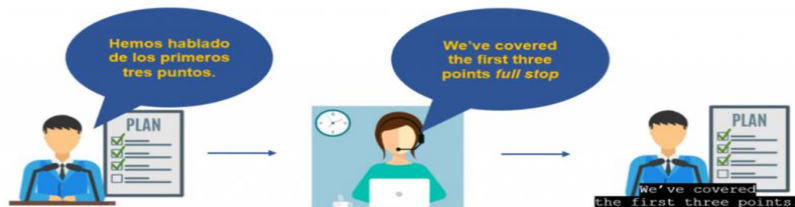


Shaping Multilingual Access Through Respeaking Technology (2020-2023, ES/T002530/1)  
 Elena Davitti, Annalisa Sandrelli, Pablo-Romero Fresco, Tomasz Korybski, Zoe Moores, Anna-Stiina Wallinheimo

INTERLINGUAL RESPEAKING

Innovative method for **real-time speech-to-text** whereby respeakers listen to live input and simultaneously render it (with added oral punctuation, content labels and software-adapted delivery) in a target language to speech recognition software that turns it into written text displayed on screen



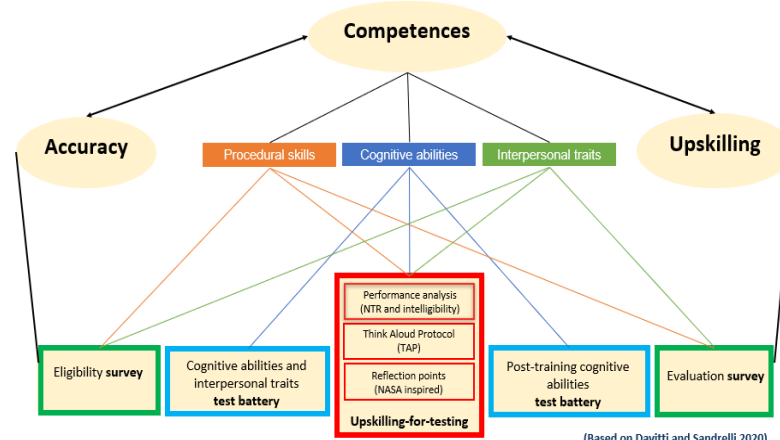
**Process:** 'simultaneous interpreting 2.0'

**Product:** live text in a different language

Complex form of **human-AI interaction**  
**Hybrid, multimodal, human-centric, in-demand** practice

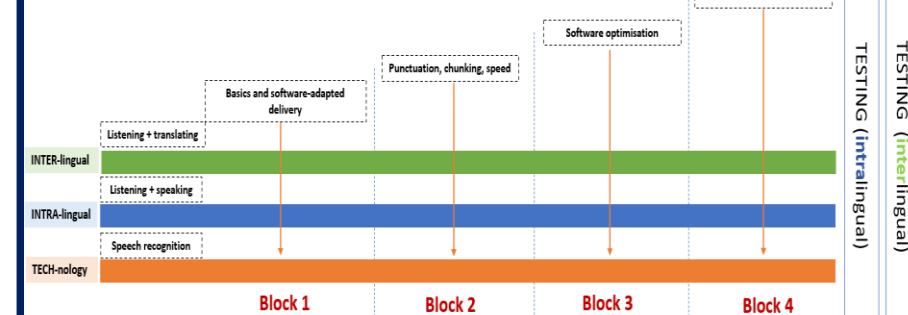
STUDY DESIGN

Methodological design



- Exploratory approach
- Mixed-methods
- Multi-staged experiment
- Within-subjects design

Upskilling-for-testing structure



- 25h course; online delivery across 5 weeks
- Blending and scaffolding approach (technique-specific)
- Dual purpose: collecting performance-related data and testing our approach to upskilling
- Final tests in both intralingual and interlingual respeaking across different scenarios (speed, planned/unplanned, multiple speakers)

OBJECTIVES AND RESEARCH QUESTIONS

**PROCESS:** To refine existing multifactorial models of competence - what human variables underly the performance of language professionals, what challenges arise during performance, and to what extent it can be sustained

**PRODUCT:** To explore what contributes to output accuracy - how well do language professionals do after 25h of upskilling and what are the predictors of high accuracy

**UPSKILLING:** To optimise upskilling for language professionals - what challenges arise during skills acquisition and what are the strengths and weaknesses of the upskilling course

SELECTED INSIGHTS INTO THE PROCESS

We investigated empirically (baseline) what **cognitive abilities** and **interpersonal traits**, underly interlingual respeaking performance.

