Language Value

December 2024 Vol. 17 Num. 2 ISSN: 1980-7103

UNIVERSITAT JAUME I

http://www.languagevalue.uji.es

TABLE OF CONTENTS

Articles

Book Reviews

An Analytical Study on Student Perceptions of Using ChatGPT in Language Translation

Zakaryia Almahasees
z_almhasees@asu.edu.jo
Applied Science Private University, Jordan

Hussein Abu-Rayyash
haburayy@kent.edu
Department of Modern & Classical Language Studies,
Kent State University, USA

Sameer Naser Olimat
solimat@hu.edu.jo
Department of English Language and Literature, Faculty of Arts
The Hashemite University, Jordan

Dana Mahadin
d.mahadin@bau.edu.jo
English Language Department, Salt Faculty of Human Sciences
Al-Balqa Applied University, Jordan

Almahasees, Zakaryia, Abu-Rayash, Hussein, Olimat, Samer Naser & Mahadin, Dana (2024). An analytical study on present perceptions of using ChatGPT in language translation. *Language Value*, 17(2), 1-23. Universitat Jaume I ePress: Castelló, Spain. http://www.languagevalue.uji.es.

December 2024

DOI: https://doi.org/10.6035/languagev.7925

ISSN 1989-7103

ABSTRACT

This study explores user perceptions and practical employment of ChatGPT Translation among students involved in English-Arabic translation tasks. For the quantitative part method, data were collected from a diverse assembly of 100 participants, comprising demographic queries and a constructed 20-item Likert scale questionnaire. The collected data were categorized and critically examined under five principal constructs: Efficiency, Accuracy, Ease of Use, Trustworthiness, and Overall Preference. The findings indicate a predominantly positive perception of ChatGPT among the participants. In addition, detailed analysis reveals novel insights, such as the considerable appreciation for ChatGPT's role in enhancing translation efficiency and the high level of trust expressed in its ability to maintain the confidentiality of translated work. Another significant finding is the tool's competitive edge, with participants favouring ChatGPT over other translation tools. Furthermore, the findings underscore the importance of extending the research landscape on AI-assisted translation tools. Translation platforms foster their effective integration into the industry and understanding of their potential impact on the future of translation pedagogy.

Keywords: ChatGPT; English-Arabic; User perceptions; AI-assisted translation tools; Translation pedagogy

I. INTRODUCTION

The interplay between technology and the translation process has significantly impacted global modes of communication. Historically, translation was a demanding and cost-intensive process, predominantly the purview of governments and large corporate entities. However, with the advent of innovative technological advancements in the present era, accessibility to translation services has substantially broadened, revolutionizing the global communication paradigm (Almahasees, 2021).

Technological interventions are implemented in many ways to augment the translation process. For example, machine translation (MT) capitalizes on the synergies between translation and technology. Current neural MT systems, as a specialized form of computer-assisted translation systems, employ intricate algorithms to transmute text from the source language (SL) into the target language (TL), signifying the capabilities of artificial intelligence (AI) (Almahasees , 2017; Hasyim et al., 2021).

Translation Memory is one of the prominent technological tools used to improve translation results. It is a segmented, translated text database that translators can reuse for future work. This significantly improves consistency in a much lesser workload. While Translation Memory systems are part of CAT tools, they differ fundamentally from MT. TM is based on human-translated segments stored in its database, while MT, especially AI-driven MT, generates the translation automatically through algorithms and neural networks. Both tools can be integrated into translation workflows, complementing each other to achieve efficiency and quality on both levels (Cai et al., 2021; Al-Taher, 2019). Besides, one of the major technological interventions, post-editing (PE) can be utilized to enhance translation quality. Generally, PE is a process in which a human translator carefully reviews and edits machine-generated text to make it more accurate, fluent, and readable. This is often dovetailed with MT systems since it represents an effective method to improve translation quality (Li & Chen, 2019). Moreover, PE holds great potential for translators' training (Krings, 2001).

Integrating technology with the translation process enables users to translate texts quickly, efficiently, and accurately. Consequently, individuals worldwide can engage in seamless cross-cultural exchanges, substantially altering the communication landscape. The advent of instant translation underscores the innumerable benefits inherent in the symbiosis between translation and technology (Almahasees, 2018). This research investigates the perception and attitude of translation students concerning the use of ChatGPT, an AI-based tool, and conventional MT when performing their English<>Arabic translations. This research does not aim directly at assessing the efficacy of these tools but rather seeks to understand how students perceive their effectiveness and potential. With that in mind, the students' perception is valuable in terms of user experiences and attitudes but may not always reflect the real efficacy or accuracy of the tools. The study attempts to bring into focus how students interact with such technologies and the perceived impacts on the performance of translation tasks.

Technology translation tools have catalysed intercultural communication improvement. The integration of technology into translation has greatly improved the capability to transcend linguistic and cultural barriers, allowing more rapid, efficient, and increasingly accurate translation processes. These have stimulated mutual understanding and fostered global interconnectedness, making the world society even more integrated with each passing day, according to O'Hagan (2019).

When applied appropriately in the translation process, translation tools like Google Translate and Microsoft Translator offer manifold benefits. They aid in minimizing typographical and grammatical errors to ensure the quality of translated content. They also have the facility to archive previously translated material, which could be a resource for subsequent translation projects. Some of these tools automate translation management tasks, greatly reducing the time to market for delivering products to the translation market. Consequently, this enables companies to produce more content within a shorter period than would have been possible earlier. While acknowledging the current limitations of MT dealing with distant languages, its rising popularity is a

testament to its potential. Advancements have been made and are continuously in the making in order to enhance the localization capability of MT, after which it will be able to adapt and translate text into various languages. Moreover, ease of usage makes MT a tool useful for professional translators and laypeople with ease (Almahasees, 2021). Given the broad integration of translation with technology and its resultant benefits, the current study tries to investigate the views of translation students on using ChatGPT in translation.

Developed by OpenAI, ChatGPT is a sophisticated chatbot at the forefront of AI-driven natural language processing (NLP) applications. Harnessing a broad array of NLP skills, including storytelling, logical reasoning, code debugging, and machine translation, ChatGPT showcases the sheer depth and breadth of AI's potential. This suite of capabilities empowers ChatGPT to foster dynamic, human-like discussions by providing valuable assistance in numerous tasks, such as drafting emails and composing articles (Hariri, 2024).

ChatGPT, unveiled in November 2022, is underpinned by a monumental large-scale language model called Generative Pre-trained Transformer (GPT) pioneered by OpenAI. It represents an evolution of the foundational technologies encapsulated in GPT-3.5 and GPT-4. To fine-tune the performance of GPT-4, OpenAI applied the concept of transfer learning prompt. The result is a chatbot capable of managing extensive text volumes, accommodating over 25,000 words, and extending its translation capabilities across more than 100 languages (Haleem et al., 2022).

The formidable capabilities of ChatGPT highlight its potential to seamlessly synergize with other MT systems, contributing to the broader ecosystem of translation services (Jiao et al., 2023). Businesses and professionals can significantly enhance their translation efficiency, accuracy, and scope by incorporating such AI-driven tools in their workflow. The innovative strides made by ChatGPT thus illuminate the vast potential of AI in revolutionizing the translation industry (Peng et al., 2023).

MT is a cumbersome process in linguistic and computational terms and is based on a series of steps which are systematic and well-sequenced. The first step includes

a very close examination and comprehension of the input SL, based on which an internal representation or mental model of the TL is constructed. This internalized representation is intended to capture the meaning, syntax, and style of the source text to provide an all-inclusive and accurate transposition into the TL. From this mental model, an appropriate form in the TL is then derived and manipulated to be structured according to the linguistic and cultural norms of the TL audience. The final step of this process is generating the translated output, which is the tangible product of these complex transformations (Almahasees, 2021).

MT, therefore, is a subfield of computational linguistics that focuses on translating texts from one language to another without human intervention. The MT paradigm is divided into four distinct yet overlapping areas: rule-based MT, statistical MT, hybrid MT, and neural MT. The advent of neural MT and the subsequent release of Google's NMT system in 2016 precipitated a sudden surge in translation quality. Subsequently, there has been an astronomical increase in the availability of translation software incorporating NMT.

ChatGPT represents another paradigm for MT. As Jiao et al. (2023) note, GPT-4 utilizes large, advanced language models for various NLP tasks in many languages. It creates a unified MT paradigm that incorporates the strengths of several previous approaches into one coherent framework. Furthermore, ChatGPT employs translation databases that streamline and enhance the translation process and offer a more nuanced understanding of language pairs, which, in turn, contributes to producing superior translations (Jiao et al., 2023). It can be concluded that the rapid evolution of MT technologies, exemplified by GPT-4, promises to usher in new heights in translation accuracy, efficiency, and scope.

II. LITERATURE REVIEW

MT is, therefore, a subfield of computational linguistics and concentrates on the translation of texts from one language to another without human intervention. The

MT paradigm comes in four clear-cut, yet overlapping areas: rule-based MT, statistical MT, hybrid MT, and neural MT. This is where Neural MT, starting this trend, followed by the release of Google's NMT system in 2016, was responsible for the sudden spike in translation quality. Subsequently, there has been an astronomical increase in the availability of translation software incorporating NMT.

According to Jolley and Maimone (2022), MT plays a significant role in language learning and instruction. They indicated that most students rely heavily on MT to complete writing assignments, especially when searching for specific words or phrases in their language. Despite recognizing the limitations of MT, students value it as a time-efficient tool for enhancing their language skills (Monib et al., 2024). Interestingly, the usefulness of MT in the L2 classroom generates mixed opinions among teachers and students; some teachers resist students' usage of MT, while other teachers perceive its pedagogical significance and advocate for further MT training for themselves and students (Almahasees, 2021).

Broadening the scope of MT application, Anazawa et al. (2013) have demonstrated its beneficial role in diverse academic disciplines, such as Nursing, Science, and Languages. For instance, MT systems have helped global nursing professionals comprehend scholarly articles. Furthermore, Biology and Microbiology students frequently resort to MT resources to concurrently study languages in their academic courses (Archila & de Mejía, 2020; Farghal & Haider, 2024). Apart from that, MT evaluation measures the quality of the translations and interpretations provided by second-language writers through grammatical accuracy analysis, semantic fidelity, lexical choice, and fluency. These measures are responsible for locating errors, making judgments about overall coherence, and determining to what degree the translated text actually conforms to the original meaning. However, using MT tools in digital collaborative writing could pose challenges for students, implying that using MT in English academic writing necessitates enhancing students' MT literacy (Almahasees, 2018).

Sujarwo (2020) conducted an analytical study to elucidate the perceptions of using MT systems in teaching Translation courses at Megarezky University. By surveying

13 Translation students, the study revealed translation students at the English Education Department in the sixth and seventh semesters. Translation students often take several semesters to intensively revise and refine words, phrases, sentences, and paragraphs generated through MT-a process called post-editing. Such a reality only underlines the difficulty that students experience in developing the competencies for critical analysis and enhancement of the output produced by MT, which should remain at the centre of their training. Conversely, Lee (2020) investigated the impact of MT on students' writing by implementing a writing test using MT. The study demonstrated that MT aided in reducing lexico-grammatical errors and enhancing revisions, thereby improving students' revision skills and understanding of writing.

Building on the recent developments in MT, researchers have scrutinized the use of MT tools for academic purposes, particularly in foreign language instruction. Lee (2023) extensively analysed 87 reports published between 2000 and 2019 concerning MT use in FL education. The study showed increased relevant publications over the past years, coupled with improved MT quality. However, the study also unveiled students' complex responses toward MT and highlighted the discrepancy between instructors' and students' perceptions of this tool.

Adding to the discourse on the potential of NMT in foreign language instruction, Klimova et al. (2023) utilized NMT to unearth best practices for language teaching. The meta-analysis results indicated that NMT effectively enhances communicative (speaking and writing) and receptive (reading and listening) language skills and mediation skills, which are integral to the translation process.

Deng and Yu (2022) presented a comprehensive literature review on MT-assisted language acquisition, focusing on potential users, users' perceptions, and MT integration into teaching and learning. The research indicated that most MT users are college and university students. However, teachers and students held ambivalent views due to various reasons. It has been found that MT integration occurred in four stages: preface, demonstration, task assignment, and evaluation. Future improvements to the MT integration process may include the addition of new functionalities.

Focusing on the potentiality of ChatGPT as a translation engine, researchers evaluated its effectiveness in dealing with European and foreign languages (such as Chinese). The study found that ChatGPT performs comparably to commercial translation tools (such as Google Translate) in high-resource European languages, yet its effectiveness diminishes for low-resource or foreign languages. In a similar vein, other researchers aimed to enhance the models used by ChatGPT to improve translations across all languages. They concluded that the performance of ChatGPT could be improved by training the machine to handle various training sets, focusing on task information, introducing domain information to enhance the generalization ability of ChatGPT, and addressing its tendency to generate incorrect translations for non-English-centric MT tasks.

III. METHODOLOGY

This research adopts a quantitative approach, examining the responses of a group of 200 undergraduate and postgraduate translation students to a 3-point Likert Scale questionnaire created with Microsoft Forms, consisting of 20 close-ended statements. The questionnaire was divided into two main sections; the first collected demographic data, such as gender, age, frequency of use, and type of device used. In the second section, the respondents were asked to share their experiences with their use of ChatGPT for translation tasks. This section included 20 closed-ended statements classified into five distinct themes: (1) efficiency, (2) accuracy, (3) ease of use, (4) trustworthiness, and (5) overall preference. A snowball sampling method was utilized, encouraging participants to share the questionnaire link among fellow translation students. The total number of respondents was 220. Twenty of them served as pilots to evaluate the reliability of the questionnaire and were subsequently removed from the study sample.

The survey used in this study was reviewed by a four-member panel specializing in machine translation to obtain their insights and recommendations on the five

constructs and 20 items. The feedback, which revolved around the questions of the questionnaire, was incorporated before the questionnaire's finalization. Furthermore, to ensure the internal consistency of the sub-scales, a Cronbach's alpha test was carried out on a subset of 7 participants, who were subsequently removed from the study, affirming the research instrument's reliability (Cronbach, 1951). Table 1 presents the results for the questionnaire's 20 items and their corresponding construct reliability.

Table 1. *Reliability analysis through Cronbach's alpha results (Cronbach, 1951)*

Construct	No. of Items	Cronbach's Alpha
Efficiency	4	0.82
Accuracy	4	0.91
Ease of Use	4	0.92
Trustworthiness	4	0.89
Overall Preference	4	0.83
All Variables	20	0.76

Table 1 showcases a considerable level of reliability, suggesting significant internal consistency. A reliability coefficient of 0.70 or more is regarded as "acceptable" in social science research (Nunnally, 1978). Correlation is a bivariate analytical method used to ascertain the direction and intensity of the link between two variables. The sign of the coefficient signifies the direction of the relationship, with "+" denoting a positive correlation and "–" a negative one. Regarding strength, the correlation coefficient's value lies between +1 and -1. A coefficient closer to 0 suggests a weak link, while a value of +1 or -1 indicates a strong correlation. Considering these results, Pearson Correlation analyses were performed (see Table 2).

Table 2. *Pearson Correlation Matrix for the Five Constructs*

	Efficiency	**Accuracy**	**Ease of Use**	**Trustworthiness**	**Overall Preference**
Efficiency					
Pearson Correlation	1	0.91*	-0.2	0.28	-0.60*
Sig. (2-tailed)		0.004	0.67	0.54	0.02
Accuracy					
Pearson Correlation	0.91*	1	0.13	0.45**	-0.80**
Sig. (2-tailed)	0.004		0.79	0.009	0.003
Ease of Use					
Pearson Correlation	-0.2	0.13	1	0.77*	-0.11
Sig. (2-tailed)	0.67	0.79		0.02	0.82
Trustworthiness					
Pearson Correlation	0.28	0.45**	0.77*	1	-0.29
Sig. (2-tailed)	0.54	0.009	0.02		0.53
Overall Preference					
Pearson Correlation	-0.60*	-0.80**	-0.11	-0.29	1
Sig. (2-tailed)	0.02	0.003	0.82	0.53	
Note: $p < 0.01$, $*p < 0.05$.					

Table 2 provides the Pearson Correlation Matrix for the five constructions. The results denote statistically significant relationships among various constructs, with some Pearson Correlation Coefficients surpassing 0.50. The most potent correlation was observed between 'Efficiency' and 'Accuracy,' with a Pearson correlation value of

0.91**, which is significant at the 0.01 level (2-tailed). Another significant relationship exists between trustworthiness and accuracy, with a Pearson correlation value of 0.45**, which is significant at the 0.01 level (2-tailed). Additionally, there was a significant negative relationship between 'Efficiency' and 'Overall Preference,' with a Pearson correlation value of -0.60*, significant at the 0.05 level (2-tailed).

IV. RESULTS

IV.1. Demographic Information

In the demographic section of the questionnaire, the researchers sought to accumulate a substantial amount of data concerning the participants' gender, age brackets (17–24, 25–34, or 35+), frequency of interaction with ChatGPT (rarely, sometimes, often, or always), and choice of device for accessing the A.I. model (desktop, laptop, tablet, or smartphone).

As presented in Table 3, the participant cohort comprised 28 males, 27.5% of the sample, and 74 females, 72.5%. This disproportionate representation of females could be traced back to the overall gender dynamic in the translation field, where females have been found to have a dominant presence (Simon, 2003; Al- Salman & Haider, 2024). This skewness may offer unique gender-specific perspectives and insights into using AI translation tools like ChatGPT.

Considering the age demographic, the data shows that most of our undergraduate participants fall into the 17 to 24 age bracket (46.1%), followed by those who are postgraduate in the 25 to 34 range (38.2%). Graduate participants aged 35 and older account for the remaining 15.7%. The younger demographic's prominence in this study could suggest a higher acceptance and engagement level with AI-driven tools like ChatGPT. This is unsurprising given the younger generation's known proclivity towards digital technologies and the growing integration of such technologies in their academic and professional lives.

Table 3. *Participants' Demographic Information*

Variable	Category	Counts	% Percentage
Gender	Male	28	27.50%
	Female	74	72.50%
Age	17-24	47	46.10%
	25-34	39	38.20%
	35+	16	15.70%
Frequency of Use	Rarely	15	14.70%
	Sometimes	20	19.60%
	Often	34	33.30%
	Always	33	32.40%
Device Type	Desktop	16	15.70%
	Laptop	41	40.20%
	Tablet	26	25.50%
	Smart Phone	19	18.60%

Regarding the frequency of interaction with ChatGPT, our data exhibits an intriguing spread. A significant chunk of participants (33.3%) reported using ChatGPT frequently, while 32.4% always resorted to the tool. On the other hand, 19.6% of respondents sometimes utilize AI, and a smaller portion (14.7%) rarely does. This information proposes a generally positive reliance on ChatGPT among translation students. Furthermore, it may indicate a growing trust in AI translation models' effectiveness, accuracy, and viability in academic and professional translation tasks.

Finally, participants' device preference data shows that the laptop was the most favoured choice (40.2%), followed by tablets (25.5%), smartphones (18.6%), and lastly, desktops (15.7%). This preference for portable devices (laptops, tablets, and

smartphones) reinforces the prevailing trend of flexibility and mobility in digital tool usage. This is especially important in translation, where adaptability and access to digital resources-including AI translation models like ChatGPT-play a critical role. Unlike traditional translation-assisted software, which is often confined to either PC or laptop platforms, the newer tools, such as ChatGPT, introduce cross-device compatibility, allowing translators to work seamlessly on smartphones, tablets, and other portable devices. In turn, this could lead to increased productivity and enable translators to adapt to different environments.

The participant group had diverse English Language graduates with Arabic as their mother tongue. That made the insights regarding the perception and use of ChatGPT beneficial. Further, their academic backgrounds and experiences differed, and this helped enrich the study in understanding how AI translation models are received among different demographics and contexts of usage.

I.V.2. Quantitative Analysis

Interestingly, the participants' responses to the 20 items in the 3-Point Likert Scale questionnaire, as described in Table 4, reveal some interesting insights concerning the participants' experiences in handling the translation tasks set using ChatGPT. The "% agree," "% neutral," and "% disagree" columns denote the percentage of participants that responded positively, negatively, or neutrally to each item. Additionally, further quantitative insight is provided by the robust statistical measures in terms of "M (S.E.)." These supplement the qualitative understanding of the dataset.

Each of the 20 items in the questionnaire was meticulously curated to encapsulate the participants' experiences and feedback regarding their interaction with the ChatGPT for translation purposes. The intricacies of these responses have been depicted comprehensively in Table 4.

Table 4 breaks down the percentage agreement along with the mean and standard error (M(S.E.)) for five key constructs, namely, Efficiency, Accuracy, Ease of Use, Trustworthiness, and Overall Preference.

Table 4. *ChatGPT Performance and User Perceptions*

No.	Construct	Item	M (S.E.)	% Agree	% Neutral	% Disagree
1.1		I can translate texts quickly using ChatGPT.	3.78 (1.1)	64.30%	26.20%	9.50%
1.2		ChatGPT helps me translate large volumes of text more easily.	3.61 (1.0)	58.70%	30.10%	11.20%
1.3	Efficiency	ChatGPT provides timely suggestions for translation.	3.51 (1.2)	52.80%	33.40%	13.80%
1.4		I can get my translation work done faster because of ChatGPT.	3.98 (0.8)	73.50%	22.70%	3.80%
2.1		ChatGPT usually provides accurate translations.	3.91 (0.9)	70.40%	26.90%	2.70%
2.2		The translations provided by ChatGPT do not require significant modifications.	3.49 (1.3)	48.70%	37.60%	13.70%
2.3	Accuracy	ChatGPT maintains the original meaning of the source text in the translated version.	3.62 (1.1)	54.60%	31.70%	13.70%
2.4		I can rely on the translations provided by ChatGPT for academic purposes.	3.74 (1.2)	62.90%	29.70%	7.40%
3.1		I find it easy to operate ChatGPT.	3.96 (1.0)	72.80%	24.50%	2.70%
3.2		The user interface of ChatGPT is user-friendly.	3.72 (1.1)	64.30%	28.20%	7.50%

No.	Construct	Item	M (S.E.)	% Agree	% Neutral	% Disagree
3.3	Ease of Use	I find it easy to navigate through the features of ChatGPT.	3.84 (1.0)	67.60%	26.40%	6.00%
3.4		Learning to use ChatGPT is easy for me.	3.68 (1.2)	58.90%	32.10%	9.00%
4.1	Trustworthiness	I trust the translations provided by ChatGPT.	4.11 (1.0)	76.20%	17.60%	6.20%
4.2		ChatGPT is a reliable tool for translation tasks.	4.05 (0.7)	73.70%	21.20%	5.10%
4.3		I trust that ChatGPT will maintain the confidentiality of my translated work.	4.32 (1.1)	82.30%	10.70%	7.00%
4.4		I believe that the translations generated by ChatGPT are dependable.	3.84 (1.0)	65.40%	27.90%	6.70%
5.1	Overall Preference	I prefer using ChatGPT over other translation tools.	3.92 (1.2)	67.90%	22.70%	9.40%
5.2		I am satisfied with the performance of ChatGPT.	4.21 (0.8)	81.20%	16.80%	2.00%
5.3		I would recommend ChatGPT to other students.	4.08 (1.1)	75.40%	20.20%	4.40%
5.4		I will continue using ChatGPT for my future translation needs.	3.84 (1.0)	65.40%	27.90%	6.70%

Efficiency, the first construct, garnered considerable agreement among the participants. An overwhelming majority affirmed that ChatGPT enabled them to translate texts swiftly (64.3% agreement, M=3.78), thereby streamlining their workflow. The capability

of ChatGPT to handle large volumes of text was also well-received (58.7% agreement, M=3.61), implying its suitability for extensive translation tasks. Participants further commended the timeliness of translation suggestions provided by ChatGPT (52.8% agreement, M=3.51), signifying its responsiveness to user inputs. Finally, ChatGPT's role in accelerating translation tasks was acknowledged by a majority (73.5% agreement, M=3.98), reinforcing the tool's contribution to productivity.

The second construct, accuracy, examined the quality of translations generated by ChatGPT. A substantial majority endorsed the accuracy of ChatGPT's translations (70.4% agreement, M=3.91), indicating trust in the AI model's linguistic competence. However, participants agreed to a lesser extent that translations provided by ChatGPT did not necessitate significant modifications (48.7% agreement, M=3.49), highlighting some room for improvement. ChatGPT's ability to maintain the original meaning in its translations was appreciated (54.6% agreement, M=3.62), suggesting the model's sensitivity to semantic preservation. Furthermore, students recognized the model as a reliable tool for academic translations (62.9% agreement, M=3.74), pointing to its adaptability to formal settings.

Ease of Use, the third construct, garnered favourable responses, with users finding ChatGPT simple to operate (72.8% agreement, M=3.96), underscoring its intuitiveness. The user-friendly interface was also appreciated (64.3% agreement, M=3.72), reflecting a positive user experience. In addition, the participants affirmed the ease of navigating through the features of ChatGPT (67.6% agreement, M=3.84), reflecting the tool's ergonomic design. Moreover, the learning curve associated with using ChatGPT was gentle (58.9% agreement, M=3.68), indicating its accessibility for novice users.

