%

Solution or **coping strategy** (*“How did you solve the problem?”*)

	#	%
I was unable to solve it	13	44.83%
I figured out a way to fix it myself without help	8	27.59%
I ignored the problem or found an alternative solution	6	20.69%
I knew how to solve it because it has happened before	1	3.45%
I asked someone for help.	1	3.45%



	#	%	<i>Time lost (\bar{x})</i>
Edit target segment (general)	5	17.24%	37'
Edit MT suggestions/post-edit	2	6.90%	15'
Read translated segments	1	3.45%	2'

- ✓ Considered as important (N=2) or **very important (N=6)** steps to complete the translation task
- ✓ Related-problems encountered considered as frustrating (N=2) or **very frustrating (N=6)**

P01: “I could not edit the MT suggestions effectively. I could view the suggestions, but the only way to edit them that I could find was to copy them into the edit field; however, when I did that, the edit field still appeared to be empty and I couldn't edit the text I had just copied and pasted. When I decided to simply write the translation myself, I couldn't read what I had just typed in either; my braille display and screen reader showed an empty edit field.”

P11: “I entered Web Editor. Then, not without difficulties, I found my way to the target segment column. And then I started to write in it. The problem is, however, that NVDA would report what I have just written, but I went back with my edit field cursor, it only read “blank”[...] As long as I am not in full control of target-text editing, I cannot complete even a single segment of my translation.”

P05: “It wasn't marked up as being an edit field, the target segment was just a line of text. Therefore I couldn't find how to edit this.”



Frustration Experiences

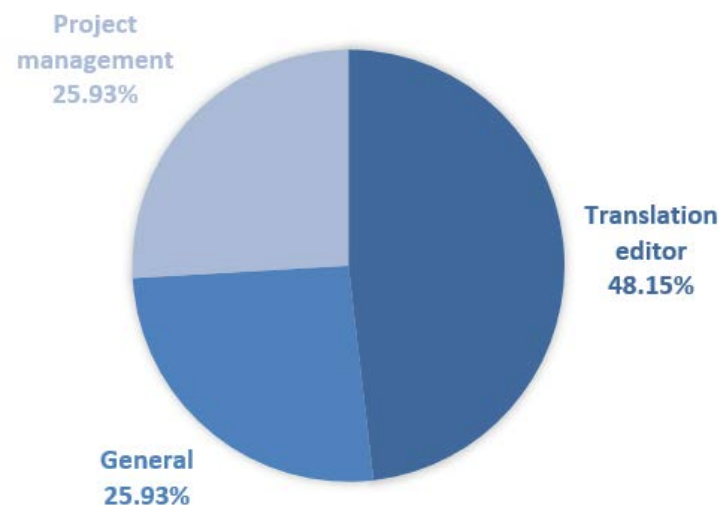
Summary



- Most **problematic steps** during the translation exercise

(“What were you trying to do?”)

	#	%	⌚ (\bar{x} , in min)
Edit MT suggestions/post-edit	6	22.22%	9'
Sign up and login	6	22.22%	10'
Upload source file	3	11.11%	8'
Revise translation	3	11.11%	3'
Edit target segment (general)	2	7.41%	13'
Export the target file	2	7.41%	23'
Set up the project	2	7.41%	3'
Navigate through main menu	1	3.70%	10'
Copy source to target	1	3.70%	15'
Check MT/TM metadata	1	3.70%	5'





Frustration Experiences



Summary

Technical **problem encountered** (“What happened?”)

	#	%
Screen reader failure	6	21.43%
Button not working	5	17.86%
Not possible to post-edit	3	10.71%
Not possible to sign up	3	10.71%
Lack of information & feedback	3	10.71%
Lack of structure	2	7.14%
Not possible to locate access to editor	2	7.14%
Not possible to export	1	3.57%
Not possible to read long segments	1	3.57%
Manual search/find of segments	1	3.57%
Difficulty editing text	1	3.57%

Solution or **coping strategy** (“How did you solve the problem?”)

	#	%
I figured out a way to fix it myself without help	10	37.04%
I was unable to solve it	7	25.93%
I ignored the problem or found an alternative solution	6	22.22%
I asked someone for help.	2	7.41%
I tried again	1	3.70%
I restarted the program	1	3.70%



Frustration Experiences

MT/Post-editing



	#	%	<i>Time lost (\bar{x})</i>
Edit MT suggestions/post-edit	6	22.22%	9'
Revise translation	3	11.11%	3'
Edit target segment (general)	2	7.41%	13'
Copy source to target	1	3.70%	15'
Check MT/TM metadata	1	3.70%	5'

- ✓ Considered as **important** (N=7) or **very important** (N=6) steps to complete the translation task
- ✓ **Variability** observed in **levels of frustration** related to problems encountered

P01: “Starting at the 4th segment, Jaws started behaving oddly while I was trying to read and edit the translation - speech output did not only read everything out loud twice, it also randomly read parts of the following lines.”

“I discovered that this only happened when the tags in the target segment hadn't been put in place yet; once I had selected 'Guess Tags' this was no longer an issue. [...] Checking the translation via Braille display worked well, though.”

P07: “While I was revising certain (longer) segments, I was no longer able to read the end of the segment, neither using speech output nor with my Braille display.”

P15: “MateCat had automatically inserted the MT suggestion. But below the translation it indicated a symbol mismatch. When reading the translation, I noticed that there were strange symbols in the middle of the sentence. When I tried to move the cursor to these symbols to delete them, MateCat crashed, and I had to restart it. This happened several times.”



Overall research indicators

- ❖ None of the tools tested could be professionally used by blind translators in their current form
 - **BUT:** MateCat could be fully accessible only with minor changes
- ❖ Blind translators are more resourceful than we thought!
 - Advanced IT competence (use of multiple AT and browsers), so they can easily adapt
 - But want to be treated as their sighted peers
- ❖ We need to look for designed-for-all solutions
 - Tools for blind translators only; e.g. EasyTrans (Al-Bassam et al. 2016): **not** the preferred approach by real end users!



❖ In-depth analysis of qualitative data gathered

- Levels of frustration; correlation with time lost
- Technical difficulties logged could provide insights for TEnT developers about what aspects to test (“accessibility check list”)
 - Send report to TEnT providers

❖ Observation study with selected participants

- Interaction with more advanced TEnT features

❖ Parallel usability study with sighted translators

- Comparison of CSUQ scores
- Comparison of user preferences regarding information quality and user interface

Thank you



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