**Cognitive abilities:** focus on **executive functions** (Miyake et al. 2000), particularly **working memory (WM)**, **shifting skills**, and **sustained attention** (known effects on simultaneous interpreting as a closely related practice); six cognitive tasks (verbal fluency, plus-minus, digit span, reading span, N-back, sustained attention to response); repeated-measures ANOVA and multiple regressions.

- WM**,  $F(1, 46) = 4.0, p = .05$  (from  $M = .83, SE = .02$  to  $M = .88, SE = .02$ ) and **shifting skills**,  $F(1, 49) = 6.42, p = .02$  (from  $M = 22.90 s, SE = 2.95 s$  to  $M = 14.55 s, SE = 1.85 s$ ) were enhanced after the upskilling course, indicating that these skills are required for high interlingual respeaking performance. **WM** was found to predict high performance ( $\beta = .36, p = .01$ ).
- Sustained attention** did not improve as  $p > .05$ , so alternative forms of attention should be investigated (e.g., divided attention).

**Interpersonal skills:** eight scales used to measure different traits, namely trait anxiety, resilience, impulsivity, cognitive flexibility, innovativeness in IT, personality, work motivation and mindfulness.

- Conscientiousness** (TIPI,  $\beta = -.32, p = .02$ ) and **integrated regulation** (when 'work is part of you', WEIMS,  $\beta = -.28, p = .04$ ) negatively predict accuracy. These findings can be linked to the real-time and cognitively demanding nature of this practice.

SELECTED INSIGHTS INTO THE PRODUCT

We used the NTR model (Romero-Fresco and Pöchhacker 2017) to measure the **accuracy** of 153 performances under different scenarios (speed, planned/unplanned, multiple speakers). We used an **intelligibility** scale (based on Tiselius 2009) for determining high and low performers, which was validated in the results obtained.

**Accuracy - average NTR results**

- across all participants and testing scenarios: **95.37%**  
*\*For reference: intralingual respeaking accuracy benchmark = 98%  
 Interlingual respeaking benchmark yet to be established*
- | Per language directionality         | Per scenario                     |
|-------------------------------------|----------------------------------|
| Romance into English: <b>96.16%</b> | Speed: <b>94.76%</b>             |
| English into Romance: <b>94.89%</b> | Planned/unplanned: <b>95.83%</b> |
|                                     | Multiple speakers: <b>95.51%</b> |

- Across all scenarios, **omissions** ( $\beta = -1.12, p < .001$ ) were the strongest negative predictor of accuracy, followed by substitutions ( $\beta = -.17, p < .001$ ) and recognitions ( $\beta = -.34, p < .001$ ).
- Effective editions**, changes in the target text which do not lead to a loss of information, were positive predictors of accuracy across all scenarios ( $\beta = .31, p = .03$ ).
- High performers** ( $n = 27$ ) scored significantly higher ( $M = 96.3%, SE = .2%$ ) than low performers ( $n = 24, M = 94.4%, SE = .2%$ ) across all scenarios,  $p < .001$ . They made significantly fewer omission and correctness errors and used effective editions significantly more than low performers.

PARTICIPANTS

Fifty-one language professionals selected out of 250+ applicants  
**Professional backgrounds:** minimum 2,000h work experience in translation, interpreting and/or pre-recorded/live subtitling; majority with 3+ professions in their cluster (composite profiles)  
**Languages:** 17 between English and each romance language (French/Italian/Spanish); 32 English>Romance; 19 Romance>English  
**Demographics:** 8 males, 43 females; *Age* = 40.12 years, *SD* = 10.97 years; from 11 countries (UK, Spain, Italy, France, Germany, Belgium, Australia, Argentina, New Zealand, USA, Peru)