Trustworthiness was highly regarded by participants who were specialists in English-Arabic translation and those with expertise in English-related fields like linguistics, literature, and language studies. The participants targeted students and professionals in translation and language disciplines to give an informed view of the subject matter. Most participants trusted the translations from ChatGPT; 76.2% agreed, M=4.11 hence trusted it. ChatGPT was recognized as a reliable tool for translation tasks

(73.7% agreement, M=4.05), asserting its consistency in performance. The high level of trust in the tool's confidentiality of translated work (82.3% agreement, M=4.32) illustrates the trustworthiness of ChatGPT, according to students, in handling sensitive information. Also, the dependability of the translations was affirmed by a majority (65.4% agreement, M=3.84), asserting the tool's credibility.

The final construct, overall preference, revealed strong favourability towards ChatGPT. Participants preferred ChatGPT over other translation tools (67.9% agreement, M=3.92), indicating its competitive edge. Furthermore, an overwhelming majority expressed satisfaction with ChatGPT's performance (81.2% agreement, M=4.21), reflecting a high degree of user contentment. Moreover, willingness to recommend ChatGPT to peers was high (75.4% agreement, M=4.08), indicating the tool's influence and acceptance within the user community. Continued usage of ChatGPT for future translation needs was also anticipated (65.4% agreement, M=3.84), showing sustained interest and loyalty towards the tool.

These analytical insights into the five constructs provide a comprehensive understanding of ChatGPT's perceived efficiency, accuracy, ease of use, trustworthiness, and overall participant preference. The in-depth examination of user experiences confirms ChatGPT's potential as a highly regarded tool for translation purposes in academic contexts. The findings agree that ChatGPT is highly useful in Translation.

V. CONCLUSION

This study elicited translation students' perceptions regarding using the tool in Translation. It has uncovered a significant breadth of insights. The findings, gathered through a quantitative method research design, elucidate the intricate user experiences with this sophisticated AI model. Furthermore, the study has examined several key constructs that determine the efficacy of such a tool, namely Efficiency, Accuracy, Ease of Use, Trustworthiness, and Overall Preference.

In the efficiency domain, ChatGPT performed very well, showing its capability in speeding up the translation process. Furthermore, the speed at which Translation of large volumes of text can be performed was highly appreciated by the participants, therefore increasing its utility in enhancing productivity. Accuracy is yet another important construct, and ChatGPT was noted for its capability to provide accurate translations despite the subtlety that there was room for improvement.

The ease of use of ChatGPT was another highlight of the study. Participants appreciated the model's user-friendliness and intuitive design, indicating a favorable user experience. The learning curve associated with mastering the tool was also perceived to be gentle, signifying its potential as a beginner-friendly digital instrument to aid in translation. Trustworthiness emerged as another forte of ChatGPT, with users trusting the tool's commitment to confidentiality and reliability. This finding was further bolstered by the participants' preference for ChatGPT over other available translation platforms, which affirms its competitiveness in the landscape of AI-assisted Translation. Nonetheless, the study has its limitations. The predominantly young female demographic composition of the participant group poses a potential challenge to the broader generalizability of the findings. Future research could, therefore, benefit from including a more varied demographic sample to ensure a comprehensive representation of user perceptions of ChatGPT. The research context might only partially represent diverse professional translation scenarios. Hence, subsequent investigations could consider expanding the study environment to include professional translators and various translation contexts. This could pave the way for a holistic understanding of ChatGPT's applicability across different professional settings.

The current study sets the stage for subsequent investigations into other language pairs, furthering the understanding of AI translation models' potential in a more global context. Furthermore, given the ever-evolving landscape of AI and its consistent advancements, a longitudinal research approach could offer invaluable insights into changing user perceptions and adaptation practices. To summarize, this research provides a noteworthy contribution to the evolving literature on AI-assisted translation

models, with a particular focus on ChatGPT. Furthermore, the results underscore the significance of integrating state-of-the-art digital tools into the translation course relating to MT and CAT tools, considering their increasing relevance and prevalence in the translation industry.

REFERENCES

Almahasees, Z. (2017). Machine Translation Quality of Khalil Gibran's The Prophet (SSRN Scholarly Paper 3068518). https://doi.org/10.2139/ssrn.3068518

Almahasees, Z. (2018). Assessment of Google and Microsoft Bing translation of journalistic texts. *International Journal of Languages, Literature, and Linguistics*, *4*(3), 231–235.

Almahasees, Z. (2021). *Analysing English-Arabic Machine Translation: Google Translate, Microsoft Translator and Sakhr*. Routledge. https://www.taylorfrancis.com/books/mono/10.4324/9781003191018/analysing-english-arabic-machine-translation-zakaryia-almahasees

Al-Salman, S., & Haider, A. (2024). Assessing the accuracy of MT and AI tools in translating humanities or social sciences Arabic research titles into English: Evidence from Google Translate, Gemini, and ChatGPT. *International Journal of Data and Network Science, 8*(4), 2483-2498.

Al-Taher, M. (2019). Google Translate's rendition of verb-subject structures in Arabic news reports. *International Journal of Arabic-English Studies, 19*(1), 195-208.

Anazawa, R., Ishikawa, H., Park, M., & Kiuchi, T. (2013). Online machine translation use with nursing literature: Evaluation method and usability. *Computers, Informatics, Nursing: CIN, 31*(2), 59–65. https://doi.org/10.1097/NXN.0b013e3182701056

Archila, P.A., & de Mejía, A. (2020). Bilingual Teaching Practices in University Science Courses: How Do Biology and Microbiology Students Perceive Them? *Journal of Language, Identity & Education, 19*(3), 163–178. https://doi.org/10.1080/15348458.2019.1654868

Cai, D., Wang, Y., Li, H., Lam, W., & Liu, L. (2021). *Neural Machine Translation with Monolingual Translation Memory* (arXiv:2105.11269). arXiv. https://doi.org/10.48550/arXiv.2105.11269

Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. https://doi.org/10.1007/BF02310555

Deng, X., & Yu, Z. (2022). A Systematic Review of Machine-Translation-Assisted Language Learning for Sustainable Education. *Sustainability*, *14*(13), Article 13. https://doi.org/10.3390/su14137598

Farghal, M., & Haider, A. (2024). Translating classical Arabic verse: human translation vs. AI large language models (Gemini and ChatGPT). *Cogent Social Sciences, 10*(1), 2410998.

Haleem, A., Javaid, M., & Singh, R.P. (2022). An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, *2*(4), 100089. https://doi.org/10.1016/j.tbench.2023.100089

Hariri, W. (2024). *Unlocking the Potential of ChatGPT: A Comprehensive Exploration of its Applications, Advantages, Limitations, and Future Directions in Natural Language Processing* (arXiv:2304.02017). arXiv. https://doi.org/10.48550/arXiv.2304.02017

Hasyim, M., Saleh, F., Yusuf, R., & Abbas, A. (2021). *Artificial Intelligence: Machine Translation Accuracy in Translating French-Indonesian Culinary Texts*. Available at SSRN 3816594. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3816594

Jiao, W., Wang, W., Huang, J., Wang, X., Shi, S., & Tu, Z. (2023). *Is ChatGPT A Good Translator? Yes With GPT-4 As The Engine* (arXiv:2301.08745). arXiv. https://doi.org/10.48550/arXiv.2301.08745

Jolley, J. , & Maimone, L. (2022). Thirty Years of Machine Translation in Language Teaching and Learning: A Review of the Literature. *L2 Journal: An Open Access*

Refereed Journal for World Language Educators, *14*(1). https://doi.org/10.5070/L214151760

Klimova, B., Pikhart, M., Benites, A.D., Lehr, C., & Sanchez-Stockhammer, C. (2023). Neural machine translation in foreign language teaching and learning: A systematic review. *Education and Information Technologies*, *28*(1), 663–682. https://doi.org/10.1007/s10639-022-11194-2

Krings, H. (2001). *Repairing texts: Empirical investigations of machine translation post-editing processes* (Vol. 5). Kent State University Press. https://books.google.com/books?hl=en&lr=&id=vsdPsIXCiWAC&oi=fnd&pg=PP15&dq=Post+editing+holds+significant+promise+for+training+translators&ots=AcEDi5xJxh&sig=e2CjDycTGqqT7wPwYyYVh6Mrg2M

Lee, S-M. (2020). The impact of using machine translation on EFL students' writing. *Computer Assisted Language Learning*, *33*(3), 157–175. https://doi.org/10.1080/09588221.2018.1553186

Li, H., & Chen, H. (2019). Human vs. AI: An Assessment of the Translation Quality Between Translators and Machine Translation. *International Journal of Translation, Interpretation, and Applied Linguistics (IJTIAL)*, *1*(1), 1–12. https://doi.org/10.4018/IJTIAL.2019010104

Monib, W. K., Qazi, A., Apong, R. A., & Mahmud, M. M. (2024). *Investigating learners' perceptions of microlearning: Factors influencing learning outcomes*. IEEE Access.

Nunnally, J. (1978). An Overview of Psychological Measurement. In B. B. Wolman (Ed.), *Clinical Diagnosis of Mental Disorders* (pp. 97–146). Springer US. https://doi.org/10.1007/978-1-4684-2490-4_4

O'Hagan, M. (2019). Introduction: Translation and technology: disruptive entanglement of human and machine. In *The Routledge handbook of translation and technology* (pp. 1–18). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315311258-1/introduction-minako-hagan

Peng, K., Ding, L., Zhong, Q., Shen, L., Liu, X., Zhang, M., Ouyang, Y., & Tao, D. (2023). *Towards Making the Most of ChatGPT for Machine Translation* (arXiv:2303.13780). arXiv. https://doi.org/10.48550/arXiv.2303.13780

Sujarwo, S. (2020). Students' Perceptions of Using Machine Translation Tools In the EFL Classroom. *Al-Lisan: Jurnal Bahasa (e-Journal)*, *5*(2), Article 2. https://doi.org/10.30603/al.v6i2.1333

Received: 03 February 2024

Accepted: 18 December 2024

Proposing the Integration of Scrum and ESP for EFL Tourism Students: Theoretical Framework and Methodological Approach

Rocío Gragera
rocio.gragera@ulpgc.es
Universidad de Las Palmas de Gran Canaria, Spain

Isabel Soto Déniz
isabel.soto@ulpgc.es
Universidad de Las Palmas de Gran Canaria, Spain

Grajera, Rocío & Soto Déniz, Isabel (2024). Proposing the Integration of Scrum and ESP for EFL Tourism Students: Theoretical Framework and Methodological Approach. *Language Value*, 17(2), 24-59. Universitat Jaume I ePress: Castelló, Spain. http://www.languagevalue.uji.es.

December 2024

DOI: https://www.doi.org/10.6035/languagev.8474

ISSN 1989-7103

ABSTRACT

This study explores the integration of Scrum methodology into English for Specific Purposes (ESP) instruction for Tourism students to address absenteeism, disengagement, and academic underperformance at the University of Las Palmas de Gran Canaria (Spain). Combining Scrum's iterative, team-based framework with ESP principles, the research aimed to enhance student engagement, language proficiency, teamwork, and self-management. Conducted over 11 weeks with second-year Tourism students, the project used real-world tasks, such as customer service interactions and conflict resolution, structured into collaborative sprints with regular feedback and reflection. The results revealed improvements in student motivation, language skills and teamwork abilities. Challenges included occasional issues with task distribution and workload management. Overall, the study demonstrates that integrating Scrum with ESP creates a dynamic and effective learning environment, aligning language instruction with professional needs while promoting active participation and skill development.

Keywords: *Scrum methodology; collaborative learning; English for Specific Purposes; agile learning; tourism education.*

I. INTRODUCTION

English as a Foreign Language (EFL) is an indispensable component of the curriculum for Tourism students, where effective communication in English is vital to their professional success. Proficiency in English is not only required for interacting with international clients but also for navigating complex professional environments that demand strong interpersonal and cultural competence. However, despite its importance, EFL courses at the University of Las Palmas de Gran Canaria's Tourism Faculty (Spain), where this study has been conducted, often face significant challenges, most notably absenteeism and academic underachievement. Many students struggle to see the relevance of English language instruction in relation to their future career needs. This gap between the curriculum and real-world application frequently results in disengagement, which contributes to poor academic performance and high dropout rates.

To address these issues, this paper explores how the integration of Scrum, an agile project management framework developed by Jeff Sutherland and Ken Schwaber, can reinforce EFL instruction. Originally designed to streamline the management of complex software development projects, Scrum emphasizes iterative cycles, known as sprints, which are aimed at producing tangible results within short time frames. Key principles of Scrum, such as collaboration, accountability, and continuous feedback, lend themselves well to educational contexts, particularly in courses designed to meet the specific needs of students, such as English for Specific Purposes (ESP).

In Tourism education, the use of ESP provides a focused, context-specific approach to language teaching, as it enables students to acquire language skills that directly correlate with their future professional roles in customer service, hospitality management, and professional communication. The combination of ESP and Scrum methodology creates a dynamic and interactive learning environment where students can actively apply their English skills in scenarios directly linked to their career paths. The theoretical foundation suggests a pathway for enhancing both student engagement and language

acquisition through the integration of these two approaches. The result is a framework that equips students with the practical communication skills required to excel in the tourism industry.

This paper will explore the rationale behind combining Scrum methodology with ESP principles, highlighting how such an integration can address persistent challenges in tourism-related EFL courses. Additionally, it discusses the potential benefits of EduScrum, the educational adaptation of Scrum, which has been specifically tailored to promote active learning and foster deeper engagement in collaborative projects (Schwaber & Sutherland, 2017; Serrador & Pinto, 2015).

II. OBJECTIVES

II.1. General objectives

The primary objective of this research is to propose and evaluate the feasibility of integrating English for Specific Purposes (ESP) principles within a Scrum-based instructional methodology. The ultimate goal is to ensure that Tourism students, who require not only general English proficiency but also specific language skills relevant to their professional contexts, receive a tailored, practical education, necessary to succeed in their future careers.

This proposed framework aims to offer solutions to two major challenges in EFL instruction for Tourism students: absenteeism and disengagement. The course will be structured around collaborative sprints, each focusing on specific tasks directly related to tourism. By integrating Scrum, students will engage in active, team-based learning, which promotes a deeper understanding of the material and encourages greater participation. Furthermore, the iterative nature of Scrum aligns with the demands of modern learning environments, where adaptability, teamwork, and reflection are critical for academic success.

II.2.Specific objectives

Promoting Collaboration and Teamwork: Scrum places a strong emphasis on collaborative, team-based learning. By incorporating Scrum into an ESP course, students will engage in group tasks that simulate real-world tourism scenarios, such as handling customer complaints or managing tour groups. This collaborative approach distributes responsibility among team members, fostering a sense of accountability while enhancing communication and problem-solving skills.

Improving Time Management and Efficiency: Scrum's structure allows students to work in short, focused sprints. Each sprint is designed to help students focus on manageable, short-term goals, which in turn enhances their time management skills. By aligning with Sutherland's principle of 'achieving twice the work in half the time,' this methodology teaches students how to prioritize tasks and manage their workload efficiently, key skills that are critical in both academic and professional settings.

Developing Practical Language Skills: The ESP framework ensures that the language tasks are directly aligned with the practical needs of the tourism industry. Students will develop specific competencies, such as drafting formal emails, interacting with customers in English, and managing conflict resolution in tourist scenarios. This focus on real-world language use equips students with the tools they need to succeed in their professional careers.

Enhancing Student Self-Management and Reflection: The iterative cycles of Scrum encourage students to reflect on their learning and progress at the end of each sprint. Reflection is a key component of Scrum's principle of continuous improvement, which enables students to adapt and refine their approaches based on feedback. By encouraging self-assessment and reflection, students will develop greater autonomy and a more proactive approach to their learning.

III. LITERATURE REVIEW

The theoretical foundation of this study rests on two key frameworks: Scrum methodology and English for Specific Purposes (ESP). Both have unique but complementary characteristics that, when integrated, provide a structured and collaborative learning environment tailored to the needs of Tourism students.

III.1. Social Constructivism, Scaffolding and Active Learning

Social constructivism, based on Vygotsky's theories, underscores the critical role of social interaction and collaboration in the learning process. Vygotsky (1978) argued that knowledge is constructed through social engagement and cultural influences, with learning driving development. This perspective contrasts with Piaget's view that development precedes learning (Amine & Asl, 2015), highlighting the dynamic interplay between social context and cognitive growth.

At the heart of Vygotsky's theory is the Zone of Proximal Development (ZPD), which represents the gap between what learners can achieve independently and what they can accomplish with guidance from teachers or peers (Gonulal & Loewen, 2018). Social interaction within the ZPD fosters intellectual growth, helping learners reach their full potential (Churcher et al., 2014). This principle resonates with Scrum's collaborative framework, where students build knowledge through shared experiences and dialogue, enabling iterative learning and continuous improvement.

Further emphasizing the role of cultural and social contexts, social constructivism highlights that students learn most effectively with scaffolding—temporary, structured support that is gradually withdrawn as they gain competence (Gonulal & Loewen, 2018). Cooperative learning complements this approach by encouraging collaboration and the sharing of perspectives among students, which supports deeper internalization of knowledge (Amineh & Asl, 2015). These principles align seamlessly with Scrum's iterative approach, where group collaboration and instructor facilitation are vital for sustained progress.

Language, as emphasized by Vygotsky, is a pivotal tool in learning, serving as a bridge between thought and consciousness. Classroom dialogue and discussion foster critical thinking and help students construct personal meaning (Amineh & Asl, 2015). Additionally, diversity and cultural influences shape students' learning experiences and understanding. Teachers play a crucial role in embracing this diversity, fostering meaningful dialogue about curriculum content and students' varied backgrounds. Effective communication and shared understanding among participants are fundamental to successful learning in a social constructivist environment (Churcher et al., 2014).

Key strategies derived from social constructivism, such as scaffolding, are central to this study. Scaffolding involves providing temporary, tailored support to help students complete tasks beyond their current abilities, gradually reducing assistance as they develop competence (Bruner, 1988). Within Scrum, scaffolding manifests through the instructor's role as a facilitator, guiding students through increasingly complex tasks while promoting autonomy and self-regulation.

Bruner's cognitive theory complements social constructivism by emphasizing discovery learning and iterative, feedback-driven processes. His concept of the spiral curriculum, which revisits foundational concepts at progressively deeper levels, aligns closely with Scrum's iterative sprints. This approach enables students to gradually build and refine their understanding over time (Bruner, 1988). As noted by Nur Arsyad et al., (2024), Bruner's theory is particularly impactful in elementary education, where scaffolding and discovery learning actively engage students and connect abstract ideas to real-world contexts. These strategies not only deepen understanding but also equip learners with critical thinking and problem-solving skills essential for addressing future challenges.

III.2. Scrum methodology

Scrum, developed by Jeff Sutherland and Ken Schwaber to manage complex software projects, has evolved into a versatile framework applied across various fields, including education. Its focus on iterative work cycles (sprints), continuous feedback, and team

collaboration makes it an effective approach for promoting active learning (Sutherland, 2014). In educational contexts, Scrum enables students to engage in iterative learning processes, reflect on their performance, receive feedback, and continuously improve.

In these settings, Scrum roles like Scrum Master and Product Owner are adapted to foster accountability and collaboration. The instructor typically assumes the role of Product Owner, establishing learning objectives and guiding students, while students share responsibility for their progress, encouraging self-regulation and teamwork (Vila-Grau & Capuz-Rizo, 2021). This collaborative model aligns with social constructivist principles, where knowledge is constructed through interaction and shared experiences, as emphasized by Vygotsky's (1978) Zone of Proximal Development (ZPD).

Scrum's iterative structure is particularly effective for Tourism students learning English for Specific Purposes (ESP). Dividing course content into manageable sprints allows students to concentrate on specific language tasks relevant to their future professional roles, such as handling customer complaints, managing bookings, and navigating cultural interactions in tourism. This method reduces cognitive overload and supports incremental skill development, with each sprint building on the achievements of the previous one (Voštinár, 2024).

Additionally, Scrum's principles of transparency, inspection, and adaptation ensure that students stay engaged and accountable. Regular sprint reviews and retrospectives provide opportunities for reflection and refinement, helping students cultivate crucial soft skills such as teamwork, communication, and leadership, which are essential for both academic success and professional growth (Delhij et al., 2015).

III.3. The Role of Agile Methodologies in Education

Agile methodologies, particularly Scrum, have gained prominence in education as a flexible framework that enhances engagement, learning outcomes, and behavioral interventions (Serrador & Pinto, 2015). Agile Teaching/Learning Methodology (ATML), derived from the Agile Methodology introduced in 2002, applies these principles to education by emphasizing flexibility, collaboration, and the integration of professional

knowledge with digital and soft skills. Initially associated with computer science, ATML has expanded into interdisciplinary fields like bioeconomy and healthcare, promoting adaptability and creativity to address complex challenges (Gorczyca et al., 2024).

The iterative and collaborative nature of agile teaching aligns closely with Problem-Based Learning (PBL). Research demonstrates that PBL fosters practical knowledge, teamwork, and critical thinking by engaging students in real-world scenarios. For instance, a third-year information systems module in South Africa successfully integrated PBL with agile practices, providing students with hands-on experience and eliciting positive feedback. This iterative approach has proven to be more compatible with agile methodologies like Scrum than traditional waterfall methods (Marnewick, 2023).

Agile project management in education also reflects the principles of active learning and self-regulated education emphasized in ATML (Yang et al., 2019). Through structured yet flexible project units, students manage tasks, track progress, and participate in feedback sessions. Teachers guide this process by addressing challenges and evaluating team performance, ensuring gradual skill development. This method enhances intrinsic motivation, critical thinking, and collaborative learning while fostering adaptability to evolving requirements (Yang et al., 2019).

Beyond education, agile methodologies have been adapted to address behavioral challenges, such as conduct disorder. Affecting approximately 5% of children, this condition involves persistent violations of social norms and poses risks such as school drop-out and incarceration. Digital tools developed using agile methodologies address these challenges by providing real-time, evidence-based guidance. For example, a time-out app created with an agile scrum framework simplifies protocols and enhances effectiveness, demonstrating the adaptability of Scrum principles beyond software development, offering user-focused solutions for behavioral interventions (Hodson et al., 2024).

The agile scrum approach exemplifies the versatility of iterative methodologies across educational, behavioral, and professional domains. By integrating feedback loops,

collaborative learning, and problem-solving frameworks, agile methods enhance student engagement, skill development, and practical outcomes. These approaches prepare students for dynamic professional environments while addressing real-world challenges through innovative, adaptable solutions (Yang et al., 2019; Hodson et al., 2024).

III.4. The Integration of English for Specific Purposes (ESP) with Agile Learning

ESP, as defined by Dudley-Evans and St John (1998), is a learner-centered approach that focuses on equipping students with the specific language skills required for success in their professional or academic fields. Unlike general EFL courses, which address broad language topics, ESP tailors its content to meet the unique needs of students. For Tourism students, this includes developing communication skills for customer service, hospitality management, and other professional contexts.

The integration of ESP with Scrum methodology creates an effective framework for practical, real-world skill application. In an ESP course for Tourism students, language tasks are directly aligned with their professional needs, such as negotiating with clients, managing bookings, and resolving customer complaints in English (Hutchinson & Waters, 1987). This alignment allows instructors to design targeted learning objectives that make the learning process more engaging and relevant to students' career paths.

Additionally, by structuring language tasks around real-world scenario in a low-risk setting, such as handling customer complaints or organizing tour activities, ESP combined with Scrum fosters meaningful, goal-oriented learning (Gonulal & Loewen, 2018). This practical focus enhances students' motivation and underscores the relevance of their language studies to their future careers. This hands-on approach strengthens language acquisition while boosting their confidence in professional communication.

Furthermore, Scrum's iterative process offers regular feedback, enabling students to refine their skills and achieve continuous improvement while taking an active role in their education. This approach encourages ownership of their learning, self-reflection, and peer collaboration, all of which are vital for success in the tourism industry. By

aligning language tasks with real-world scenarios, students see the practical relevance of their English studies, which leads to increased motivation and reduced absenteeism (Mahnic, 2012; Vila-Grau & Capuz-Rizo, 2021).

IV. METHODOLOGY

This section outlines the methodology designed for integrating Scrum with English for Specific Purposes (ESP) in a Tourism-focused EFL course. The proposed course structure is built around Scrum's iterative, team-based approach, ensuring that students engage in practical, relevant language tasks while developing key professional skills. The methodology has been crafted to meet the specific language needs of Tourism students, emphasizing collaborative learning, time management, and continuous feedback.

IV.1. Subjects of study

The subjects of this study consist of a group of 96 second-year undergraduate students from the University of Las Palmas de Gran Canaria's Tourism Faculty in Spain, who have taken part in an ESP scrum-based project for a period of 11 weeks.

IV.2. Materials

This project and its consequent study have made use of accessible materials, mostly digital, namely Microsoft One Drive apps and the university's virtual campus (Moodle). A virtual survey was completed by 89 of the 96 participants. The use of these digital materials was possible thanks to the participants' personal means, to the university's free software, platforms and licenses and to the university's Language Laboratory, which provides the students with computers for tests and projects.

In addition, the university's Administrative and Support Personnel provided the students with desks and chairs to create the foundation of their stands, which they decorated with personal materials designed and created by each group. Moreover, we made use of the Faculty of Tourism's main hall in order to celebrate the final event of the project, a Tourism Fair.

IV.3. Procedure

IV.3.1. Course Structure: Organizing Learning into Sprints

The course will be organized into two-week sprints, each focusing on a set of language tasks relevant to the tourism industry. These tasks are designed to mimic real-world scenarios, such as customer service interactions, handling complaints, writing formal business emails, and conducting tourist information sessions. By breaking the course into manageable sprints, students can focus on specific language skills without becoming overwhelmed by the volume of material. This structure also allows for regular feedback and reflection, which are key components of the Scrum methodology (Sutherland, 2014).

Each sprint will begin with a sprint planning session, during which the students, working in teams, will select tasks from a backlog of activities prepared by the instructor (Product Owner). These tasks will include a mix of oral, written, and interactive activities, all of which are designed to help students practice their language skills in a professional tourism context (Voštinár, 2024). Students will be encouraged to collaborate and divide tasks among themselves, fostering a sense of responsibility and teamwork.

Throughout each sprint, students will participate in daily Scrum meetings; brief, stand-up sessions where team members share their progress, discuss challenges, and plan their next steps. These daily meetings help keep students on track and ensure that they are actively engaged in their learning process (Delhij et al., 2015). The short, focused nature of these meetings also allows for continuous reflection and adjustment, helping students to stay aligned with their goals and make incremental improvements.

At the end of each sprint, students will present their work in a sprint review, where they will receive feedback from both their peers and the instructor. This feedback is critical for helping students identify areas for improvement and adjust their approach in future sprints. Following the sprint review, students will participate in a sprint retrospective, where they will reflect on what went well, what challenges they faced, and how they can improve in the future (Sutherland, 2014). This iterative process of reflection and adjustment is at the core of Scrum's principle of continuous improvement.

IV.3.1. Scrum Events in Education

The Scrum process in education revolves around several key events, including sprint planning, daily stand-ups, sprint reviews, and retrospectives (Delhij et al., 2015). In a Tourism-focused EFL course, these events help students stay on track while fostering collaboration and self-reflection.

Sprint Planning: During sprint planning, student teams, guided by the instructor (Product Owner), decide which language tasks from the backlog will be tackled during the upcoming sprint. These tasks are aligned with real-world tourism scenarios, such as managing customer inquiries or resolving conflicts in a hospitality setting. Sprint planning ensures that students are not overwhelmed by the volume of material and can focus on achieving specific, manageable goals (Vila-Grau & Capuz-Rizo, 2021).

Daily Stand-Ups: Daily stand-ups are short, five-minute meetings where students share their progress, identify any challenges, and plan their next steps. This regular check-in process helps maintain transparency and ensures that the team remains aligned with its sprint goals. In an EFL context, these meetings provide opportunities for students to practice professional communication in English, further enhancing their language proficiency (Delhij et al., 2015).

Sprint Reviews: At the end of each sprint, students present their work in a sprint review, receiving feedback from their peers and the instructor. This feedback is critical for helping students identify areas for improvement, both in their language skills and their approach to teamwork. The review also allows students to demonstrate their progress in applying English to real-world tourism scenarios (Sutherland, 2014; Vila-Grau & Capuz-Rizo, 2021).

Sprint Retrospectives: Following the sprint review, students participate in a sprint retrospective, where they reflect on what went well, what challenges they faced, and how they can improve in future sprints. This reflection process fosters a growth mindset, encouraging students to view challenges as opportunities for improvement (Sutherland, 2014; Vila-Grau & Capuz-Rizo, 2021).

IV.3.3. Implementation of Scrum in ESP Projects

By following Scrum principles, students will not only improve their language skills but also develop important soft skills such as teamwork, communication, and time management. The iterative nature of Scrum ensures continuous improvement and provides students with regular feedback, making the learning process more dynamic and responsive to their needs. The aforementioned proposal integrates the Scrum methodology into an ESP-focused Tourism Fair project.

IV.3.4. Project Overview: Tourism Fair

The *Tourism Fair* is a practical project in which students work in teams to design and present tourism stands representing various countries with Anglo-Saxon heritage. The project focuses on developing spoken production and interaction skills, with students creating both physical and digital materials to showcase tourism aspects of their assigned countries. The project promotes the use of technical vocabulary, cooperative learning, and the practical application of language skills in real-world scenarios.

IV.3.5. Temporalization of the Teaching Proposal with Scrum Integration

Introduction and Project Kick-off (Week 1)

Objective: Introduce students to the project and the Scrum methodology. Define the scope of the project and assign countries to each team.

Scrum Elements:

Sprint Planning: Hold the first sprint planning session. Each team will break down the project into smaller tasks that align with Scrum's iterative approach.

Team Formation: Students will be divided into teams of 5-6 members, with roles assigned (Scrum Master, Product Owner, and Development Team).

Project Backlog: The Product Owner (teacher) will provide a backlog of tasks related to research, content creation, and stand design.

Sprint 1 (Weeks 2-3)

Objective: Research the assigned country and begin initial content creation. Focus on identifying key tourism features (landmarks, culture, history).

Scrum Elements:

Daily Stand-ups: Teams will hold 5-minute daily stand-ups to discuss progress, obstacles, and next steps.

Sprint Review: At the end of Week 3, teams will present their research findings and receive feedback from peers and the instructor. Feedback will focus on the relevance and accuracy of the information.

Sprint Retrospective: Teams will reflect on what went well during the research phase and what could be improved for the next sprint.

Sprint 2 (Weeks 4-5)

Objective: Develop the stand design, focusing on visual and interactive elements. Begin drafting a presentation script for the fair.

Scrum Elements:

Sprint Planning: Teams will select tasks related to stand design from the backlog. Tasks may include creating visuals, collecting materials, and brainstorming interactive activities.

Daily Stand-ups: Continued daily check-ins to ensure progress on the stand design and preparation for the presentation.

Sprint Review: Teams will showcase their initial stand designs and receive feedback. This review will emphasize creativity, teamwork, and the use of technical vocabulary.

Sprint Retrospective: Reflect on the design process and team dynamics, focusing on how the design and presentation aspects can be further improved.

Sprint 3 (Weeks 6-7)

Objective: Finalize the stand and practice the presentation. Rehearse responses to potential audience questions.

Scrum Elements:

Daily Stand-ups: Ensure that the stand is ready for the presentation. Teams will finalize visual and interactive elements.

Sprint Review: Conduct a full rehearsal of the stand presentation, including a Q&A session to simulate the actual fair. The instructor will provide feedback on fluency, pronunciation, and presentation skills.

Sprint Retrospective: Teams reflect on their readiness for the tourism fair, identify any last-minute improvements, and ensure that all tasks are completed.

The Tourism Fair (Week 8)

Objective: Present the tourism stands to classmates and invited guests (other students or faculty members). Each group will simulate a tourism fair, interacting with "visitors" and promoting their assigned country.

Scrum Elements:

Final Presentation and Assessment: The final sprint review will take place as teams present their stands and engage in spoken interaction with visitors. The assessment will focus on spoken production and interaction, including fluency, creativity, and teamwork.

Post-Fair Reflection and Evaluation (Week 9)

Objective: Reflect on the learning process and evaluate the overall effectiveness of the Scrum methodology in the project.

Scrum Elements:

Sprint Retrospective: Teams will reflect on their performance during the fair and discuss what they learned from the project. They will also provide feedback on the Scrum process and how it helped or hindered their learning experience.

Final Assessment: The instructor will provide final grades based on the criteria listed above, along with feedback on language use and presentation skills.

IV.4. Data treatment

Students' feedback was collected through virtual surveys containing 20 statements with a Likert scale (Strongly agree to Strongly disagree) in order to measure the strengths and weaknesses of our intervention, as well as to what extent the initial objectives of the study had been achieved. These data were afterwards transferred to an Excel spreadsheet and were analyzed statistically to extract results and draw conclusions

IV.5. Challenges and limitations

The successful implementation of Scrum methodology relies heavily on technology access and digital literacy, particularly for tools such as virtual campuses and shared drives that streamline task organization and communication. While the university provided necessary platforms and physical resources, this study acknowledges that not all students possess equal levels of digital proficiency or access to reliable technology outside of the classroom. This discrepancy could hinder the effectiveness of Scrum processes, such as daily stand-ups or sprint planning. In cases where technology access is limited, alternative methods, such as paper-based task boards or in-person progress check-ins, can be employed to maintain the structure and goals of the Scrum methodology.

Lastly, this study encountered the limitation of student adaptation to new instructional methodologies. Some participants were initially resistant to the shift from traditional, teacher-centered instruction to a more student-driven, collaborative framework. The requirement to take ownership of their learning and contribute actively in teams represented a significant adjustment for these students. While the majority ultimately adapted to and appreciated the methodology, early resistance highlights the need for gradual implementation. Providing a thorough orientation to the principles and expectations of Scrum, as well as ongoing support during the initial stages, would help ease the transition and encourage full participation.

V. RESULTS

The analysis of the survey results reveals valuable insights into the perceptions of students regarding the Tourism Fair project. The survey consisted of 20 statements, each evaluated using a Likert scale with categories ranging from "Strongly Agree" to "Strongly Disagree". The data collected from the 89 participants offers a clear understanding of the strengths and areas for improvement in the course methodology, collaborative dynamics, and overall project structure.

V.1. Survey results

The first statement, "I believe that the activities carried out during the project were relevant to my professional future in tourism," received predominantly positive feedback, with 61 respondents expressing agreement (20 Strongly Agree and 41 Agree). This indicates that the majority of students found the activities highly relevant to their professional goals, although 20 participants remained neutral, and 8 provided negative responses.

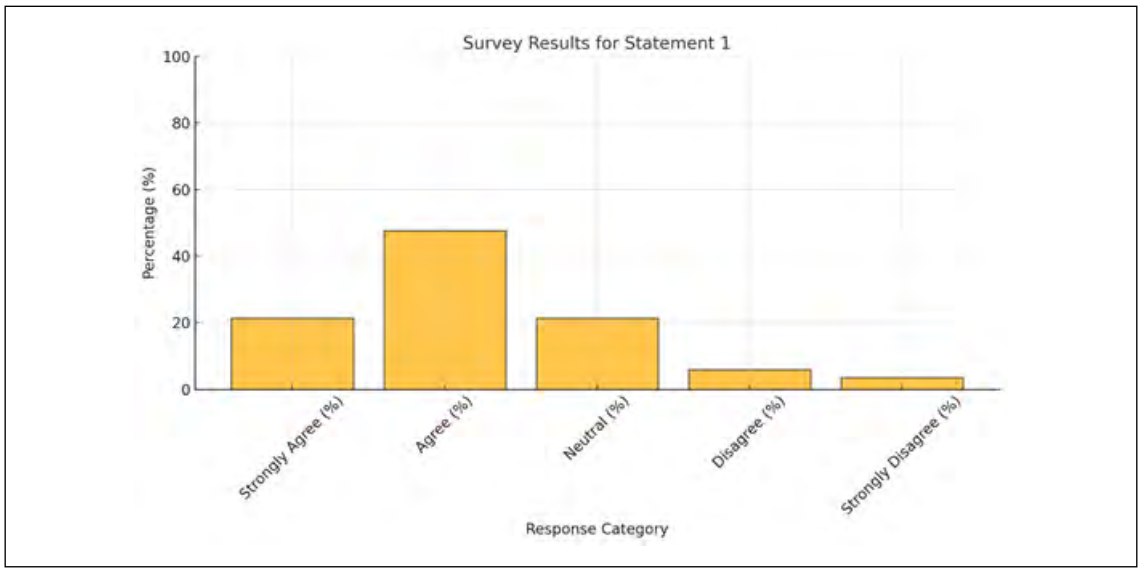


Figure 1. *Bar graph displaying the results for the relevance of the project activities for the students' professional future in tourism.*

Similarly, statement 2, "The tasks assigned at each stage were clearly linked to specific skills in the field of tourism," exhibited a strong trend of approval, with 63 positive

responses, 17 neutral, and a minimal 9 negative responses. This result suggests that the tasks were well-aligned with the intended professional skills, supporting the course's objectives effectively.

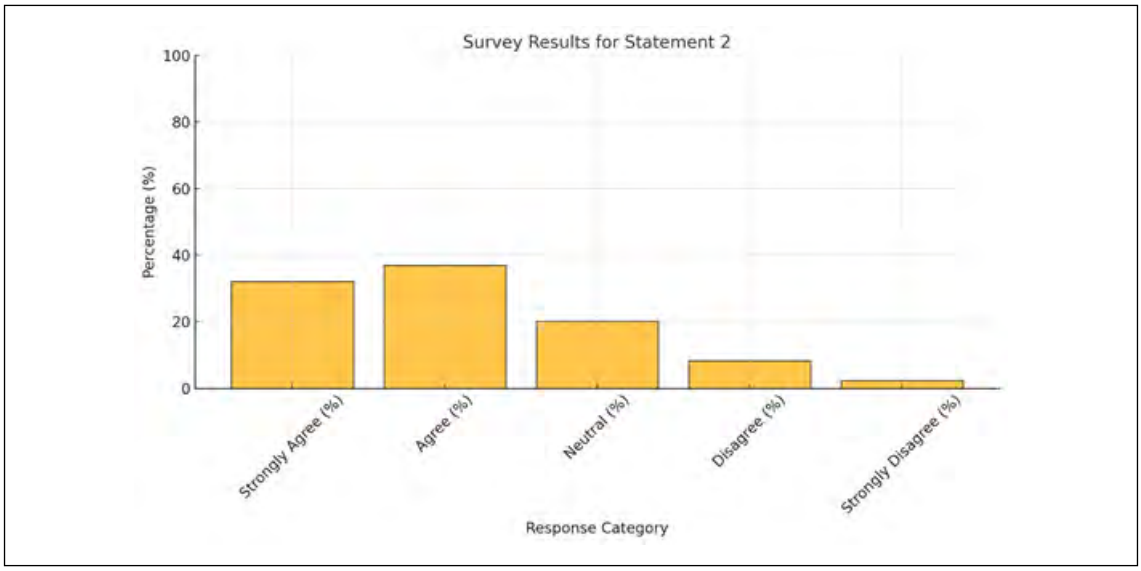


Figure 2. *Bar graph displaying the results about the connection between the tasks and specific skills of tourism.*

Statement 3, which addressed motivation with the claim "I felt motivated to actively work within my team during each stage," reflected slightly more mixed results. While 48 students responded positively, 28 expressed neutrality, and 13 disagreed. The relatively high level of neutral responses suggests that not all students experienced consistent motivation throughout the project. Instead, they experienced a changing boost of motivation depending on the sprint. The balanced motivation of each member of the group needs to be taken into consideration by the Scrum Master.

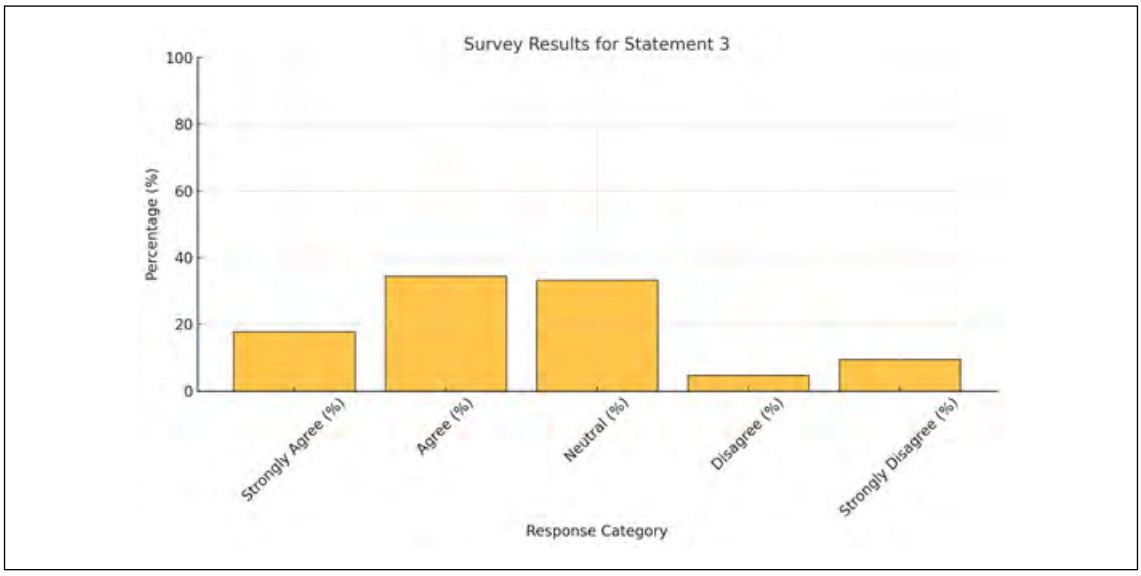


Figure 3. *Bar graph displaying the results of motivation throughout stages.*

In contrast, statement 4, "The methodology promoted collaborative work among team members," showed similar trends, with 44 positive responses, 21 neutral, and a notable 24 negative responses. These results highlight potential challenges in fostering effective collaboration within teams, as a significant portion of students did not perceive teamwork as successful or engaging.

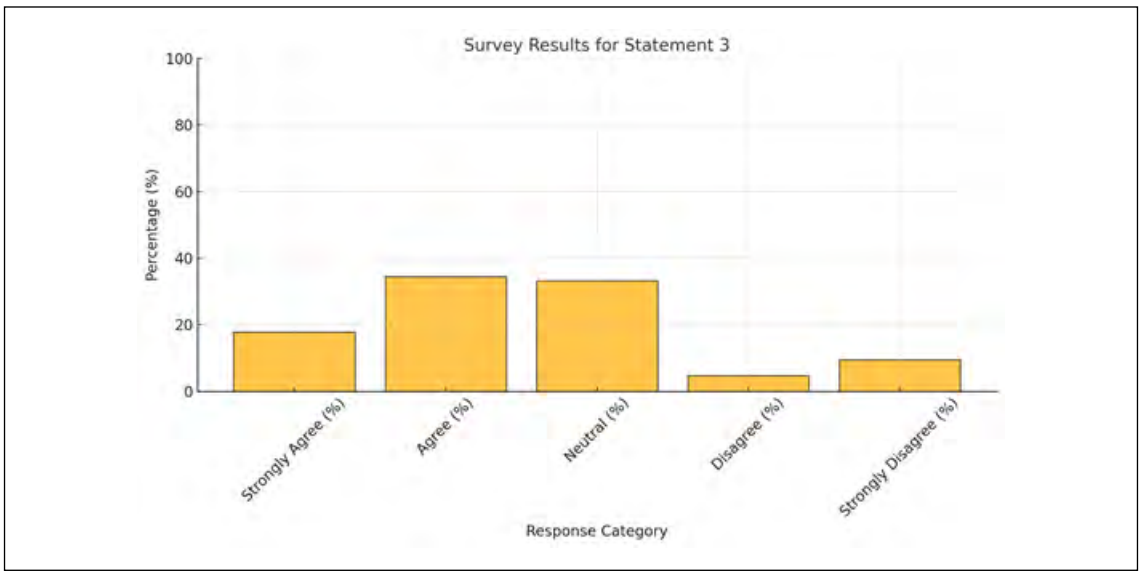


Figure 4. *Bar graph displaying the results of perception on collaborative work.*

When asked about the usefulness of review meetings for reflection, as in statement 5, the results were more divided. Out of 89 responses, 41 students responded positively,

while 25 expressed neutrality and another 23 disagreed. This division indicates that the review meetings were not universally perceived as helpful, suggesting a need to reassess their structure and purpose to make them more engaging and constructive.

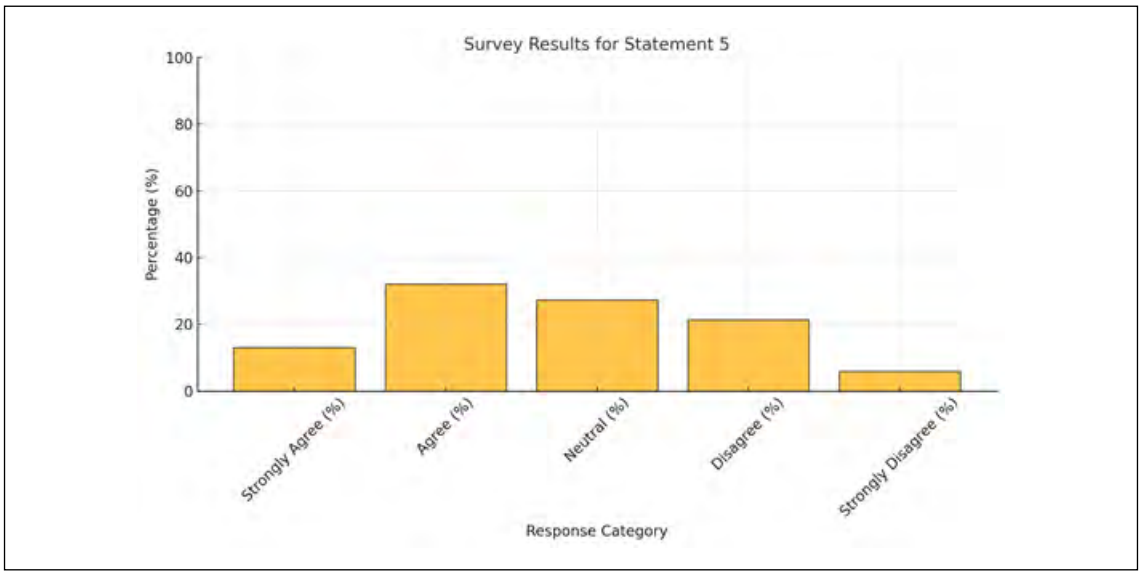


Figure 5. *Bar graph displaying the results of perception on review meetings.*

Conversely, statement 6, which focused on fairness in the distribution of tasks, received a more favorable response. A total of 54 students agreed that the tasks were distributed fairly, while 19 remained neutral, and 16 disagreed. This demonstrates that most students were satisfied with task distribution, though improvements could still be made to address the concerns of the minority.

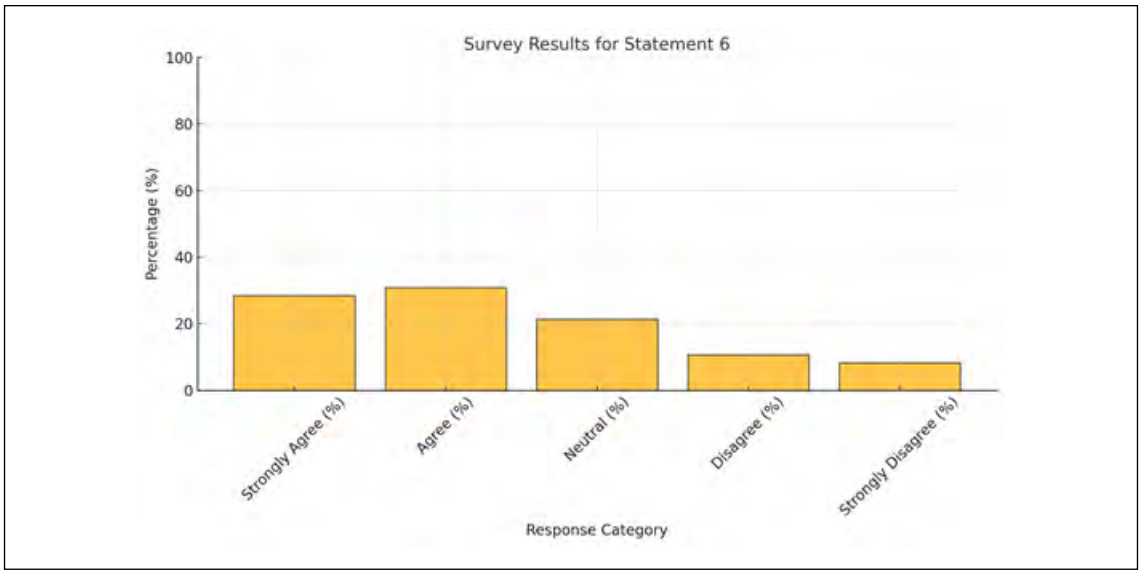


Figure 6. *Bar graph displaying the results of perception on tasks distribution.*

The sprint-based structure, as mentioned in statement 7, was generally well-received, with 45 positive responses. However, the high number of neutral responses (32) points to a level of indifference or uncertainty regarding this method's effectiveness in promoting active participation.

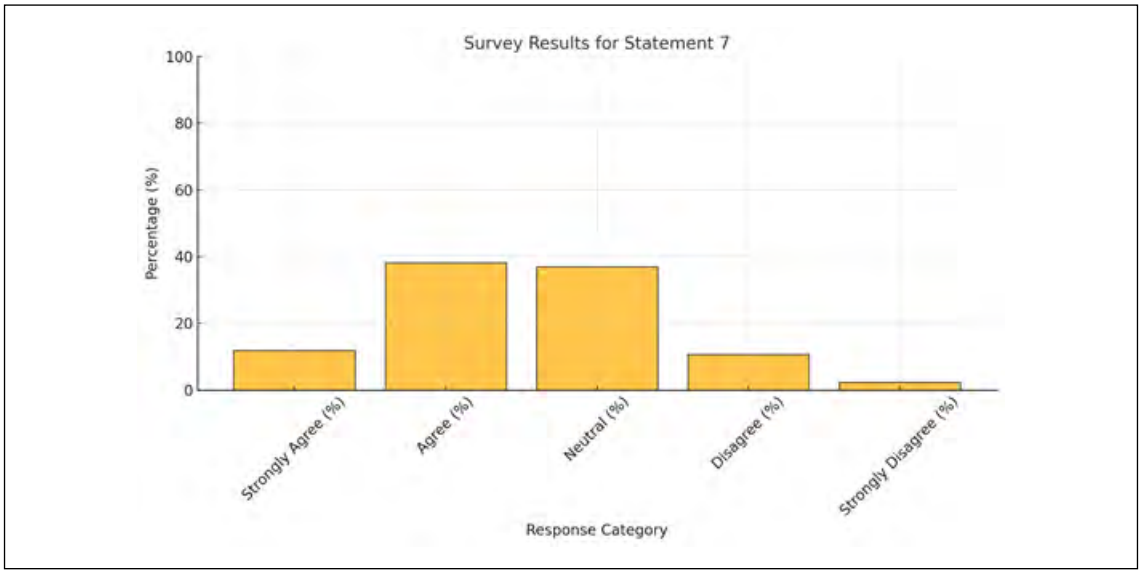


Figure 7. *Bar graph displaying the results of the connection between sprint-based structure and active participation.*

Statement 8, which addressed engagement through methodology, received positive feedback from 50 respondents, though 25 remained neutral and 14 disagreed. This indicates that while the methodology was engaging for most, there remains a subset of students who did not experience this benefit.

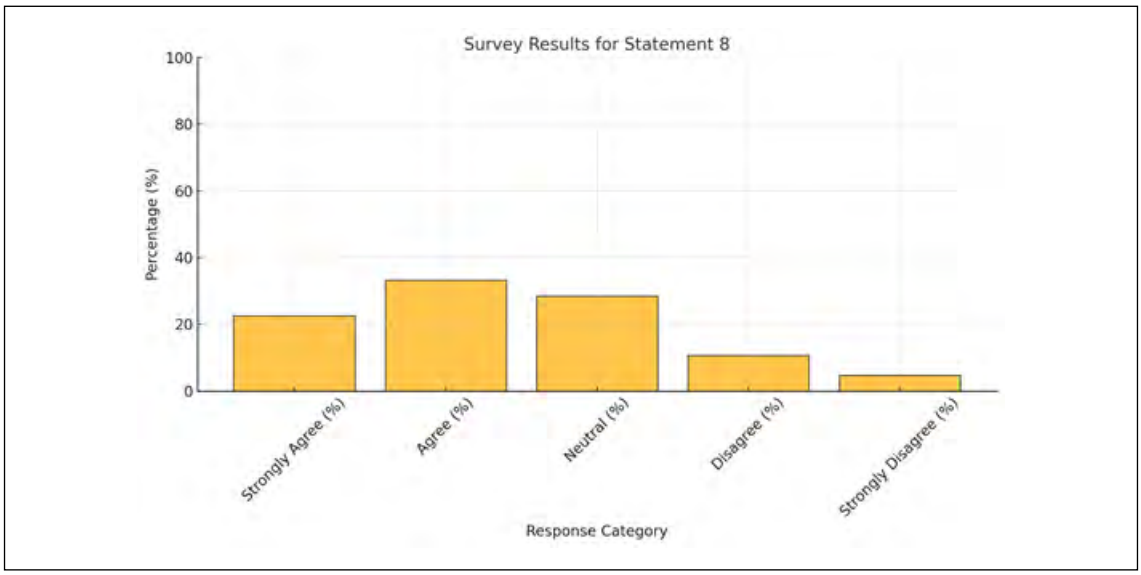


Figure 8. *Bar graph displaying the results of the connection between this methodology and the students' engagement.*

A similar pattern emerged in statement 9, where students were asked whether project dynamics reduced their sense of disconnection or disinterest. While 44 participants responded positively, 26 remained neutral, and 19 disagreed, reflecting a moderate level of success in this area.

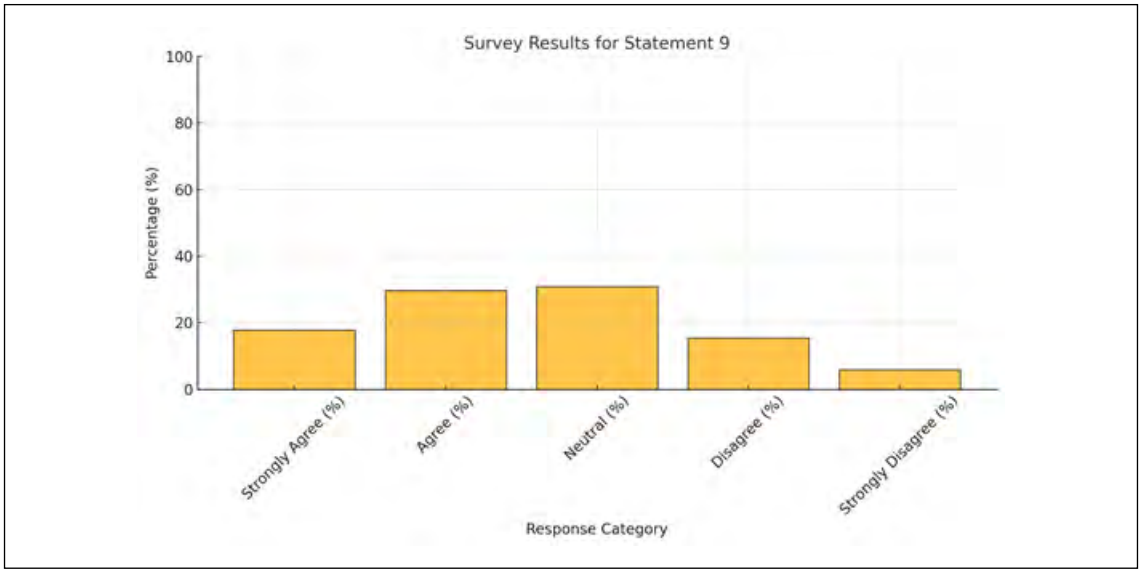


Figure 9. *Bar graph displaying the results of the connection between this project and interest in this subject.*

In statement 10, concerning attendance improvement due to the interactive course format, the feedback was again mixed. Thirty-nine students agreed that their

attendance improved, while 28 remained neutral and 22 disagreed. This highlights an opportunity to further explore and enhance the interactive components of the course to encourage greater attendance.

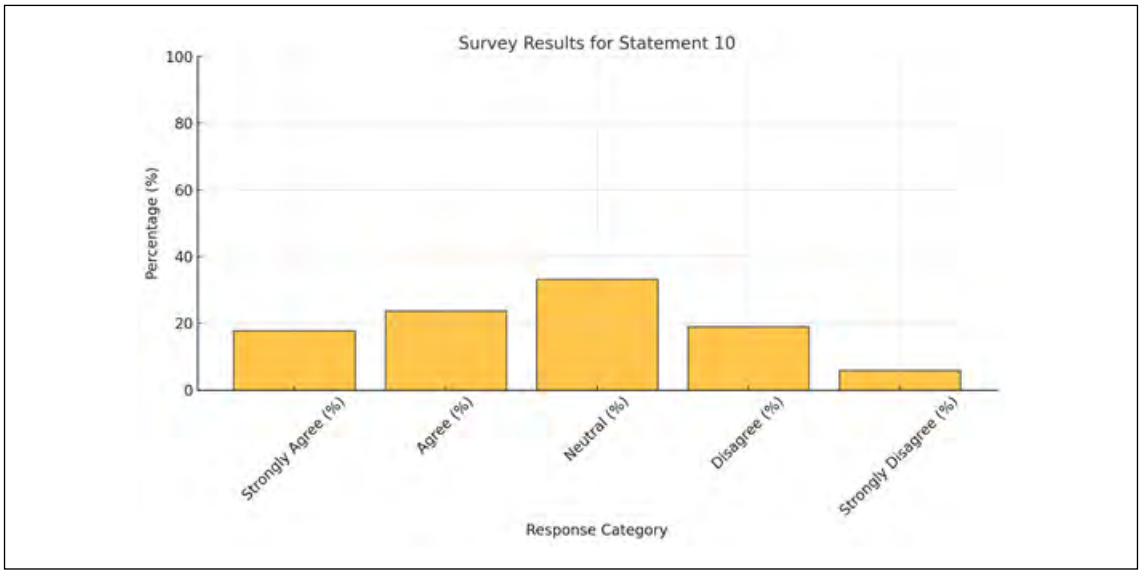


Figure 10. *Bar graph displaying the results of the connection between this format and class attendance.*

By contrast, statement 11, which focused on improving technical vocabulary related to tourism, showed overwhelmingly positive results, with 64 participants expressing agreement. This finding suggests that the project successfully contributed to the students' professional vocabulary development, which is essential for communicational proficiency in ESP.

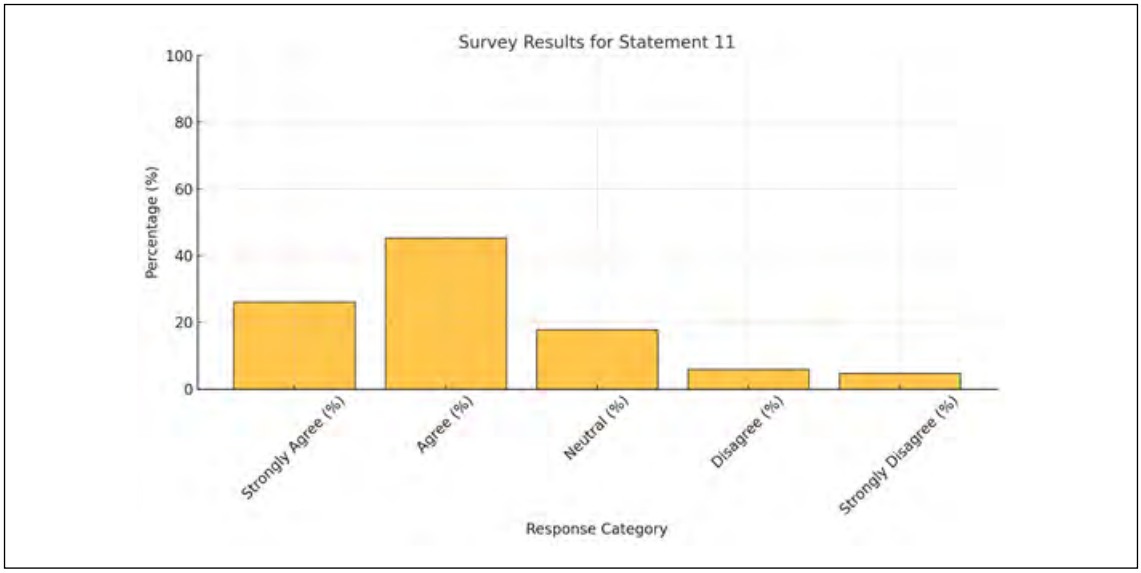


Figure 11. *Bar graph displaying the results of the connection between the proposed activities and the improvement of technical vocabulary related to tourism.*

Statement 12 addressed the improvement of communication skills in professional contexts, with 52 students agreeing that their skills had improved. While 25 participants expressed neutrality, only 12 disagreed, demonstrating that the course was generally effective in this regard.

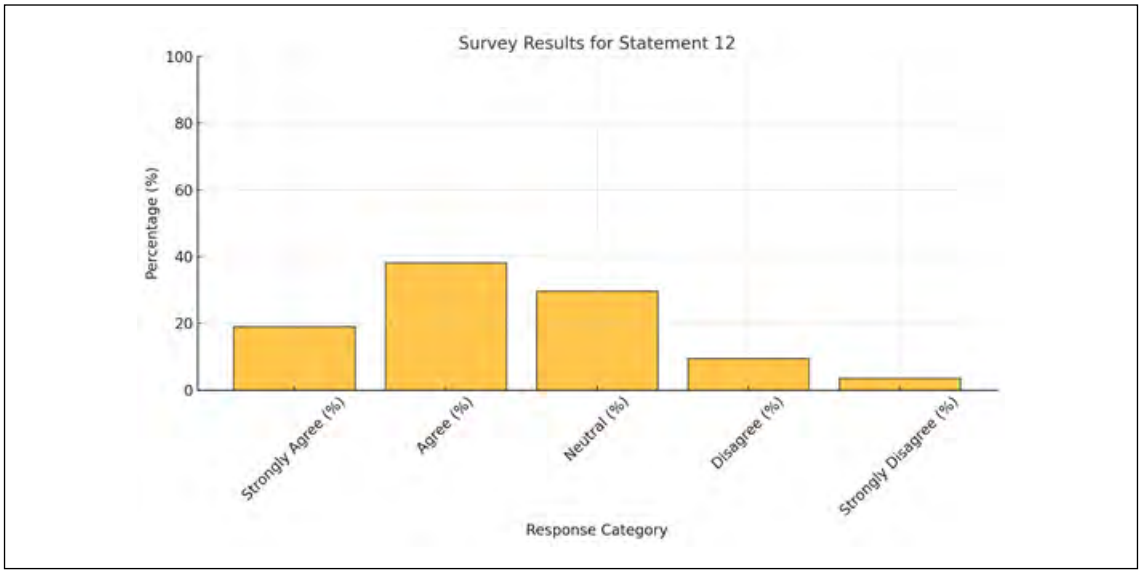


Figure 12. *Bar graph displaying the results of the perception on the improvement of communication skills in English in professional contexts related to tourism.*

The results of statement 13 further supported the course's practical relevance, as 56 students agreed that tasks prepared them for real-world situations like presentations

and customer service. Although there were 19 neutral responses and 14 disagreements, the overall trend remains positive.

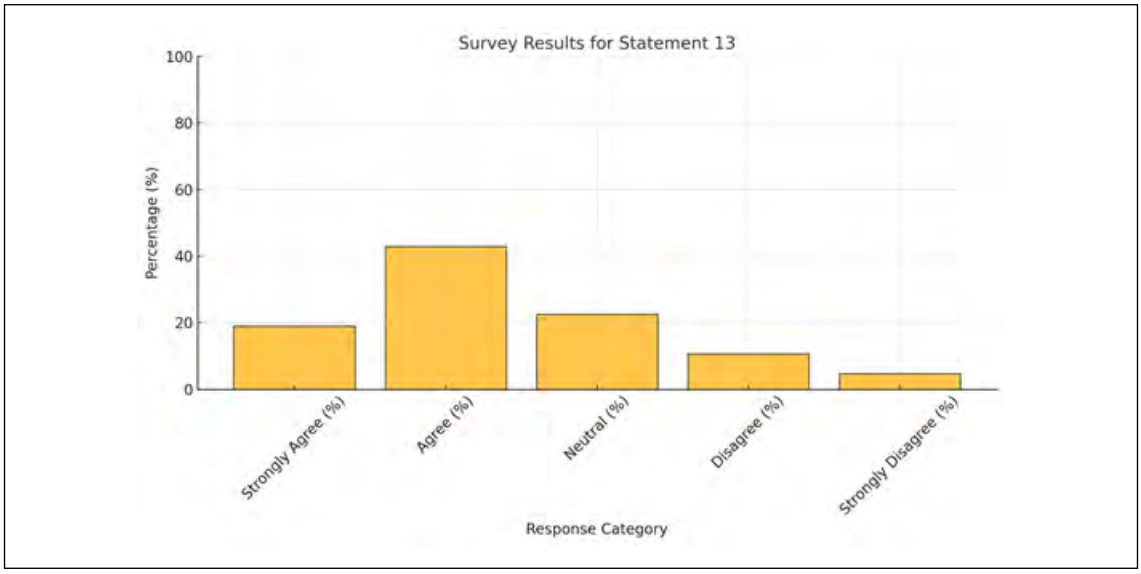


Figure 13. *Bar graph displaying the results of the connection between tasks and practical situations in the tourism field.*

The ability to solve tourism-related problems, as declared in statement 14, received mixed feedback. While 49 participants responded positively, 25 remained neutral, and 15 disagreed, indicating room for improvement in this aspect of the methodology.

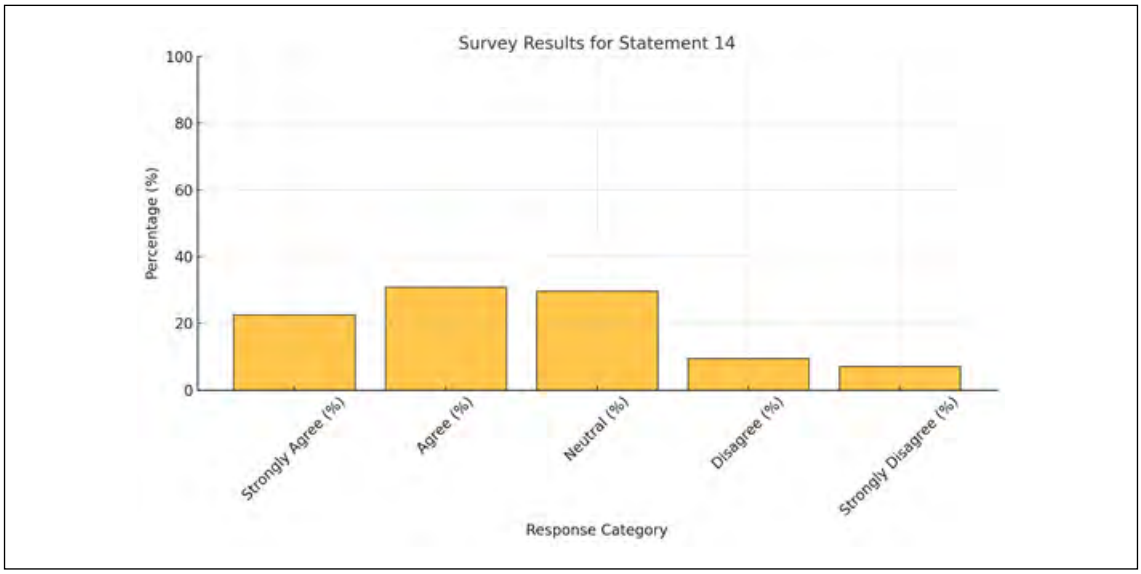


Figure 14. *Bar graph displaying the results of the connection between this methodology and the ability to solve tourism-related problems in English.*

Similarly, statement 15, which evaluated adaptability to changes during the project, showed moderate approval, with 46 students agreeing and 19 disagreeing. This result reflects some success in fostering adaptability but highlights the need for adjustments to ensure consistency.

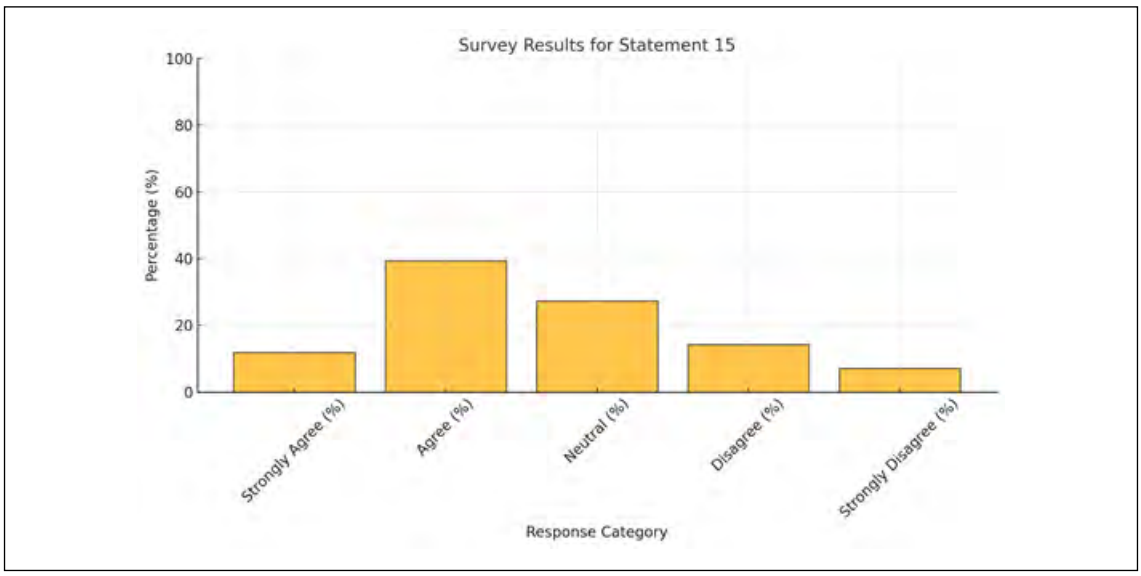


Figure 15. *Bar graph displaying the results of the connection between the iterative structure of Scrum and the ability to adapt to changes and challenges during the project.*

Regarding feedback meetings, statement 16 revealed that only 41 students found these meetings useful, while 30 remained neutral and 19 disagreed. These results suggest that feedback sessions could be more targeted and actionable to better meet students' needs.

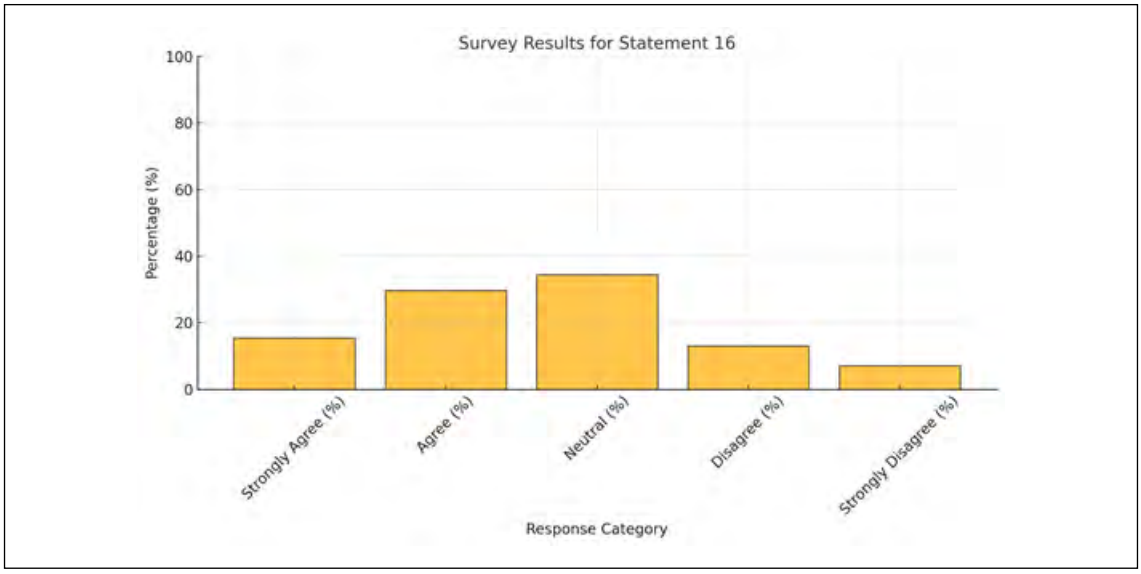


Figure 16. *Bar graph displaying the results of the perception on the retrospective meetings' utility for identifying strengths and weaknesses.*

Statement 17, which explored reflection on learning, showed similar trends. Forty-five participants responded positively, but 29 expressed neutrality, pointing to a need for clearer reflective practices.

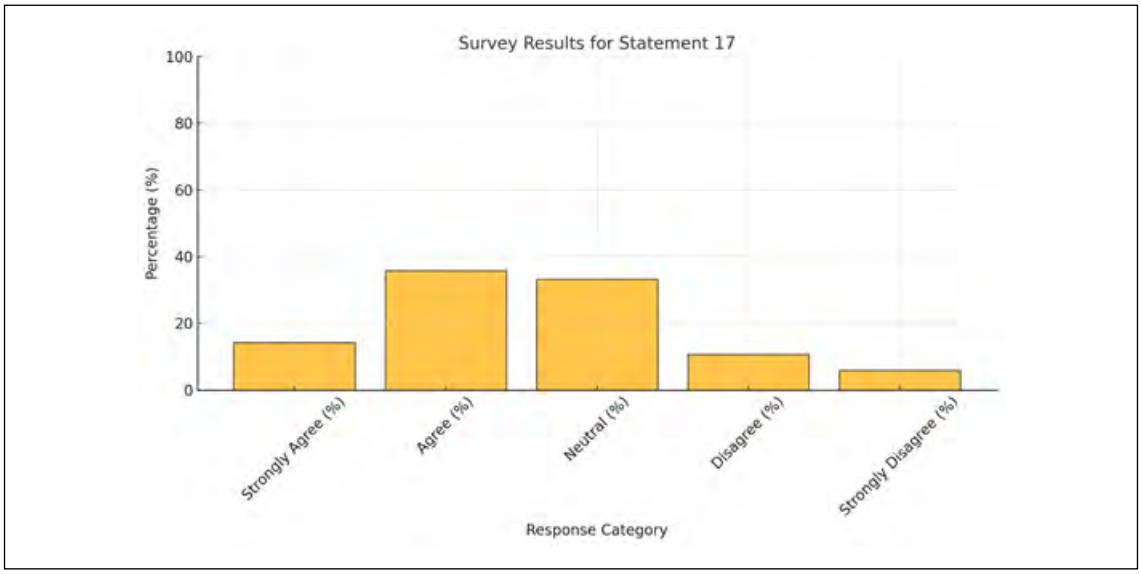


Figure 17. *Bar graph displaying the results of the perception on reflecting and learning.*

Satisfaction with project results, as addressed in statement 18, was moderately positive, with 47 students agreeing and 31 remaining neutral.

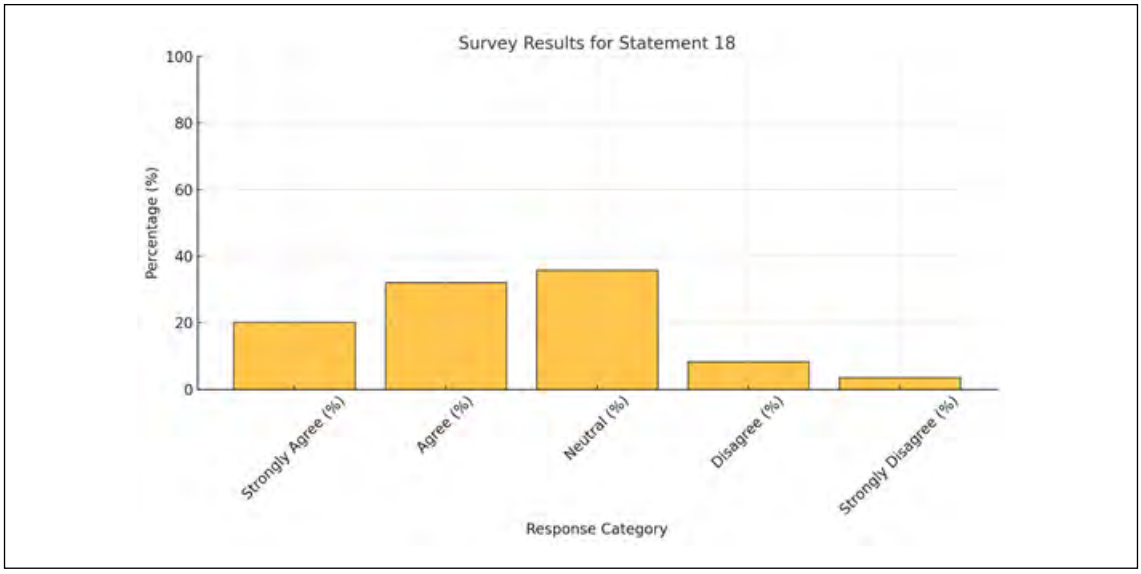


Figure 18. *Bar graph displaying the results of students' satisfaction.*

The recommendation of the methodology for future courses, as highlighted in statement 19, received strong support, with 55 positive responses. This indicates that a majority of students valued the approach and believed it could benefit others.

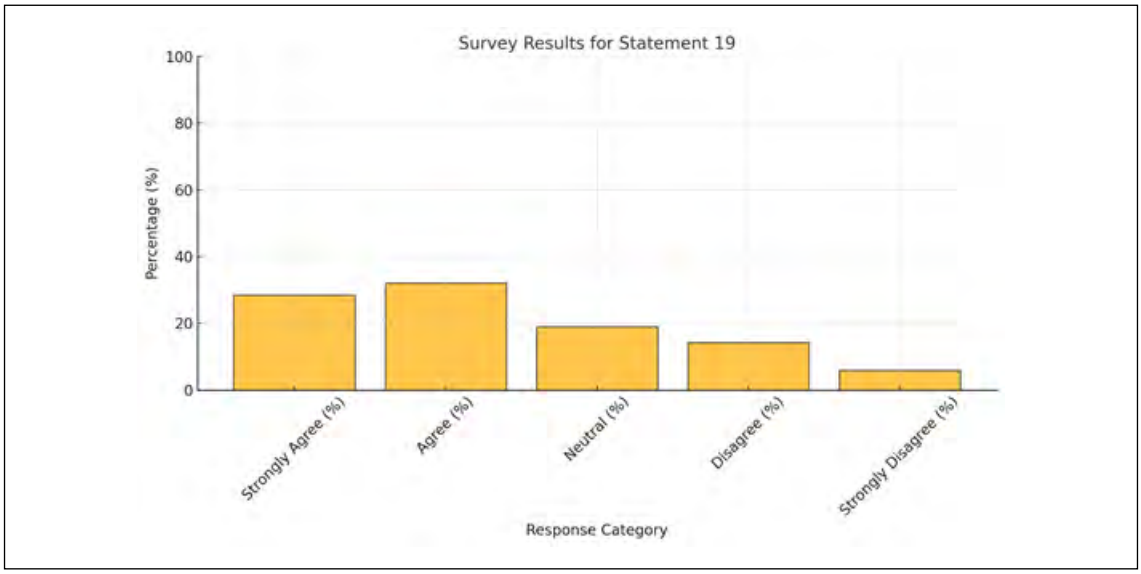


Figure 19. *Bar graph displaying the results of students' recommendation.*

Finally, statement 20, which assessed the overall improvement in professional preparation, demonstrated high levels of agreement, with 58 positive responses. This confirms that the project succeeded in enhancing students' professional readiness for the tourism field.

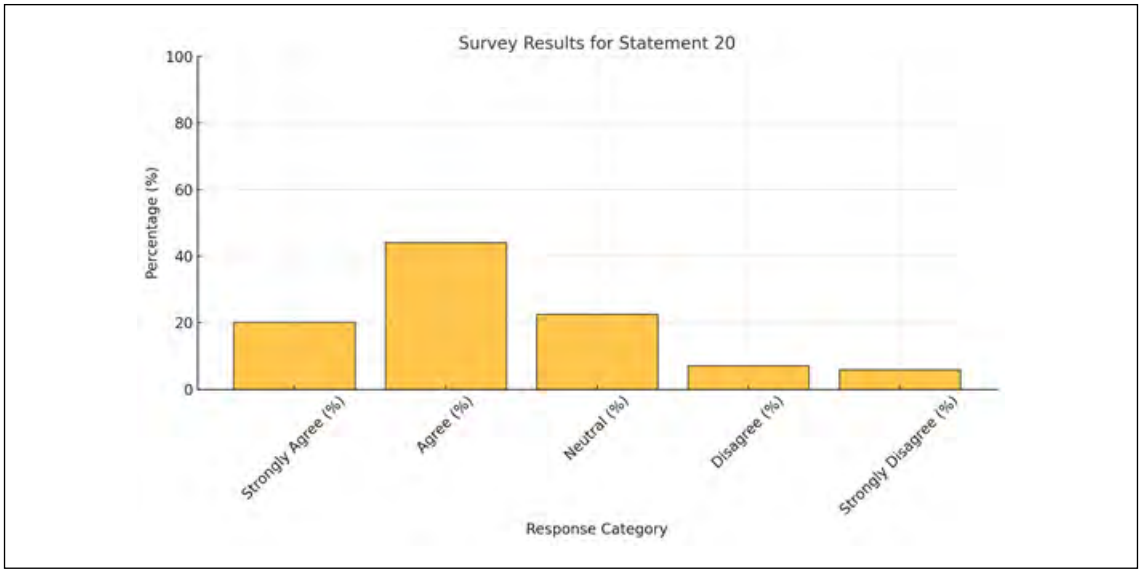


Figure 20. *Bar graph displaying the results on the students' perception of this experience's impact on their professional preparation for the tourism field.*

VI. DISCUSSION

The integration of Scrum methodology with English for Specific Purposes (ESP) in the Tourism Fair project has proven successful in addressing critical challenges in EFL education, particularly for Tourism students who require a balance of language proficiency, professional competencies, and essential soft skills. The results highlight significant achievements in reducing absenteeism, improving language skills, fostering teamwork, increasing productivity, and promoting self-management, while also uncovering areas for improvement.

Absenteeism, a persistent issue in traditional EFL courses, was notably reduced as a result of the collaborative and interactive nature of the Scrum-based approach. According to the survey results, 43.8% of students agreed or strongly agreed that the project motivated them to attend and participate actively in class. Students attributed this improvement to the shared accountability within their teams, where their roles and contributions were critical to group success. The dynamic nature of the project, which involved real-world tasks and peer interaction, provided a stark contrast to the often disengaging lecture-based methods. This finding aligns with prior research

highlighting the role of collaborative and goal-oriented frameworks in reducing student disconnection and absenteeism (Vila-Grau & Capuz-Rizo, 2021; Voštinár, 2024).

In addition to improved attendance, the project demonstrated measurable success in enhancing language proficiency. A significant 58.4% of respondents reported that their English skills improved through participation in real-world scenarios such as role-playing customer interactions and addressing client complaints. The iterative nature of Scrum, which emphasizes regular feedback and reflective learning, played a central role in this improvement. For example, 46.1% of students agreed that sprint reviews and retrospectives helped them refine their language use and build confidence. The focus on technical vocabulary was equally effective, with 71.9% of students agreeing that the tasks enhanced their understanding of tourism-related terminology. The combination of structured feedback and practical tasks ensured that students developed communication skills applicable to real-life contexts, underscoring the alignment between Scrum and ESP.

Teamwork and collaboration, essential skills for the tourism industry, were also key strengths of the project. Survey responses revealed that 49.4% of students agreed or strongly agreed that the project improved their ability to work effectively in teams. By assigning roles such as Scrum Master or Product Owner, the methodology provided opportunities to develop leadership, problem-solving, and time management skills. Students appreciated the collaborative environment, with 49.4% expressing comfort working within teams and acknowledging that peer interaction enhanced both their teamwork and language practice. However, a minority of students (18.0%) highlighted concerns about unequal task distribution, suggesting that some group members contributed less than others. This feedback indicates a need for instructors to closely monitor team dynamics and implement measures, such as peer evaluations, to ensure fair participation.

Efficiency and productivity were also improved through the Scrum framework, which breaks tasks into short, manageable sprints. Students reported that the sprint structure helped them organize their workload more effectively, with 50.6% agreeing that the

division of tasks into clear stages made the project feel achievable. Retrospective meetings were particularly valuable, as 46.1% of students noted that these sessions helped them identify areas for improvement and apply these insights in subsequent sprints. The iterative approach not only maintained focus but also encouraged continuous adjustment and reflection, reflecting Scrum's core principle of maximizing efficiency through adaptive learning.

The methodology also promoted greater student autonomy and self-management, skills that are vital for success in both academic and professional settings. The results indicate that 51.7% of students agreed or strongly agreed that the project encouraged them to take ownership of their learning. By requiring students to manage tasks, collaborate with peers, and reflect on their progress, Scrum fostered a sense of responsibility and independence. However, 21.3% of respondents reported feeling overwhelmed by the workload at times, suggesting that clearer guidance on time management strategies or adjustments to task complexity may be necessary in future iterations of the project.

While the survey results demonstrate the overall success of the Scrum-ESP integration, certain challenges remain. For instance, review meetings and feedback sessions were not always perceived as useful. Although 46.1% of students found these meetings helpful for reflection, a considerable number expressed neutrality or disagreement. This result highlights the need to reassess the structure and purpose of feedback sessions to ensure they are actionable and engaging for all participants. Similarly, while teamwork and collaboration were largely successful, issues of unequal task distribution underscore the importance of monitoring group dynamics more closely to maintain fairness and accountability.

In general, the project's outcomes reflect the transformative potential of combining Scrum methodology with ESP to address key challenges in EFL Tourism education. The reduction in absenteeism, improvement in language proficiency, enhancement of teamwork skills, and development of self-management abilities demonstrate the value of this student-centered, iterative approach. However, the findings also point to areas

for improvement, particularly in balancing workloads, refining reflective practices, and addressing team dynamics. By addressing these challenges, future implementations of this methodology can further optimize its impact, ensuring that students are better prepared for professional roles in the tourism industry.

VII. CONCLUSION

The implementation of Scrum methodology integrated with English for Specific Purposes (ESP) instruction for Tourism students has successfully addressed key challenges outlined in this study, directly linking the results to the general and specific objectives of the research. By promoting an interactive, collaborative, and iterative learning environment, this approach has demonstrated tangible improvements in reducing absenteeism, enhancing language proficiency, fostering teamwork, and developing self-management skills among students, while also highlighting areas for further refinement.

The primary general objective of this study was to develop a methodology that improves student engagement and language proficiency in EFL courses for Tourism students. The results show that Scrum's iterative and team-based framework provided significant gains in both areas. One of the specific objectives focused on reducing absenteeism, a major issue in traditional, lecture-based instruction. The survey results revealed that 43.8% of students agreed or strongly agreed that the project motivated them to attend classes regularly and participate actively. This finding demonstrates that the collaborative structure of Scrum, which emphasizes shared accountability within teams, fostered a stronger sense of commitment among students. The project dynamics and real-world tasks, such as handling client scenarios or preparing for presentations, made the course content more relevant to students' future professional goals, further reducing disconnection and disinterest in the subject matter.

Another key specific objective was to enhance students' language proficiency, particularly in tourism-related contexts. The study confirmed that 58.4% of students

felt their English skills improved significantly, especially in speaking and listening. By engaging in practical tasks, such as role-playing customer interactions and resolving tourism-related challenges, students were able to apply their language skills in real-world scenarios. The iterative nature of Scrum, including regular sprint reviews and feedback sessions, contributed to this success, with 46.1% of respondents highlighting the value of continuous feedback in refining their communication abilities. Furthermore, 71.9% of students agreed that the project helped them develop a stronger technical vocabulary relevant to tourism, aligning the outcomes with ESP's focus on profession-specific language development (Hutchinson & Waters, 1987). This result validates the integration of ESP and Scrum as a highly effective framework for achieving practical language learning objectives.

The study also met its specific objective of improving teamwork and collaboration among Tourism students. Given the collaborative demands of the tourism industry, fostering these soft skills is critical for professional readiness. The results indicate that 49.4% of participants recognized improvements in their teamwork abilities, with Scrum roles such as Scrum Master and Product Owner providing opportunities to practice leadership, problem-solving, and time management. The collaborative nature of the methodology allowed students to build confidence through peer interaction, with 49.4% expressing satisfaction with the team-based dynamic. However, the study also revealed a challenge: 18.0% of students reported unequal task distribution within teams, signaling the need for instructors to introduce mechanisms such as peer evaluations to ensure fairness and accountability.

The fourth specific objective aimed to enhance student autonomy and self-management through Scrum's structured yet flexible approach. The results confirm that 51.7% of students believed the project encouraged them to take ownership of their learning, manage their time effectively, and reflect on their progress. Students reported increased confidence in planning tasks and completing responsibilities independently, a critical skill for success in both academic and professional settings. This shift toward student-centered learning represents a departure from traditional teacher-led

instruction, empowering students to become active participants in their education. Nonetheless, 21.3% of respondents expressed feelings of being overwhelmed by the workload, suggesting that additional time management guidance or adjustments to task complexity may be required in future iterations.

Scrum's emphasis on iterative progress and continuous reflection also addressed the study's objective of increasing efficiency and productivity in the learning process. By organizing tasks into short, manageable sprints, students were able to approach their workload in a more structured and achievable manner. 50.6% of participants reported that the sprint structure helped them stay organized and focused, while 46.1% found retrospective meetings useful for identifying areas for improvement and streamlining their efforts in subsequent sprints. This cycle of reflection and improvement mirrors Scrum's core principles and provides a foundation for sustained academic success.

While the study demonstrated clear success in meeting its objectives, it also highlighted areas that require attention to maximize the effectiveness of the methodology. For instance, feedback meetings, while valuable for many, were not universally perceived as useful, with some students expressing neutrality or disagreement regarding their utility. Additionally, issues of team imbalance and workload management suggest the need for closer monitoring and intervention from instructors to ensure that all students benefit equally from the collaborative framework. Future iterations of the course should aim to refine these components to further optimize the learning experience.

In conclusion, the integration of Scrum methodology with ESP instruction successfully achieved the study's objectives of reducing absenteeism, enhancing language proficiency, fostering teamwork, and promoting self-management among Tourism students. By aligning real-world tasks with structured, collaborative learning processes, this approach not only improved students' engagement and language skills but also equipped them with the soft skills necessary for success in their professional careers. While challenges such as workload management and team dynamics remain, the overall results validate the effectiveness of this innovative methodology. Moving

forward, continued refinement and empirical validation of the approach will ensure its sustainability and broader applicability in EFL and professional education contexts.

REFERENCES

Amineh, R. J., & Davatgari Asl, H. (2015). Review of constructivism and social constructivism. *Journal of Social Sciences, Literature and Languages, 1(*1), 9–16.

Bruner, J. S. (1988). Learning and the social environment. Harvard University Press.

Churcher, K. M. A., Downs, E., & Tewksbury, D. (2014). "Friending" Vygotsky: A social constructivist pedagogy of knowledge building through classroom social media use. *The Journal of Effective Teaching, 14*(1), 33–50.

Delhij, A., Van Solingen, R., & Wijnen, F. (2015). *EduScrum guide*. EduScrum.

Dudley-Evans, T., & St. John, M. J. (1998). *Developments in English for Specific Purposes: A multidisciplinary approach.* Cambridge University Press.

Gonulal, T., & Loewen, S. (2018). Scaffolding technique. In J. I. Liontas (Ed.), *The TESOL encyclopedia of English language teaching* (1st ed.). Wiley. https://doi.org/10.1002/9781118784235.eelt0180

Gorczyca, A., Klimek-Kopyra, A., Kiełbasa, B., Pink, M., Redlichová, R., Wieczorek-Przybyło, M., Piecuch, K., Pereira, F., Raposo, A., Saude, S., Durão, A., Chaves, H., Barbosa, E., Rodrigues, A. I., Santamarta, J. C., Cruz-Pérez, N., & Rodríguez-Alcántara, J. S. (2024). *Agile teaching methodology* [Manual]. Universidad de La Laguna. https://doi.org/10.25145/b.2023.13

Hodson, N., Woods, P., Sobolev, M., & Giacco, D. (2024). A digital microintervention supporting evidence-based parenting skills: Development study using the agile scrum methodology. *JMIR Formative Research, 8,* e54892. https://doi.org/10.2196/54892

Hutchinson, T., & Waters, A. (1987). *English for Specific Purposes: A learning-centered approach.* Cambridge University Press.

Mahnic, V. (2012). A capstone course on agile software development using Scrum. *IEEE Transactions on Education, 55*(1), 99–106.

Marnewick, C. (2023). Student experiences of project-based learning in agile project management education. *Project Leadership and Society, 4*, 100096. https://doi.org/10.1016/j.plas.2023.100096

Nur Arsyad, S., Tangkin, W. P., Sumartono, S., & Astuti, B. (2024). Implications of Bruner's cognitive theory on elementary school education in the 21st century. *Klasikal: Journal of Education, Language Teaching and Science, 6*(3), 697–704. https://doi.org/10.52208/klasikal.v6i3.1225

Schwaber, K., & Sutherland, J. (2017). The Scrum guide. Scrum.org.

Serrador, P., & Pinto, J. K. (2015). Does Agile work? A quantitative analysis of agile project success. *International Journal of Project Management, 33*(5), 1040–1051.

Sutherland, J. (2014). Scrum: The art of doing twice the work in half the time. Crown Business.

Vila-Grau, G., & Capuz-Rizo, S. F. (2021). La extensión de la agilidad al ámbito docente a través de Scrum y eduScrum. *Revista de Tecnología Educativa, 13*(2), 135–148.

Voštinár, A. (2024). Agile methods in higher education: Implementing Scrum in language learning. *Journal of Educational Innovations, 22*(3), 27–39.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Yang, J., Zhang, X. L., & Su, P. (2019). Deep-learning-based agile teaching framework of software development courses in computer science education. *Procedia Computer Science, 154*, 137–145. https://doi.org/10.1016/j.procs.2019.06.022

Received: 21 October 2024

Accepted: 17 December 2024

Pedagogic natural language processing resources for L2 education: Teachers' perceptions and beliefs

Carlos Ordoñana-Guillamón
Carlos.ordonana@cud.upct.es
Centro Universitario de la Defensa – CUD San Javier, Spain

Pascual Pérez-Paredes
pascualf@um.es
Universidad de Murcia, Spain

Pilar Aguado-Jiménez
paguado@um.es
Universidad de Murcia, Spain

Ordoñana-Guillamón, Carlos, Pérez-Paredes, Pascual, Aguado-Jiménez, Pilar (2024). Pedagogic natural language processing resources for L2 education: Teachers' perceptions and beliefs. *Language Value*, 17(2), 60-99. Universitat Jaume I ePress: Castelló, Spain. http://www.languagevalue.uji.es.

December 2024

DOI: https://doi.org/10.6035/languagev.8522

ISSN 1989-7103

ABSTRACT

Pedagogic natural language processing resources (P-NLPRs) are a group of online technologies that aid teaching practices and hold the potential to enable Data-Driven Learning approaches by providing teachers and students with linguistic information. This study explores the perspectives of L2 educators on the potential implementation of P-NLPRs in their teaching practices. A training module was designed to provide information on the potential applications of different P-NLPRs, from which quantitative data was gathered (n=77) from PRE- and POST-surveys. Additionally, individual interviews were carried out with some of the participants (n=4) five years later to assess long-term P-NLPR uptake. Results offer insight into educators' perception towards adopting P-NLPRs for their language teaching. Their perspectives seem to differentiate three main groups: a) *tools to help learners learn* (i.e. online dictionaries, text-to-speech technologies); b) *tools to help teachers teach* (i.e. automatic summarization tools, lexical profilers), and c) *tools to help expand linguistic knowledge* (corpora, POS taggers, lemmatizers).

Keywords: *Data-Driven Learning; new literacies; teacher training; language processing technologies; individualized learning*

I. INTRODUCTION

Data-Driven Learning, or DDL (Johns, 1991), aims to foster the personalization and individualization of language learning (Pérez-Paredes et al., 2019) by encouraging learners to take an active role when discovering linguistic patterns, generally through the manipulation and exploration of textual data (Boulton & Vyatkina, 2021; Farr & Hagen Karlsen, 2022). DDL has garnered increasing attention from scholars in the last decade (Boulton & Vyatkina, 2021), as the literature has suggested that DDL promotes problem-solving, analytical skills, autonomy, and language awareness in learners (Farr & Hagen Karlsen, 2022). Scholars have pointed out that this approach can only be viable across different educational levels if it is adopted by 'ordinary' members of the community (Pérez-Paredes, 2010). In other words, teachers and learners outside tertiary education need to engage with language processing tools before they can be perceived as useful in L2 classrooms (Chambers, 2019).

However, in spite of the general consensus among scholars about the benefits of DDL approaches, the area seems to struggle in achieving a widespread uptake both among academics, and students and educators (Chambers, 2019; Pérez-Paredes, 2022). Consequently, recent literature has started to suggest that DDL would benefit from a 'revamp' in terms of re-assessing how to approach DDL research as well as how to best tackle the practical implementation of its methods (Meunier, 2020, 2022). This includes the possibility of expanding the potential toolset of DDL beyond corpus-based resources, taking hold of the wide range of digital tools available on the internet, including Natural Language Processing Technologies.

Natural Language Processing Technologies (NLPTs) are technologies that process, generate and manipulate written and spoken language with the use of software applications for different purposes (Nilsson, 2009). They are available on desktop and mobile devices (Bird et al., 2009; Pérez-Paredes et al., 2018), either via desktop applications and web browsers or integrated in mobile apps, respectively. The use of NLP tools in education contexts has been extensively studied during the last decade

(Zhu, 2023); NLPTs such as automatic speech recognition, word frequency count, vocabulary profiling, online lexical databases and dictionaries have shown positive results in improving pronunciation (Golonka et al., 2012), lexical retention (Cobb, 1997), translation skills (Mekheimer, 2012), reading level assessment for L2 students (Huang & Liou, 2007) and in increasing L2 writing awareness (Pérez-Paredes et al., 2019).

The connection between NLPTs and DDL is by no means new to academia, as Cantos (2002) and Granger et al. (2007) had already suggested using natural language processing tools as a way of promoting DDL-like practices. Pérez-Paredes et al. (2018, 2019) explored the perspectives of teachers and learners from different backgrounds towards using various NLP tools as vehicles of DDL to promote learners' linguistic awareness through the autonomous interaction with the target language. However, academia seems mostly oblivious regarding this connection, as direct research addressing the combination of NLP resources and DDL are scarce.

Therefore, this paper aims to address the gaps identified in Meunier (2020, 2022) and Pérez-Paredes et al. (2018, 2019) by proposing pedagogic NLPT resources (P-NLPRs) as a group of technologies that process both L1 and L2 languages in order to facilitate L2 learning across levels and educational contexts. P-NLPRs may provide language teachers and learners with opportunities to personalize the L2 learning experience. These resources include, among others, online dictionaries, automatic text-to-speech tools, and lexical profilers (see Figure 2).

The present study hence provides a preliminary exploration on the potential impact of P-NLPRs in education contexts, stressing the perspectives of in-service teachers after completing a professional development initiative in the context of an Erasmus+ project that aimed to promote the use of P-NLPRs. Using a mixed-methods research design (Teddlie & Tashakkori, 2009), we look at the perspectives of a group of language teachers (n=77) that completed the course and individual interviews (n=4) that revisited the take-up and use of P-NLPRs five years after the completion of the course. Our paper seeks to contribute to understanding how NLP technologies can

inform language teaching practice and how they can favour personalized language learning across the board. Additionally, this research addresses gaps in the literature by exploring the perspectives of in-service language teachers from different countries with varying degrees of teaching experience

The following sections will provide the rationale behind our research questions, as well as a detailed description of the different elements that are part of our study design.

II. LITERATURE REVIEW

II.1. Digital Literacies and P-NLPRs in L2 Teaching Practices

Digital literacies, "a constellation of symbolically mediated practices that involve various kinds of knowledge, predispositions, and skills to deal with texts in electronically-mediated environments" (Kern, 2021; p.134) do not refer solely to the handling of electronic devices, but rather to an individual's agency to navigate digital environments (Elola & Oskoz, 2017). Digital literacies allow for a more autonomous, agentive role for learners (Lotherington & Ronda, 2014) and educators as digital literacies can provide individualized learning experiences (Chapelle, 2006). The efficient use digital resources such as P-NLPRs demands from users a set of skills based on the adequate management and interpretation of increasingly sophisticated symbolic systems (Kern, 2021). The acquisition of such a skillset is important for both instructors and learners alike, as the former need to be able to guide their students in technology-mediated contexts. The TPACK model (Technological Pedagogical Content Knowledge) aims to address such challenges by facilitating teaching development programmes to provide learning opportunities to develop teachers' technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK) on the use of different technological resources (Cabero & Barroso, 2016; Mishra & Koehler, 2006). This has become even more essential in a post COVID-19 world, especially in the context of language learning, as traditional education has been forced to adapt to online environments (Kern, 2021).

Teacher training on technology usage has received great attention from CALL research. Scholars have also noted that sustained and supported "opportunities to learn something new or to learn about something familiar more deeply" should be "grounded in immediate teaching contexts [and] encouragement to change classroom and school practices in innovative ways" (Knobel & Kalman, 2016: p.3). Romeo & Hubbard (2010) found that providing information on how to use different applications related to listening skills resulted in learners increasing their ability to autonomously engage with the technologies for listening practice. A similar course of action has been suggested with Open Educational Resources (OERs) (Littlejohn & Hood, 2017). Trust, Maloy, and Edwards (2022) designed a training module aimed at posing students as OER designers and curators, with promising results in increasing student motivation, attitudes towards learning and supporting the development of new literacies' skills. Projects such as CATAPULT (http://catapult-project.eu/) aim to train language for specific purposes (LSP) teachers, providing them with the necessary resources to, in turn, teach their LSP students. Further research emphasizes the importance as well of fostering authentic experiences, hands on practice and teacher reflection in ICT teacher training (Hsu & Lin, 2020).

Scholars point out that specialized training becomes even more crucial when dealing with corpora and DDL-based instruction. Chambers (2019) warned not only against a lack of DDL-proficient educators, but also against a scarcity of DDL experts in academic institutions able to provide the appropriate training. Training in corpora and DDL-based literacy has extensively been called upon by scholars; Poole (2020) suggested that users might find corpus-based methodologies as 'inefficient' due to difficulties in managing corpus data and corpus feedback. Leńko-Szymańska (2017) pointed out that DDL-specific training should promote teacher autonomy and enable them to design DDL-based materials tailored to student needs. Recent efforts in providing corpus literacy instruction to pre-service teachers include Le Foll (2024) and Abdel-Latif (2021)

The question of how to approach proficiency building in technology has been thoroughly explored by the literature. Several well-known theoretical models aim to

represent user behaviour in technology acceptance and uptake, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), and the Technology Acceptance Model (TAM) (Davis, 1989) and its updated version, TAM 2 (Venkatesh & Davis, 2000). These frameworks have been commonly used to evaluate and predict the uptake of emerging technologies (Criollo-C et al., 2024). Among the most important factors that influence potential behaviour, *intention* is regarded as an important predictor of behaviour, which in turn is influenced by other factors such as performance expectancy or *perceived usefulness*, that is, an individual's belief that a certain system can improve their job performance (Davis, 1989; Venkatesh et al., 2003).

Perceived usefulness has been extensively studied in relation to language learning technologies (Lai, 2013) and OERs (Kelly, 2014). Research has suggested that teachers tend to make use of the technologies they are more comfortable with due to using them on a daily basis (Kessler, 2018). It has also been suggested that increased familiarity with a given product is linked to its perceived usefulness (Zhu & Chang, 2015). Pérez-Paredes et al. (2018), and Ordoñana et al. (2018) have argued that familiarity with P-NLPRs could in fact be a main predictor of a further increase in frequency of use. Thus, increasing teacher knowledge of how P-NLPRs work to foster their familiarity with P-NLPRs could in turn increase their frequency of use of these resources. However, a generalized lack of familiarity with P-NLPRs has been reported (Pérez-Paredes et al., 2018), even though research shows there is a growing interest among educators regarding the possibilities OERs and P-NLPRs may offer (Farrow et al., 2015; Pérez-Paredes et al., 2018). The literature has called for increased efforts in disseminating OER and P-NLPR knowledge to foster familiarity with the resources (Pérez-Paredes et al., 2018), which additionally remains in line with the necessity to keep up with the constant development of new literacies (Kern, 2021; Trust et al., 2022).

As stated above, the present paper aims to follow up on the gaps previously identified in the literature: addressing the issues with DDL requires an attempt to 'revamp' the area by opening up the potential toolset to other resources beyond using only

corpora (Chambers, 2019; Meunier, 2020, 2022); yet, the actual adoption of most of the tools included among P-NLPRs is fairly limited (Pérez-Paredes et al., 2018, 2019), which hurdles the assessing of the viability of P-NLPRs as vehicles for DDL practices and their impact in promoting individualized and personalized learning. Hence, the present study will first describe the process of implementation of a training module specifically designed to target the *perceived usefulness* of P-NLPRs as vehicles for DDL within the framework of the Transforming European Learner Language into Learning Opportunities (TELL-OP) project.

Thus, our research questions (RQ) aim to discuss whether our efforts in building up knowledge and long-term usage have been successful: (1) *Has the TELL-OP training module in the use of P-NLPRs succeeded in contributing to the promotion of language teachers´ perceived usefulness of P-NLPRs?*

(2) *After five years of hands-on experience, how do in-service teachers perceive the viability of using P-NLPRs in their respective educative contexts?*

(3) *According to in-service L2 teachers, how can NLP tools favour personalized and individualized learning across the board?*

II.2. Materials and Methodology

This study uses a sequential mixed-methods (Teddlie & Tashakkori, 2009) one-group PRE-survey/POST-survey repeated measures design without a control group, followed by a series of long-term interviews. Repeated measures were applied to several scales drawn from related items from a questionnaire developed specifically for this study. In the following paragraphs we will offer a description of the training module the subjects participated in, as well as detailed information on the data collection and analysis.

The present study is thus designed to provide both qualitative and quantitative insights on the perspectives of in-service L2 instructors towards using P-NLPRs in their teaching practices.

II.2.1. The Sample

Second language teachers from across the EU were invited to participate in the course (see section II.2.2.) through social media, newsletters, and e-mails. The recruitment strategy included dissemination of information throughout university departments, secondary education institutions, and teacher Unions. All participants were second or foreign language educators. Among those who started the program, 345 completed an initial PRE-survey questionnaire, and 39.1% (n=135) completed a POST-survey questionnaire. To ensure that results could be fully matched and compared between the PRE- and POST-surveys, each participant was assigned a personal code to be included at the beginning of both questionnaires. Finally, after completing the course, 77 subjects filled in both questionnaires with the individual code and could be adequately matched for analysis. The comparisons reported in this research are based on the responses from those 77 subjects.

Most participants were female (92.2%) and over 30 years old (44.2%). The most widely represented countries were Germany (37.7%), Belgium (31.2%) and Spain (14.3%), while the additional 17% grouped teachers from the UK, France, Austria, Italy, Poland, Macedonia, Ukraine, or Kazakhstan, and even four subjects from the US and Australia. Their teaching was similarly distributed between Secondary (31.2%), Higher (26.0%) and Adult education (31.2%). Finally, 48.5% had less than 5 years of teaching experience, 34.9% between 10 and 15 years, and 16.7% more than 15 years.

II.2.2. The Training Module

The module was developed as part of the Erasmus+ project TELL-OP, a strategic partnership that aimed to promote DDL practices using ICTs and OERs (TELL-OP, 2015). The project included five teams of language learning experts from different countries (United Kingdom, Belgium, Germany, Spain and Turkey). This module aimed to promote TPACK-based knowledge (Mishra & Koehler, 2006) about different P-NLPRs available online in order to foster the potential adoption of these tools for the participants' teaching practices by providing a detailed description of the different types of tools

and their potential application in a language education context. The course was set up on a Moodle platform (https://moodle.org/) and took 25 hours in the timespan of five weeks, from January 16th, 2017, to February 17th, 2017.

Table 1. *A sample of some of the P-NLPRs included in the module. Note that some of them may not be available as of the time of the reading of this article*

Text-to-Speech technologies	http://www.naturalreaders.com/index.html http://text-to-speech.imtranslator.net http://www.fromtexttospeech.com https://text-to-speech-demo.mybluemix.net
Lemmatizers	http://textanalysisonline.com/nltk-wordnet-word-lemmatizer http://textanalysisonline.com/nltk-wordnet-lemmatizer
Resource-linked text builders	http://lextutor.ca/ra_read/ http://www.lextutor.ca/hyp/ http://sifnos.sfs.uni-tuebingen.de/VIEW/
Text summarization tools	http://autosummarizer.com/ http://freesummarizer.com/ http://textsummarization.net/text-summarizer http://www.splitbrain.org/services/ots http://textcompactor.com/
Online dictionaries and collocation dictionaries	http://www.oxforddictionaries.com/ http://www.oxfordlearnersdictionaries.com/ http://en.pons.com/translate http://dict.leo.org/ende/index_en.html http://forbetterenglish.com/index.cgi http://www.linguee.com/
Automated POS taggers	http://nlp.stanford.edu/software/tagger.shtml http://ucrel.lancs.ac.uk/claws/trial.html http://parts-of-speech.info https://gate.ac.uk/wiki/twitter-postagger.html

Lexical profilers	http://www.lextutor.ca/vp/eng/ http://www4.caes.hku.hk/vocabulary/profile.htm http://www.sfu.ca/~msevier/WebVocabularyProfilerCS.htm http://vocabkitchen.com http://www.insightin.com/vocabulary/profiler.php
Word lists by frequency count	http://www.wordfrequency.info http://www.writewords.org.uk/word_count.asp http://www.wordcounter.com http://www.textfixer.com/tools/online-word-counter.php http://www.online-utility.org/text/analyzer.jsp
Social networking services	https://www.pinterest.com https://www.tumblr.com https://www.instagram.com https://www.snapchat.com https://www.flickr.com https://www.podomatic.com/ https://www.facebook.com/ https://twitter.com

The contents of the module were designed following standard practices in online training (Vai & Sosulski, 2015). Learning materials were grouped under five main blocks: (1) Pronunciation; (2) Vocabulary Acquisition; (3) Reading Skills; (4) Interaction; and (5) Writing Skills. Each block contained information on several related P-NLPRs, which was in turn structured into four sections: (a) what is it? (b) how can it be used? (c) how does it contribute to language learning? and (4) P-NLPR examples and P-NLPR practice. Each block was made available weekly to participants over five consecutive weeks. For each module, participants were encouraged to take part in forum discussions and assignments related to the tools suggested in each block. The assignments prompted language teachers to use some of the P-NLPRs from the block to gain hands-on experience. They were then encouraged to write an account of their experience with P-NLPRs.

The selection process of the tools for the module followed specific criteria: the P-NLPRs included had to be available via a computer or a mobile device during the period of

the training module for free and to serve a pedagogical purpose for language learning. All the selected P-NLPRs targeted English, although some of them worked for other languages such as Spanish or German. Table 1 shows examples of the selected P-NLPRs. The module was delivered in four different languages, English, Spanish, German and French, and was officially offered in the United Kingdom, Spain, Germany and Belgium. The enrolment and certification process were coordinated by the four participating universities.

II.2.3. PRE-survey/POST-survey: The Questionnaires

The quantitative data were collected using 5-point LIKERT-scale surveys (Owen, 2017) with a PRE-survey/POST-survey design to compare the results prior to and following completion of the module. Items from both PRE-survey and POST-survey were designed and selected following notions of theoretical pluralism (Stockwell, 2022). The items in both questionnaires were designed to target the subjects' previous knowledge of the tools (i.e. whether the participants know what the tools are and what they can do) (PRE-survey) as well as knowledge acquired after the course (POST-survey), familiarity (i.e. how accustomed the subjects were to using the tools on a frequent basis) with the different P-NLPRs before and after the module and perceived usefulness of the tools.

The PRE-survey comprised 49 items including demographic and professional information (age, country, years of experience and type of institution where they are employed) as well as specific questions and scales on language teachers´ knowledge, experience, perception on the role of P-NLPRs on teaching practices, familiarity with P-NLPRs, and frequency of use of P-NLPRs prior to the course. The POST-survey consisted of 24 items, which dealt with the participant's engagement with the course contents, knowledge of P-NLPRs, intention to use them in the future, and scales on the role of perception, familiarity and perceived usefulness of the P-NLPRs (Table 2).

Table 2. *Main evaluation variables in PRE- and POST-survey*

		PRE-survey	POST-survey
Knowledge of P-NLPRs		✓	✓
Experience with P-NLPRs		✓	
Intention to use P-NLPRs in the future			✓
Opinion of course			✓
Scales	Perceptions of P-NLPRs	✓	✓
	Familiarity with P-NLPRs	✓	✓
	Frequency of use of P-NLPRs	✓	
	Perceived usefulness of P-NLPRs		✓

Knowledge of P-NLPRs, previous experience and intention to use P-NLPRs in the future were measured through a single item each. Engagement with the course included three items assessed individually (whether the course had been useful, showed new ways of teaching, and increased willingness to use P-NLPRs). Scales on perceptions and familiarity with P-NLPRs on the PRE- and POST-surveys included 5 and 15 items respectively. The scale on the perceptions on the role of P-NLPRs for teaching included items evaluating their initial, subjective view of the general role that P-NLPRs may have as a tool for improving language teaching practices (e.g., whether they were easy to integrate, student appreciation of their use, or their utility for reaching out more students). The familiarity scale covered the different P-NLPRs individually in order to assess how successful the module was in increasing participants' familiarity with them. Likewise, the perceived usefulness scale comprised the same item list and measured the extent to which each P-NLPR is considered useful (e.g. "I think online dictionaries are useful for my language teaching"). Response for all evaluative items ranges between 1 (Not at all/Completely disagree) and 5 (Always/Completely agree). Item scores were averaged within each scale to ensure they kept within range.

Both questionnaires were developed specifically for this study and were checked for content validity by several experts participating in the TELL-OP project. Inventory of instruments included in the list for evaluation of familiarity, frequency of use and perceived usefulness of the different P-NLPRs were selected from suggestions of an international expert panel. In the case of the perceptions on the role of P-NLPRs scale, construct validity was tested by means of confirmatory factor analysis (CFA) to confirm its unifactorial structure [RMSEA= 0.016, 90%CI 0.00-0.08; CFI=0.99; TLI=0.99). Reliability tests were carried out on each scale, using the whole sample of the PRE-survey (n=345), or POST-survey (n=135) in the case of the perceived usefulness scale. Scale reliability was assessed through Cronbach's alpha (Perceptions on the role of P-NLPRs = .786; Familiarity with P-NLPRs = .896; Frequency of use of P-NLPRs = .903; Perceived usefulness of P-NLPRs = .950)

II.2.4. The Interviews

The questions for the interview were designed ad hoc for this study. The interview was conducted in Spanish, structured into four distinct parts. Firstly, the participants were given, as a reminder, an overview of the different P-NLPRs covered in the module. They were also asked how frequently they had used them after the course and why. Secondly, they were inquired about the possible impact of the tools in their teaching practices and the role of authentic language in class. Thirdly, they were asked about DDL and the impact of these tools in the approach. The final part of the interview dealt with their perspectives on individualized learning. The script the interviewer used to guide the data collection can be found among the supplementary materials accompanying this work. The sessions took place via ZOOM and lasted between 40 and 100 minutes each, resulting in 39,488 words transcribed. The transcripts were then coded using a deductive approach (Azungah, 2018) in combination with grounded theory (Strauss & Corbin, 1994). Each of the interviewees' responses was analysed in order to extract the main ideas, which were later grouped and categorized to, in turn, allow for a more comprehensive, qualitative analysis (e.g. see table 7 below)

II.2.5. Statistical Analyses

Paired-sample t-tests were performed to compare pre and post intervention scores for variables with repeated measures (P-NLPR knowledge, perception and familiarity). Additionally, multiple regression analyses were carried out on two continuous variables that were considered as main outcomes: perceived usefulness and intention to use P-NLPRs following intervention. Univariate linear/ordinal regression analyses were first conducted to assess the association between each predictor variable with the outcomes in order to explore individual relationships between them (Cohen et al., 2003; Pedhazur, 1997). Variables which showed significant associations in the univariate analyses were then entered in multivariate linear regression models to determine whether the relationship was independent and strong enough to remain significant in the presence of other variables and which presented the most relevant contribution to outcome prediction. All statistical analyses were performed with SPSS 28.0 for Windows (SPSS; Chicago, IL).

III. RESULTS AND DISCUSSION

III.1. Results

In the present section we describe the outcomes of the different analyses performed for the present study. Subsections III.1.1, III.1.2 and III.1.3 will outline the results of the quantitative analyses, which will provide the necessary insight to address RQs 1 and 2. Subsection 4.4 will outline the data gathered in the qualitative analysis, which will in turn be used as the basis for the discussion in RQ3. First, we will describe the participants' relationship with P-NLPRs; that is, their knowledge, experience and perceptions regarding these kinds of teaching resources (III.1.1). We also examine whether the course had an impact on the participants by comparing the responses obtained after the course to the PRE-survey scores on those variables that were measured at both moments (Knowledge, perceptions and familiarity regarding P-NLPRs) (III.1.2). We continue by determining, by means of regression analyses, which of the measured

variables showed a stronger association with the main outcome variables assessed in the POST-survey (i.e., Intention to use and perceived usefulness), which are thought to influence actual use of P-NLPRs (III.1.3). These outcomes were further checked using the magnitude of the changes produced during the module as predictors to ascertain the impact of the course progresses on intention and perceived usefulness. Long-term perceptions of the course participants are described qualitatively in (III.1.4).

III.1.1. Language teachers' engagement with the module and P-NLPRs

The subjects declared (Table 3) having moderate previous knowledge of P-NLPRs (M=2.39; SD=1.2) and experience in using them (M=2.11; SD=1.27). However, their perceptions of the role of P-NLPRs in their language teaching outscore their actual practice with greater means for all items in the scale, including expectancies regarding students and the institution´s appreciation of incorporating P-NLPRs to language teaching. Nevertheless, the general frequency of use was quite low (M=1.85; SD=0.63), and only "use of online and collocation dictionaries" showed a score above 3 (M=3.64; SD=1.37).

Table 3. *Profile of the participants*

ID	age range	mother tongue	gender	Qualifications	years of experience	level taught	based country	Language level (CEFR)
A	45-54	Polish	Female	MA	+20 years	Adult Education	Spain	C1
B	45-54	Spanish	Female	PhD	+20 years	Tertiary Education	Spain	B1, B2
C	45-54	Spanish	Female	MA	+20 years	Secondary Education, Tertiary Education	USA	A1, B1, B2
D	35-44	Spanish	Male	PhD	11-15 years	Tertiary Education	Spain	C1

In the POST-survey, results regarding module evaluation showed largely positive evaluations. The module was viewed as useful and capable of showing innovative

ways of teaching. This apparently fuelled participants´ knowledge of P-NLPRs and their intention to use them, which reached a high score (M=3.9; SD=0.92 and M=4.11; SD=0.94, respectively). Hence, the training experience had seemingly produced changes in the participants ' relationship with P-NLPRs, which we test and describe in the following section.

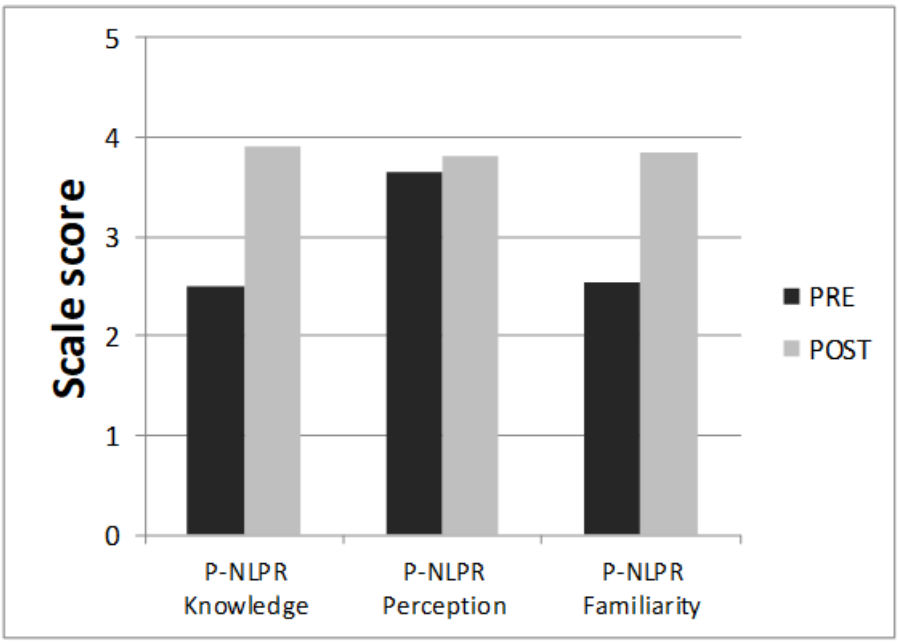


Figure 1. *Comparison between pre- and POST-survey results on subjects' knowledge, perception and familiarity with P-NLPRs*

III.1.2. Language teachers' trajectories during the module

Paired-sample t-tests were carried out to compare pre and post intervention scores with two main objectives: as a basic checking procedure of the appropriateness of the intervention and for determining the magnitude of the changes. Analyses showed that perception of P-NLPRs increased slightly and non-significantly [t(76)= -1.55; p= .125; MPRE= 3.65, SD=0.8; MPOST= 3.80, SD=0.8] after the course (Table 4; Figure 1). However, both familiarity with P-NLPRs[t(76)= -11.48; p= <.001; MPRE= 2.54, SD=0.8; MPOST= 3.85, SD=0.9] and P-NLPR knowledge [t(76)= -10.115; p= <.001; MPRE= 2.49, SD=1.1; MPOST= 3.90, SD=1.0] (Figure 1) significantly increased after completing the module.

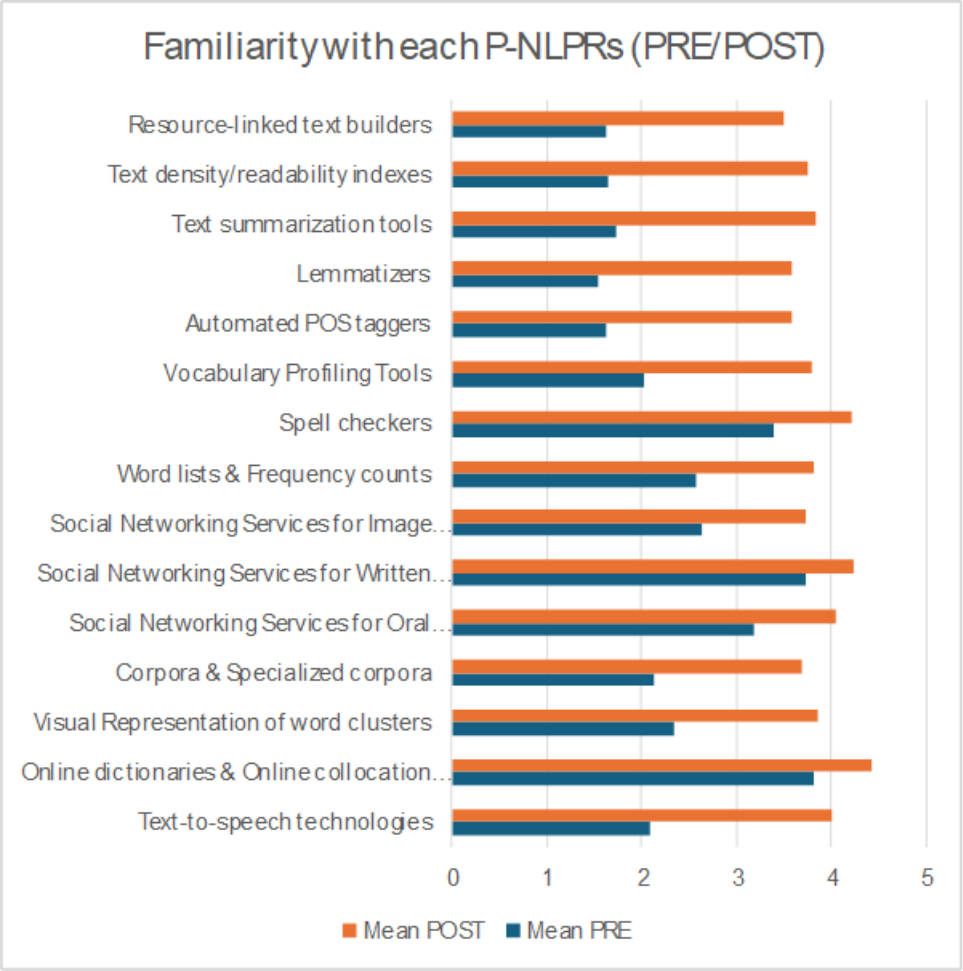


Figure 2. *Name Changes in familiarity with each P-NLPRs individually between PRE- and POST- test*

Figure 2 displays the difference between scores at PRE- and POST-survey for items in the familiarity scale. The familiarity rate is higher for each item in POST-survey. Items which participants reported being more familiar with before completing the course, such as Online Dictionaries (PRE= 3.82), Social Networking Sites for Written Discourse (PRE= 3.73), and Spell Checkers (PRE= 3.39) are those which increase the least (POST=4.42, POST=4.25, and POST=4.21, respectively), while the least known items, namely Lemmatizers (PRE= 1.54), Resource-linked text builders (PRE= 1.62) or Automated POS taggers (PRE= 1.63) experience a starker increase (POST=3.59, POST=4.25, and POST=4.21, respectively).

Table 4. *Mean (SD) scores for PRE- and POST-survey for different variables related to self-reported knowledge, experience, perceptions about P-NLPRs, intention to use them and opinions about the course. Items that composed the scale in italics*

Item/Scale	PRE-survey	POST-survey
Engagement with the course		
This course has been useful		4.33 (1.0)
This course has shown me new ways of using P-NLPRs in teaching		4.38 (0.9)
Knowing more about P-NLPRs increased my willingness to use them		4.27 (0.9)
I have knowledge of P-NLPRs (Knowledge)	2.39 (1.2)	3.9 (0.9)
I have experience using P-NLPRs (Previous experience)	2.11 (1.3)	
Perception of P-NLPRs (Scale)	3.65 (0.8)	3.80 (0.8)
P-NLPRs may be useful for teaching languages	4.01 (1.0)	4.47 (0.8)
P-NLPRs help me to reach out to more students	3.40 (1.2)	3.68 (1.1)
I think P-NLPRs are easy to integrate into my daily teaching	3.17 (1.0)	3.39 (1.0)
I think my students appreciate my using P-NLPRs for language learning	3.41 (1.1)	3.87 (0.9)
I think my institution supports my using P-NLPRs for language teaching	3.26 (1.2)	3.67 (1.0)
Familiarity with P-NLPRs (Scale)	2.54 (0.8)	3.85 (0.9)
Perceived usefulness (Scale)		3.82 (0.8)
Intention to use P-NLPRs for teaching in the future		4.11 (0.9)

III.1.3. Perception of P-NLPRs usefulness and intention to use P-NLPRs following the module

Perception of usefulness and intention to use P-NLPRs were measured at POST-survey as the main outcome variables, as both variables are widely related to actual use of those teaching resources. Regression analyses were carried out for each of them independently. For each case, the rest of the measured variables were used as predictors. We first analysed the association of each single variable with the outcome (i.e., univariate analysis) to determine whether there was a significant association

between predictor and outcome variables (Tables 5 and 6). Subsequently we analysed the joint effect of all the significant predictor variables on multivariate models, to ascertain which of the predictors showed a more robust and reliable association with the outcomes.

Table 5. *Univariate linear regression analyses for perception of usefulness of P-NLPRs after the course. Bold text for significant results.*

	B	**CI 95%**		**Wald**	**P**
Subject characteristics and working environment					
Gender	1.281	-3.499	6.061	.276	.599
Age	-1.141	-4.057	1.776	.588	.443
Years of Experience	-.070	-1.009	.868	.022	.883
Working Institution					
Secondary School	-3.605	-7.894	.685	2.712	.100
Higher Education	-1.846	-6.251	2.559	0.675	.411
Adult Education	-.852	-5.141	3.438	0.151	.697
Other (Ref)	0				
Institution fosters the use of MDs	1.842	-.719	4.403	1.988	.159
MD training	**3.201**	**.362**	**6.039**	**4.884**	**.027**
P-NLPRs Training	1.833	-1.963	5.629	.896	.344
PRE-survey measures					
Previous knowledge about P-NLPRs	-822	-.399	2.043	1.741	.187
Previous experience with P-NLPRs	.439	-.622	1.500	.658	.417
P-NLPRs Perception (PRE)	**1.783**	**.142**	**3.423**	**4.538**	**.033**

	B	CI 95%		Wald	P
P-NLPRs Familiarity (PRE)	**2.233**	**.789**	**3.677**	**9.185**	**.002**
P-NLPRs Use	**2.623**	**.677**	**4.569**	**6.977**	**.008**
POST-survey measures					
Knowledge of P-NLPRs after course	**4.053**	**3.097**	**5.009**	**69.009**	**<.001**
P-NLPRs Perception (POST)	**5.462**	**4.349**	**6.575**	**92.518**	**<.001**
P-NLPRs Familiarity (POST)	**4.407**	**3.427**	**5.388**	**77.576**	**<.001**

III.1.3.a.Perception of P-NLPRs usefulness

Within the first round of regression analyses, only "training in the use of mobile devices" was found to be significantly related to perceived usefulness (B= 3.2, p= .027) for the group of variables related to subject characteristics (i.e. demographics and years of experience) and working environment (i.e. type of institution and its attitude towards the use of mobile devices [MD] in the classroom). As for the PRE-survey and POST-survey assessment measures (knowledge, perception, familiarity and frequency of use), almost all individually showed a significant association with perceived usefulness of P-NLPRs (Table 5). Self-reported knowledge and experience with P-NLPRs were the only variables with no significant relationship with this scale.

Table 6. *Univariate ordinal regression analyses for intention to use P-NLPRs after the course. Bold text for significant results.*

	B	CI 95%		Wald	P
Subject characteristics and working environment					
Gender	1.254	-.517	3.024	1.927	.165
Age	.634	-.340	1.608	1.627	.202
Years of Experience	-.82	-.388	.223	0.281	.223
Working Institution					

	B	CI 95%		Wald	P
Secondary School	-.889	-2.396	.618	1.336	0.248
Higher Education	-.992	-2.535	.551	1.586	0.208
Adult Education	-.779	-2.286	.729	1.025	0.311
Other (Ref)	0	-2.396	.618	1.336	0.248
Institution fosters MD	**.905**	**.039**	**1.771**	**4.195**	**.041**
MD training	.941	-0.56	1.937	3.424	.064
P-NLPR Training	.100	-1.138	1.337	0.025	.874
PRE-survey measures					
Previous knowledge about P-NLPRs	.354	-.057	.764	2.855	.091
Previous experience with P-NLPRs	.307	-.051	.666	2.826	.093
P-NLPR Perception (PRE)	**.904**	**.315**	**1.493**	**9.053**	**.003**
P-NLPR Familiarity (PRE)	**.953**	**.379**	**1.526**	**10.606**	**.001**
P-NLPR Use	**1.316**	**.480**	**2.152**	**9.515**	**.002**
POST-survey measures					
Knowledge of P-NLPRs after course	**1.441**	**.897**	**1.984**	**27.010**	**<.001**
P-NLPR Perception (POST)	**4.547**	**3.106**	**5.988**	**38.250**	**<.001**
P-NLPR Familiarity (POST)	**1.286**	**0.748**	**1.823**	**21.988**	**<.001**
P-NLPR Perceived usefulness	**2.433**	**1.636**	**3.230**	**35.833**	**<.001**

In a subsequent step, variables showing an independent significant association in the regression analyses were introduced in three different multiple regression models defined by group of origin (Subject characteristics and working environment, PRE-survey, and POST-survey measures) in order to select those most representative for each group. Only POST-survey familiarity (B= 2.64; p= <.001) and POST-survey

perception of P-NLPRs (B= 3.66; p= <.001) remained significant in their association to perceived usefulness of P-NLPRs.

III.1.3.b. Intention to use P-NLPRs in the future

Results from the univariate ordinal regression analyses showed that, among those variables related to subject characteristics and working environment, only working in institutions encouraging the use of mobile devices had a significant positive association with the intention to use P-NLPRs (B= .905; p= .041). Other variables such as gender, age, or years of experience did not show significant association with a positive intention. Similarly, having received training in the use of MDs or P-NLPRs, or previous knowledge and experience using P-NLPRs were not significantly related to the "intention outcome" (Table 6).

Both PRE-survey and POST-survey measures on perception and familiarity, as well as PRE-survey use of P-NLPRs and POST-survey knowledge and perceived usefulness of P-NLPRs after completing the module were significantly associated with the intention to use P-NLPRs in the future (Table 6). Again, significant variables were introduced stepwise in a final multivariate model following the steps described above. The results show that only one of those variables remained in significant association with the future intention to use P-NLPRs (Figure 3): POST-survey perception of P-NLPRs (B= 4.494; p= <.001). All other variables lost significance when entering the model in subsequent steps.

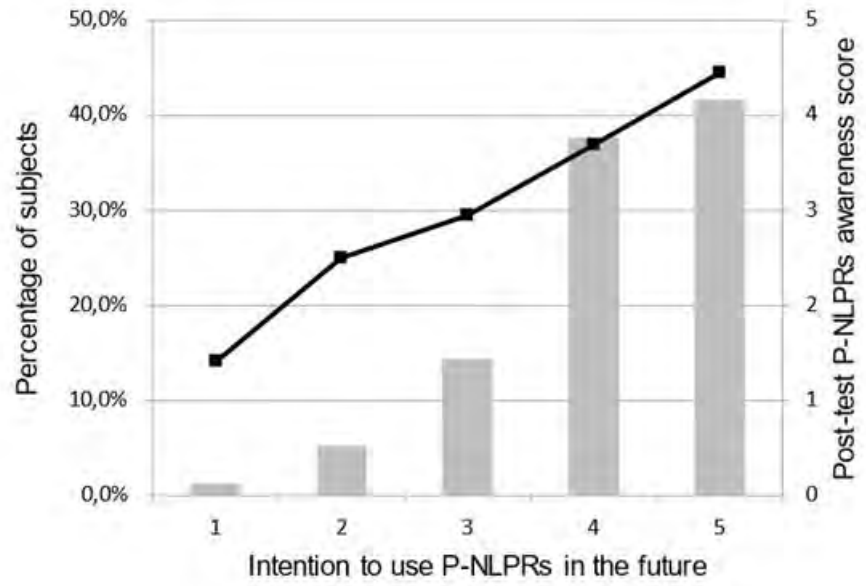


Figure 3. *Association between intention to use P-NLPRs in the future (bars) and P-NLPRs perception score (line). Bars represent percentage of subjects per category in intention (1-none to 5-surely) and line represents POST-survey P-NLPRs perception score.*

III.1.3.c. Changes after the course and main outcomes

As a further check of the course effect, an analysis was performed on whether those changes that had been observed in knowledge, perception, and familiarity with P-NLPRs were related to the main outcomes of perceived usefulness and intention to use P-NLPRs. Hence, change scores (i.e., POST minus PRE score) of knowledge, perception and familiarity were used as predictors in a linear regression model using perceived usefulness as outcome. Both perception change (B=1.20; CI 95% .032, 2.364; Wald=4.05; p=.032) remained significantly associated with perceived usefulness in the multivariate model.

The same analytical procedure with the intention to use P-NLPRs as outcome yielded similar results but only for change in perception of P-NLPRs, which showed a significant association with an intentional attitude (B=1.22; CI 95% .530, 1.914; Wald=11.98; p=.001) in the multivariate analysis, even when adjusting for change in knowledge and familiarity.

III.1.4. Interviews

The interviews took place five years after the completion of the module (see 3.4), which provided the researchers with an unusually long post-treatment evaluation of the impact of the training on language teachers' careers. The interviewees declared that completing the module had indeed been useful for them and that they had been making use of some of the P-NLPRs. Table 7 offers an overview of which tools they have used in their teaching practice.

In spite of generally showing a positive attitude towards the tools, the participants report having actually used highly familiar resources such as online dictionaries or text-to-speech technologies. There seems to be three main reasons behind their reluctance towards using some of the remaining resources: a) user-friendliness and visual appeal of the tools; b) appropriateness for the teaching context; and c) appropriateness for the learner context, such as the perception that certain resources belong to an academic environment. Additionally, subject C reports the impossibility of using online tools that require any kind of registration for her underage students.

All the subjects, however, agree on the importance of using authentic language in language education. They report designing their teaching materials with authentic pieces of language in mind.

> "Years ago I taught A1 […] and I was always against slowing down audio clips. […] You have to listen to it at natural speed, because if I talk to you very slowly […] and then you go out and listen to someone who speaks slightly faster, you will not understand anything" (Subject A)

The subjects show some reservations about Data-Driven Learning and its actual in-class viability. The participants believe that their learners lack the necessary interest to approach language learning with such a mindset. More specifically, they remarked that raising language awareness may not result in the desired outcomes, as learners usually study foreign languages for practical reasons (speaking, reading, writing…) rather than for the sake of knowledge. 'I believe that most people have no interest in

knowing how language works' (Subject B). They, however, find DDL-related P-NLPRs highly interesting for learners with a personal interest in expanding their linguistic knowledge, though, such as undergraduates or postgraduates in modern languages.

The interviewees agree on individualized learning improving teaching practice and reflection, yet all of them cite difficulties in its implementation due to highly populated classrooms and lack of effective time to carry out truly personalized learning. Subject C says: 'I have 25 [students] per class. It is difficult [to implement] individualization. Besides, the curriculum is common to all of them.'

Furthermore:

> "If we are aware that we have students that learn better in a visual way, then we will try to use visual-heavy resources in order to better get to them as well, right? If we have other students with a more developed linguistic intelligence, hey, let's […] combine different kinds of activities so we can reach every single one of them. I wish we could make individualized content for each one of our students, but the truth is […] we have in class more than a hundred or so students." (Subject D)

Table 7. *Overview of the frequency of use of P-NLPRs after the course*

P-NLPR	A	B	C	D
Text-to-speech technologies	Yes, especially when there is a specific word, she wants students to hear	Yes, especially to help students with their presentations	Yes, she used them in class and the students appreciated it, especially at lower levels	Yes, he uses them sometimes
Online dictionaries	Yes, constantly	Yes, constantly	Yes	Yes, frequently
Visual Representation of word clusters	Yes, sometimes as an activity in class	No, but she teaches her pre-service learners how to use it	She uses semantic maps, but she doesn't use the tool	No, although he thinks depending on how it is implemented it could be viable

P-NLPR	A	B	C	D
Corpora & Specialized corpora	No, only the instances shown in online dictionaries	No, she believes it can be useful for English Studies undergraduates	No, she thinks it is not user-friendly enough for her students	No, he does not think it would be useful in class
Social Networking Services	No, she doesn't like them	No, she doesn't like them	No. There are legal concerns at her institutions	No. However, he thinks they are useful as students are quite familiarized with them. Its success would also depend on the teacher's own familiarity
Word lists & Frequency counts	No, she finds it interesting for an academic environment	Not for class, but to inform her own research	No, but she finds them interesting	No.
Vocabulary Profiling Tools	Yes, especially to inform assessment design	No, she thinks her students would lose interest	No, she does not think it would be useful for her secondary education students	No, he thinks these tools can help inform teacher materials, but they are more useful for an academic context
Automated POS taggers	No, she finds it interesting for an academic environment	No, she thinks its use would be more appropriate for English Studies undergraduates	No, it doesn't fit with her institution's philosophy	No. It's too complicated for his students
Lemmatizers	No, the tool seems too academic to use in class	No, but she may have	No	No. He thinks they could be occasionally helpful

P-NLPR	A	B	C	D
Text summarization tools	No, but she finds them interesting	She teaches it to her pre-service learners	No, but seems open to use it to inform her teaching materials	No, although he knew about it he never used it in class
Resource-linked text builders	Not really	No	She thinks it's useful; she reckons doing similar work by herself	No, but he thinks it could be useful

The participants note that the tools could help in the process of individualization, especially in relation to informing material design:

'Yes, I think they do [help with individualization]. […] For example, with every new edition of the textbook they [the publishers] improve the online platform for the students. […] It includes many different resources' (Subject A).

'I believe they can [help], a lot. For instance, [automatic summarizers], the ability to adapt to different levels. I think that may help me greatly to personalize my teaching.' (Subject B).

'Honestly, I would need to try it, right? At first sight, some of them seem viable. They could help me in preparing materials' (Subject C).

'Of course they [the P-NLPRs] can help […], by creating different types of activities, and we know there are some students who, due to their individual characteristics, will benefit from this' (Subject D).

III.2. Discussion

This study offers empirical information about language educators' perception towards adopting P-NLPRs for their language teaching. The data collected confirms that the training module designed for this study targets intention and perceived usefulness successfully; on the other hand, factors such as institution support has been suggested as being influential on subjects' intention to use P-NLPRs. Research on DDL has been mostly limited to tertiary education members, so the perspectives this study

provides from in-service educators covering a diverse range of teaching institutions and levels (i.e. secondary education) contribute to underscore some of the issues that need addressing in future research. These results suggest a division within the different P-NLPRs into three main groups: a) tools to help learners learn; b) tools to help teachers teach, and c) tools to help expand linguistic knowledge, provided the individual necessary motivation for it. The following sections will connect the results collected with the RQs outlined at the end of section 2.

III.2.1. Has the TELL-OP training module in the use of P-NLPRs succeeded in contributing to the promotion of language teachers´ perceived usefulness of P-NLPRs?

The initial answer seems positive, as the POST-survey participants said they may use P-NLPRs in their teaching in the future (Table 4). The only exception to this positive pattern was the P-NLPRs perception scale. In this case, the module managed to increase how participants perceive P-NLPRs, albeit non-significantly. This result could be explained by the high expectations about P-NLPRs the subjects declared prior to participating in the course, illustrated by an already high score at PRE-survey. This interpretation concurs with the literature, which has noted a generalized positive attitude among educators towards P-NLPRs (Pérez-Paredes et al., 2018).

In particular, P-NLPR perception at POST-survey remains the most important variable associated with perceived usefulness and intention to use P-NLPRs. This association is robust enough to maintain its significance, even after control for other variables takes effect. Even though the change in the perception score between the PRE- and POST-survey was slight, its relation to both outcomes is still significant. The measure of perception of P-NLPRs seems to summarize all other variables and encompass the main factors influencing intention to use P-NLPRs in the future. Familiarity at POST-survey is the other scale (see Table 2) that appears to be independently associated with perceived usefulness, although to a lesser extent. While significant association does not imply causality, results suggest that both encouraging familiarity with P-NLPRs and increasing teachers' perception of P-NLPRs may play an important role in increasing the intention to use P-NLPRs for language teaching. In fact, participants

declared that increasing knowledge about P-NLPRs strengthened intentions to use P-NLPRs in the future, in line with the literature (Littlejohn & Hood, 2017). Further exploration would thus be necessary to assess the extent to which these factors are essential for the potential adoption of P-NLPRs by the education community, perhaps by considering the broader scope of teacher knowledge covered in T-PACK (Mishra & Koehler, 2006).

Participating in the training activity seems to have contributed to increasing perceived usefulness of P-NLPRs, as it was strongly associated with positive changes in perceptions about and familiarity with P-NLPRs after the course. In fact, perceived usefulness shows one of the strongest associations with intentions in the univariate analysis. These results would support the literature suggesting perceived usefulness to be an important factor in increasing intention (Kelly, 2014; Lai, 2013; Lai et al., 2014), which strongly influences whether users will ultimately adopt the tools (Davis, 1989; Venkatesh et al., 2003). Moreover, these outcomes seem to imply that focusing on how P-NLPRs can be useful for learners should be important to consider when designing a course, as suggested by Lai et al. (2014). This finding is potentially relevant for future teacher training.

Institutions play a pivotal role in teacher development, the data suggests. Working in an institution that encourages the use of mobile devices (MDs) for language teaching appears to show a strong association to familiarity and having received training in the use of MDs with intention to use. The literature has stressed repeatedly the importance of providing sustained, supported learning opportunities grounded in immediate teaching contexts that show innovative ways to improve teaching practices (Knobel and Kalman, 2016). Even though none of the PRE-survey measures outscore the strength of the association of POST-survey measures (Tables 5 and 6), the latter are consistently, in statistical terms, more robust. Additionally, P-NLPR perception at POST-survey maintains its association to perceived usefulness and intention after controlling for knowledge, familiarity or even actual frequency of use of P-NLPRs at PRE-survey. This suggests that the impact of the course may go beyond the previous experience of the participants with P-NLPRs.

III.2.2. After five years of hands-on experience, how do in-service teachers perceive the viability of using P-NLPRs in their respective educative contexts?

The interviewees show positive attitudes towards the P-NLPRs in general, yet not all the presented P-NLPRs were appraised equally. Taking into account the participants' declared delayed usage of the individual tools (table 7) and their perspectives on the potentiality of each tool for the classroom, we have classified the P-NLPRs into three distinct groups: tools that help learners learn, that is, aimed at helping learners perform their activities in-class (i.e. Text-to-speech technologies, online dictionaries), tools that help teachers teach and inform their material design (i.e. automatic text summarizers, visual representation of word cluster tools, lexical analysers), and tools to expand linguistic knowledge (i.e. lemmatizers, POS taggers, corpora), suitable for learners who are interested in developing their language awareness.

The time-consuming process of selecting, designing, and implementing DDL-based materials, teachers' perceived inability to interpret their students' findings, and the lack of available, ready-to-use DDL-informed materials accessible to teachers and students have been identified as hurdles to the implementation of language data-related activities in the classroom in agreement with Chambers, (2019), Poole, (2020), Zareva, (2017). This is reflected on the subjects' perspective on the more 'DDL-like' tools (i.e. corpus-related tools). The very notion of raising language awareness in learners that belong to a non-linguistics related background seems to be perceived as futile. They cite student predisposition towards learning languages, as the average learner usually takes up a foreign language mainly for practical reasons, that is, to be able to competently communicate with it. Thus, the difficulty of introducing corpora as a recursive resource in L2 teaching practices (Latif, 2021) suggest that P-NLPRs could help redirect DDL research towards reaching a 'feasibility scenario' in which DDL-based materials and textual data are tailored to the learners ' needs (Pérez-Paredes, 2010).

Additionally, there is a general reluctance towards using social media as language learning tools. Only one of the participants (subject B) seemed open to the idea, due

to his undergraduate students' familiarity with social media apps, which would ease the implementation of activities based on MALL (Mobile-Assisted Language Learning) and CALL media. It is, however, a contentious topic for both educators who dislike and/or are unfamiliar with how these applications work and for teachers in a secondary education environment. The latter case seems to raise concerns due to learners being underage and the lack of control over the apps' usage.

III.2.3. According to in-service L2 teachers, how can NLP tools favour personalized and individualized learning across the board?

The participants found that the majority of the P-NLPRs were more useful to inform their homemade teaching materials rather than to let the students use them by themselves. They particularly pointed at automatic text summarization tools, lexical profiling resources or resource-linked text builders as potentially helpful resources, as they allow for the adaptation of teaching materials to the specific needs of the learner, whether by highlighting linguistic issues that need addressing or by calibrating the linguistic level of a particular teaching material.

The idea of individualized learning seems attractive to all the participants, although the level of viability relies heavily on constraints from lack of available preparation time, curriculum flexibility and/or institution support. This becomes a common gripe amongst the participants, who feel they cannot implement innovative practices as freely as they would like due to limitations imposed by the curriculum and by the logistics of managing a large number of students per class. This relates to the literature calling for an increased effort from both curricula and institutions to adapt their policies to provide room for educators to implement alternate teaching practices (Chambers, 2019; Pérez-Paredes et al., 2018).

IV. CONCLUSIONS

This study conceptualized P-NLPRs as free-to-use digital tools that offer language-related information with the intent of informing the design and implementation of an individualized learning process. Such tools could also be used as vehicles for DDL-like activities in the classroom (Cantos, 2002; Granger et al., 2007; Pérez-Paredes et al., 2018, 2019), as they allow for the exploration of authentic linguistic data without the need to use a corpus. Training language teachers in the use of P-NLPRs in the classroom contributes to the development of new literacies, which have become an essential part of the skillset of educators (Kern, 2021; Trust et al., 2022).

Our results showed that the module significantly increased the knowledge about and the familiarity with P-NLPRs, which appear to be necessary —but not sufficient— factors for perceived usefulness and intention to occur. Knowledge, familiarity, and perception were related to perceived usefulness, and all four with intention to use P-NLPRs. Working in institutions encouraging the use of mobile devices may also have an indirect effect on intention, which stresses the relevance of the efforts from institutions to provide learning opportunities for teachers (Knobel & Kalman, 2016). Our interview data revealed that training efforts may need to go beyond knowledge-driven approaches and increase their focus on aspects such as usability of P-NLPRs, their role on students' attraction and participation, and ease of integration in daily practice in order to effectively promote teacher adoption of innovative technology. This research contributes to filling some gaps in CALL and teacher training. Particularly, this research explored in-service language teachers with varying degrees of teaching experience, as opposed to other research designs (Taghizadeh & Basirat, 2022) that examine pre-teachers' attitudes and perspectives in a one-site research design. The variety of countries where our teachers develop their practice offers a multi-site, wide-ranging perspective on the use of P-NLPRs, particularly across Europe, that is missing in the literature.

Some limitations should be considered when interpreting the results of this study, thus readers' discretion is advised. The tools selected for this study are but a handful in the vast and ever-evolving landscape of P-NLPR design and development. The TELL-OP website (www.tellop.eu) includes a wide range of these tools in different languages. Similar tools as those covered in this study may be perceived differently due to differences in how they perform the language processing and how they present the data obtained, whether explicitly or implicitly —i.e. included as part of a larger learning platform (Katinskaia et al., 2018). The utilisation of P-NLPRs in more 'subtle' ways (i.e. without explicitly stating that the main purpose of using certain P-NLPRs is to raise language awareness) might result in a better engagement from teachers and students alike. Furthermore, despite the seemingly positive impact of the intervention, it must be noted that our outcomes are based on perceptions and self-reports and are by no means indicative of an actual increase in frequency of use of P-NLPRs. Moreover, sample size for the quantitative data is on the limit for a reasonable multivariate analysis and may be slightly underpowered for more complex analyses, including the exploration of inter-country differences, which could provide interesting insight in other areas, such as multilingualism-driven research.

Data collection and sampling procedures for the interviews and questionnaires were completed online, which could as well raise concerns about the trustworthiness of the responses. A larger participant pool would of course have provided additional power for greater accuracy and precision. It should be noted that almost half of our subjects declared having less than five years of experience in teaching when the survey was completed; this could likely point at a bias of self-selection, as their perceptions might be affected by the novelty of the resources rather than by actual hands-on practice. Further research should take this into account to explore the perspectives of experienced teachers, which might provide different insight on the matter.

Further research on the topic of teacher engagement with P-NLPR tools is necessary. There are several possible reasons behind instructors' reluctance to include these resources that have not been covered in this paper, such as questions of quality

of the tools, accuracy of the data processed or user-friendliness (Burstein, 2009; Burstein et al., 2012), to name a few. Further attempts at designing similar training modules should improve the sophistication of the tasks included and the depth of the information provided on the different types of P-NLPRs and their potential for language instruction. Such factors need be explored to advance on the outcomes of this research. A qualitative perspective may be needed to obtain more in-depth information about how teachers introduce P-NLPRs into their own conception and approach to language pedagogy. To this regard, the research presented here can be considered as a useful source of information as a starting point to design and guide the development of further inquiries.

The findings of our research suggest that integrating language teachers' views on the uses of P-NLPRs can indeed increase the opportunities for further engagement with textual data and language awareness classroom activities. Text-driven examination of language in the L2 classroom does not have to be limited to corpus use, but rather expand their toolset to adapt to a much wider audience through the adoption of P-NLPRs. This perspective would concur with the literature stressing the importance of a more generalized adoption of DDL and DDL-like practices in the classroom (Chambers, 2019).

REFERENCES

Abdel-Latif, M. (2021). Corpus literacy instruction in language teacher education: Investigating Arab EFL student teachers' immediate beliefs and long-term practices. ReCALL, 33(1), 34–48. https://doi.org/10.1017/S0958344020000129

Azungah, T. (2018), "Qualitative research: deductive and inductive approaches to data analysis", *Qualitative Research Journal*, Vol. 18 No. 4, pp. 383-400. https://doi.org/10.1108/QRJ-D-18-00035

Bird, S., Klein, E. and Loper, E. (2009). *Natural language processing with Python*. Sebastopol: O'Reilly Media.

Boulton, A., & Vyatkina, N. (2021). Thirty years of data-driven learning: Taking stock and charting new directions over time. *Language Learning & Technology*, *25*(3), 66-89.

Burstein, J. (2009). Opportunities for natural language processing in education. In A. Gelbulkh (Ed.), Lecture notes in computer science: Vol.5449. *Computational linguistics and intelligent text processing.* (pp. 6–27). Berlin, Germany: Springer-Verlag.

Burstein, J., Shore, J., Sabatini, J. Moulder, B. Holtzman,S., & Pedersen, T. (2012). The Language MuseSM system: Linguistically focused instructional authoring. *ETS Research Report Series*, 2012 (2), i-36.

Cabero, J., & Barroso, J. (2016). ICT teacher training: a view of the TPACK model / Formación del profesorado en TIC: una visión del modelo TPACK. Culture and Education, 28(3), 633-663. https://doi.org/10.1080/11356405.2016.1203526

Cantos Gómez, P. (2002). Integrating corpus-based resources and natural language processing tools into CALL. *International Journal of English Studies*, 2(1), 129-166.

Chambers, A. (2019). Towards the corpus revolution? Bridging the research–practice gap. *Language Teaching, 52*(4), 460-475. doi:10.1017/S0261444819000089

Chapelle, C. (2006). Autonomy meets individualization in CALL. Mélanges Crapel, 28.

Cobb, T. (1997). Is there any measurable learning from hands-on concordancing? System, 25, 301–315.

Cohen, J., Cohen, P., West, S.G., Aiken, L.S. (2003) *Applied Multiple Regression / Correlation Analysis for Behavioral Sciences*. Lawrence Erlbaum, London.

Criollo-C, S., González-Rodríguez, M., Guerrero-Arias, A., Urquiza-Aguiar, L. F., & Luján-Mora, S. (2024). A Review of Emerging Technologies and Their Acceptance in Higher Education. *Education Sciences*, *14*(1).

Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of lnformation Technology. *Management Information Systems Quarterly*, 13(3), 319–339.

Elola, I., & Oskoz, A. (2017). Writing with 21st century social tools in the L2 classroom: New literacies, genres, and writing practices. *Journal of Second Language Writing*, *36*, 52-60. https://doi.org/https://doi.org/10.1016/j.jslw.2017.04.002

Farr, F., & Hagen Karlsen, P. (2022). DDL pedagogy, participants, and perspectives. In R. R. Jablonkai & E. Csomay (Eds.), *The Routledge Handbook of Corpora and English Language Teaching and Learning* (pp. 329-343). Routledge.

Farrow, R., Pitt, R., de los Arcos, B., Perryman, L., Weller, M., & McAndrew, P. (2015). Impact of OER use on teaching and learning: Data from OER Research Hub (2013–2014). *British Journal of Educational Technology*, 46, 972–976.

Golonka, E., Bowles, A., Frank, V., Richardson, D., & Freynik, S. (2012). Technologies for foreign language learning: a review of technology types and their effectiveness. *Computer Assisted Language Learning*, 27(1), 70-105.

Granger, S., Kraif, O., Ponton, C., Antoniadis, G., & Zampa, V. (2007). Integrating learner corpora and natural language processing: A crucial step towards reconciling technological sophistication and pedagogical effectiveness. *ReCALL*, *19*(3), 252-268. https://doi.org/10.1017/S0958344007000237

Huang, H., & Liou, H. (2007). Vocabulary Learning in an Automated Graded Reading Program. *Language Learning & Technology*, 11(3), 64-82.

Hsu, Y.-Y., & Lin, C.-H. (2020). Evaluating the effectiveness of a preservice teacher technology training module incorporating SQD strategies. *International Journal of Educational Technology in Higher Education, 17*(1). doi:10.1186/s41239-020-00205-2

Johns, T. (1991). Should You Be Persuaded: Two Examples of Data-driven Learning. In T. Johns & P. King (Eds.), *Classroom concordancing* (pp. 1-16). Centre of english language studies, The University of Birmingham.

Katinskaia, A., Nouri, J., & Yangarber, R. (2018). Revita: a Language-learning Platform at the Intersection of ITS and CALL. in C Nicoletta (ed.), *Proceedings of the Eleventh International Conference on Language Resources and Evaluation*

(LREC 2018). European Language Resources Association (ELRA), pp. 4084-4093, International Conference on Language Resources and Evaluation , Miyazaki, Japan, 07/05/2018 . < http://www.lrec-conf.org/proceedings/lrec2018/summaries/841.html >

Kelly, H. (2014). A path analysis of educator perceptions of open educational resources using the technology acceptance model. *The International Review of Research in Open and Distributed Learning*, *15*(2), 26-42.

Kern, R. (2021). Twenty-five years of digital literacies in CALL. *Language Learning & Technology*, 25(3), 132–150. http://hdl.handle.net/10125/73453g

Kessler, G. Technology and the future of language teaching. *Foreign Language Annals*. 2018; 51, 205– 218. https://doi.org/10.1111/flan.12318

Knobel, M., & Kalman, J. (2016). Teacher learning, digital technologies and new literacies. In M. Knobel & J. Kalman (Eds.), *New literacies and teacher learning: Professional development and the digital turn*, (pp. 1-20). New York, NY: Peter Lang.

Lai, C. (2013). A framework of developing self-directed technology use for language learning. *Language Learning & Technology*, 17(2), 100–122.

Lai, C., Shum, M., & Tian, Y. (2014). Enhancing learners' self-directed use of technology for language learning: the effectiveness of an online training platform. *Computer Assisted Language Learning*, 29(1), 40-60.

Latif, M. M. A. (2021). Corpus literacy instruction in language teacher education: Investigating Arab EFL student teachers' immediate beliefs and long-term practices. *ReCALL,* 33(1), 34-48.

Le Foll, E. (2024). 'Opening up' Corpus Linguistics: An Open Education Approach to Developing Corpus Literacy among Pre-service Language Teachers. Second Language Teacher Education, 2(2), 161-186. https://doi.org/10.1558/slte.25371

Leńko-Szymańska, A. (2017). Training teachers in data-driven learning: Tackling the challenge. *Language Learning & Technology*, 21(3), 217–241.

Littlejohn, A., & Hood, N. (2017). How educators build knowledge and expand their practice: The case of open education resources. *British Journal of Educational Technology, 48*(2), 499–510.

Lotherington, H., & Ronda, N. (2014). 2B or not 2B? From pencil to multimodal programming: New frontiers in communicative competencies. In J. Guikema & L. Williams (Eds.), *Digital literacies in foreign and second language education* (pp. 9–28). CALICO.

Mekheimer, M. (2012). Assessing Aptitude and Attitude Development upon Teaching Translation Skills using LMS and an Online Dictionary. *CALICO Journal*, 29 (2), 321-340.

Meunier, F. (2020). A case for constructive alignment in DDL: Rethinking outcomes, practices and assessment in (data-driven) language learning. In P. Crosthwaite (Ed.), *Data-Driven Learning for the Next Generation: Corpora and DDL for Pre-tertiary Learners* (pp. 13-31). Routledge.

Meunier, F. (2022). Revamping DDL: affordances of digital technology. In R. R. Jablonkai & E. Csomay (Eds.), *The Routledge Handbook of Corpora and English Language Teaching and Learning* (pp. 344-360). Routledge.

Mishra P., Koehler J. (2006). Technological pedagogical content knowledge: A new framework for teacher knowledge. Teachers College Record, 108, 1017–1054.

Nilsson, N. (2009). Natural language processing. In N. Nilsson (Ed.) *The quest for artificial intelligence* (pp. 103–113). Cambridge: Cambridge University Press.

Ordoñana, C., Pérez-Paredes, P., Aguado-Jiménez, P. (2018, July). *Language Teachers' Perceptions on the use of P-NLPRs*. Paper presented in CALL your Data 2018, Bruges, Belgium. Retrieved from https://www.call2018.org/wp-content/uploads/2018/07/proceedings-CALL-2018.pdf

Owen, C. (2017). Surveys. In J. Swain (Ed.), *Designing research in education* (pp. 123–147). London: Sage.

Pedhazur, E.J. (1997) *Multiple regression in Behavioral Research*. Harcourt Brace, Fort Worth.

Pérez-Paredes, P. (2010). Corpus linguistics and language education in perspective: Appropriation and the possibilities scenario. In T. Harris & M. Moreno Jaén (Eds.), *Corpus linguistics in language teaching* (pp. 53–73). Peter Lang.

Pérez-Paredes, P. (2022). A systematic review of the uses and spread of corpora and data-driven learning in CALL research during 2011-2015. *Computer Assisted Language Learning*, 1-26. https://doi.org/10.1080/09588221.2019.1667832

Pérez-Paredes, P., Ordoñana, C., & Aguado-Jiménez, P. (2018). Language teachers' perceptions on the use of OER language processing technologies in MALL. *Computer Assisted Language Learning*, 31:5-6, 522-545

Pérez-Paredes, P., Ordoñana, C., Van de Vyver, J., Meurice, A., Aguado-Jiménez, P., Conole, G., & Sánchez, P. (2019). Mobile data-driven language learning: Affordances and learners' perception. *System*, 84, 145-159.

Poole, R. (2020). "Corpus can be tricky": revisiting teacher attitudes towards corpus-aided language learning and teaching. *Computer Assisted Language Learning*, 1-22.

Romeo, K., & Hubbard, P. (2010). Pervasive CALL learner training for improving listening proficiency. In M. Levy, F. Blin, C. Siskin, & O. Takeuchi (Eds.), *World CALL: International perspectives on computer-assisted language learning.* New York: Routledge

Stockwell, G. (2022). Theory in MALL. In Mobile Assisted Language Learning: Concepts, Contexts and Challenges (pp. 90–113). chapter, Cambridge: Cambridge University Press.

Strauss, A., & Corbin, J. (1994). Grounded theory methodology: An overview. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 273–285). Sage Publications, Inc.

Taghizadeh, M., & Basirat, M. (2022). Investigating pre-service EFL teachers' attitudes and challenges of online teaching. Computer Assisted Language Learning, 1-38.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage Publications, Inc.

TELL-OP. (2015). *Our Aims*. Retrieved from http://www.tellop.eu/our-aims/

Trust, T., Maloy, R. W., & Edwards, S. (2022). College student engagement in OER design projects: Impacts on attitudes, motivation, and learning. *Active Learning in Higher Education*. https://doi.org/10.1177/14697874221081454

Vai, M., & Sosulski, K. (2015). Essentials of online course design: a standards-based guide (2nd ed.). Routledge.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science, 46*(2), 186–204. doi: 10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, F. D., & Davis, G. B. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.

Zareva, A. (2017). Incorporating corpus literacy skills into TESOL teacher training. ELT Journal, 71 (1), 69-79.

Zhu, Q. (2023). Natural Language Processing in Teacher Training: a systematic review. *Lecture Notes in Education Psychology and Public Media*, *18*(1), 83-90. https://doi.org/10.54254/2753-7048/18/20231293

Zhu, D. H., & Chang, Y. P. (2015). Effects of interactions and product information on initial purchase intention in product placement in social games: the moderating role of product familiarity. *Journal of Electronic Commerce Research, 16*(1), 22-33.

Received: 11 November 2024

Accepted: 18 December 2024

Multidimensional Analysis of Linguistic Variation in the Russian Speeches Before War in Ukraine

Bahaa-eddin Abulhassan Hassan
bahaaeldin_ali@art.sohag.edu.eg
Sohag University, Egypt

Hassan, Bahaa-eddin Abulhassan (2024). Multidimensional Analysis of Linguistic Variation in the Russian Speeches Before War in Ukraine. *Language Value, 17*(2), 100-126. Universitat Jaume I ePress: Castelló, Spain. http://www.languagevalue.uji.es.

December 2024

DOI: https://doi.org/10.6035/languagev.7999

ISSN 1989-7103

ABSTRACT

Linguistic variation is a trending topic to study genre analysis on the grounds of theory, methodology, and practicality. This study sets out to explore the genre analysis and text type of Russian speeches at the Munich Security Conferences MSC from 2007 to 2018 using multidimensional analysis. Through comparative Multi-dimensional (MD) analysis homogeneous and heterogeneous linguistic features are found. Data for the current research is taken from MSC websites by the selection of 13 Russian speeches allocated into the sub-categories of expository texts. For comparative MD analysis of sub-genre of the English version of the Russian speeches at MSC MAT tagger 1.3.3 findings were taken. The outcome indicates that there are high scores on D3 and D5 and low scores on D1 which suggests that the expository genre is utilized in the Russian speeches in MSC. The possible reasons for this linguistic variation are also discussed in the conclusion.

Keywords: Multidimensional analysis; Linguistic variation; Genre; Register; Text-type; MAT

I. INTRODUCTION

The tradition of systemic functional grammar contains some of the most sophisticated concepts on genre and register. According to this tradition, a language variety is defined by its linguistic characteristics and functionally associated with specific contextual or situational parameters of variation. Alternatively, it can be thought of as a particular configuration of field, tenor, and mode choices (in terms of Hallidayan grammar). Genre is more abstractly defined:

> A genre is known by the meanings associated with it. In fact the term "genre" is a short form for the more elaborate phrase "genre-specific semantic potential" … Genres can vary in delicacy in the same way as contexts can. But for some given texts to belong to one specific genre, their structure should be some possible realisation of a given GSP Generic Structure Potential … It follows that texts belonging to the same genre can vary in their structure; the one respect in which they cannot vary without consequence to their genre-allocation is the obligatory elements and dispositions of the GSP. (Halliday & Hasan, 1985, p. 108)

This study retains emphasis on the practically reliable model of multidimensional analysis. The study of linguistic variations in language or texts is common in the field of Linguistics. The multidimensional analysis approach for investigating linguistic variation is a reliable method in corpus-based research. It is becoming increasingly popular for its authentic results which save time when evaluating various forms of linguistic variation (Huang, 2013). The method of MD analysis can be applied to investigate linguistic differences among language varieties, genres, registers, etc. In the interim, MD analysis has become a reliable method to study linguistic variations.

Most corpus-based studies depend directly or indirectly on the notion of genre or the related concept register and text type. Many studies mainly use the term genre (e.g. Halliday, 1978; Swales 1990, 2004; Bhatia 1993; Devitt et al., 2004; Halliday & Matthiessen, 2004; Nesi & Gardner, 2012), others use both the terms text type and genre (e.g. Biber, 1988, 1989; Stubbs, 1996). In general, studies on linguistic variation focus on a specific *genre* or a manageable set of genres, in order to limit

generalizations and linguistic features. Genre is based on external, non-linguistic, "traditional" criteria and text type is based on the interior, linguistic qualities of texts (Biber, 1988, p. 70, 170; EAGLES, 1996). According to this perspective, a genre is a conventionally recognized grouping of texts based on properties other than lexical or grammatical (co-)occurrence features. Instead, a genre is defined as a category assigned on the basis of external criteria such as intended audience, purpose, and activity type. According to Biber (1988, p. 170), "genre categories are determined on the basis of external criteria relating to the speaker's purpose and topic; they are assigned on the basis of use rather than on the basis of form". Paltridge (1996) considers "text types" as "discourse/rhetorical structure types,"

Table 1. *Paltridge's Examples of Genres and "Text Types" (based on Hammond, Burns, Joyce, Brosnan & Gerot, 1992)*

Genre	Text type
recipe	procedure
Personal letter	anecdote
advertisement	description
Police report	description
Student essay	exposition
Formal letter	exposition
Formal letter	Problem-solving
News item	recount
Health brochure	procedure
Student assignment	recount
Biology textbook	report
Film review	review

As cultural structures that shift with the times, with fashion, and with social movements of ideology, genres can appear and disappear or evolve. As a result, it has been noted that several English subgenres of "official documents" have evolved recently, becoming more conversational, intimate, and familiar—sometimes purposefully, with the intention of manipulating others (Fairclough, 1992). Since genre labels are descriptions of socially constructed, functional text categories, they remain unchanged despite the fact that the genres have altered in terms of the registers invoked (a feature of intertextuality), among other modifications.

II. MULTIDIMENSIONAL ANALYSIS

A number of researches have dealt with MD analyses. Biber (1988) first introduced the MD method which incorporates quantitative and qualitative comparative analysis of various dimensions of registers. The most influential work on text typology is Biber's (1989) work employing his factor-analysis-based multi-dimensional (MD) method; nonetheless, his categories do not appear to have been adopted by other linguists. It is asserted that the linguistic features of his eight text types—such as "informational interaction," "learned exposition," and "involved persuasion"—are as distinctive as possible. Biber (1993) points out that since situational characteristics of linguistic variation may be ascertained before texts are collected, it is more crucial to concentrate on covering them all as a first step in building a corpus, whereas

> there is no a priori way to identify linguistically defined types ... [however,] the results of previous research studies, as well as on-going research during the construction of a corpus, can be used to assure that the selection of texts is *linguistically* as well as *situationally representative* [italics added]. (1993: 245)

The most perplexing terms are genre and register, which are frequently used synonymously due to their some degree of overlap. One distinction between the two is that, while register is associated with the organization of situation or immediate context, genre tends to be more closely tied to considerations of ideology and power

and is more closely associated with the organization of culture and social purposes around language (Bhatia, 1993; Swales, 1990). According to Crystal (1991, p. 295) *register* is as "a variety of language defined according to its use in social situations, e.g. a register of scientific, religious, formal English.".

Couture (1986) provides a new perspective on the differentiation between genre and register.

> While registers impose explicitness constraints at the level of vocabulary and syntax, genres impose additional explicitness constraints at the discourse level … Both literary critics and rhetoricians traditionally associate genre with a complete, unified textual structure. Unlike register, genre can only be realized in completed texts or texts that can be projected as complete, for a genre does more than specify kinds of codes extant in a group of related texts; it specifies conditions for beginning, continuing, and ending a text (p.82).

This article utilizes a collection of texts that are assembled as corpora to test the results of MD analysis based on Biber (1988). These speeches can be analyzed in terms of text types and are linked to power, ideological, and discourse—all of which are dynamic, negotiated elements of language use in specific contexts. Steen (1999) conceptualizes genre using the notion of basic-level categories:

> It is presumably the level of *genre* that embodies the basic level concepts, whereas *subgenres* are the conceptual *subordinates,* and more abstract *classes of discourse* are the *superordinates.* Thus the *genre* of an advertisement is to be contrasted with that of a sermon, a recipe, a poem, and so on. These genres differ from each other on a whole range of attributes … The *subordinates* of the genre of the advertisement are less distinct from each other. The press advertisement, the radio commercial, the television commercial, the Internet advertisement, and so on, are mainly distinguished by *one* feature: their medium. The *superordinate* of the genre of the ad, advertising, is also systematically distinct from the other superordinates by means of only *one* principal attribute, the one of domain: It is "business" for advertising, but it exhibits the respective values of "religious", "domestic" and "artistic" for the other examples. [all italics added] (p. 112)

Basically, Steen suggests that we can identify genres by their cognitive basic-level status: genres are most different from one another in terms of specific attributes, whereas sub-genres, which operate on a prototype basis, have fewer distinctions among themselves. According to Steen, a genre is characterized by a set of seven attributes:

- *domain (e.g., art, science, religion, government),*
- *medium (e.g., spoken, written, electronic),*
- *content (topics, themes),*
- *form (e.g., generic superstructures, à la van Dijk (1985), or other text-structural patterns),*
- *function (e.g., informative, persuasive, instructive),*
- *type (the rhetorical categories of "narrative," "argumentation," "description," and "exposition") and*
- *language (linguistic characteristics: register/style[?]). Steen introduces a preliminary sketch of this approach to genre (and hence to a taxonomy of discourse),*

MD was also applied to different corpora. For example, Cao and Xiao (2013) study the differences between abstracts written by native British and Chinese authors in academic research articles. Gray (2013) uncovers multidimensional patterns of variation in academic research articles. Friginal and Mustafa (2017) also examine linguistic differences between abstracts published in the United States and Iraq. Gardner et al. (2019) use MD to analyze university student writing.

III. RESEARCH QUESTIONS

The study is a content analysis of the Russian speeches at MSC from 2007 till 2018. The key theme of these speeches focused on declaring the end of the unipolar world. Russian speakers advocated new multipolar world to end US hegemony. The study

argues that linguistic variation analysis could reveal the intentions of Russian policy makers to enter war in Ukraine. The present study is an attempt to find out answers to the following questions:

1) How far is the method of MD analysis reliable in describing linguistic variation?
2) What are the linguistic variations found in the Russian speeches in MSC?
3) What are the text types of the Russian speeches in MSC as provided by MAT analyses?

This paper suggests that it is fruitful to start by looking at the genre (categories of texts) of the Russian speeches in MSC, or even "text type" in Biber's sense (categories of texts empirically based on linguistic characteristics) and relate it (through induction) to the existence of register (situation and discourse).

IV. RESEARCH FRAMEWORK AND METHODOLOGY

This research is a mixed method research as the quantitative and qualitative approaches were adopted to find out the Russian speeches in MSC. I chose these texts because they summarize the Russian attitude before its war on Ukraine. Biber's (1988) theoretical model for multidimensional MD analysis was applied in the current study. MD analysis is a method that looks into linguistic variation on six dimensions by calculating co-occurring linguistic features using statistical techniques.

Table 2. *Biber's Dimensions and text types*

Dimension	Description
1	Dimension 1 is the opposition between Involved and Informational discourse. Low scores on this variable indicate that the text is informationally dense, as for example academic prose, whereas high scores indicate that the text is affective and interactional, as for example a casual conversation. A high score on this Dimension means that the text presents many verbs and pronouns (among other features) whereas a low score on this Dimension means that the text presents many nouns, long words and adjectives (among other features).

Dimension	Description
2	Dimension 2 is the opposition between Narrative and Non-Narrative Concerns. Low scores on this variable indicate that the text is non-narrative whereas high scores indicate that the text is narrative, as for example a novel. A high score on this Dimension means that the text presents many past tenses and third person pronouns (among other features).
3	Dimension 3 is the opposition between Context-Independent Discourse and Context Dependent Discourse. Low scores on this variable indicate that the text is dependent on the context, as in the case of a sport broadcast, whereas a high score indicate that the text is not dependent on the context, as for example academic prose. A high score on this Dimension means that the text presents many nominalizations (among other features) whereas a low score on this Dimension means that the text presents many adverbs (among other features).
4	Dimension 4 measures Overt Expression of Persuasion. High scores on this variable indicate that the text explicitly marks the author's point of view as well as their assessment of likelihood and/or certainty, as for example in professional letters. A high score on this Dimension means that the text presents many modal verbs (among other features).
5	Dimension 5 is the opposition between Abstract and Non-Abstract Information. High scores on this variable indicate that the text provides information in a technical, abstract and formal way, as for example in scientific discourse. A high score on this Dimension means that the text presents many passive clauses and conjuncts (among other features).
6	Dimension 6 measures On-line Informational Elaboration. High scores on this variable indicate that the text is informational in nature but produced under certain time constraints, as for example in speeches. A high score on this Dimension means that the text presents many post modifications of noun phrases (among other features).

According to Biber (1989), each dimension is scored with positive and negative factor. In each factor there is a set of co-occurring features. The present study was done on the following six dimensions:

Table 3*. Biber's (1989) text types*

Text Type	Characterizing Genres	Characterizing Dimensions	Description
Intimate interpersonal interaction	telephone conversations between personal friends	high score on D1, low score on D3, low score on D5, unmarked scores for the other Dimensions	Texts belonging to this text type are typically interactions that have an interpersonal concern and that happen between close acquaintances

Text Type	Characterizing Genres	Characterizing Dimensions	Description
Informational Interaction	face-to-face interactions, telephone conversations, spontaneous speeches, personal letters	high score on D1, low score on D3, low score on D5, unmarked scores for the other Dimensions	Texts belonging to this text type are typically personal spoken interactions that are focused on informational concerns
Scientific Exposition	academic prose, official documents	low score on D1, high score on D3, high score on D5, unmarked scores for the other Dimensions	Texts belonging to this text type are typically informational expositions that are formal and focused on conveying information and very technical
Learned Exposition	official documents, press reviews, academic prose	low score on D1, high score on D3, high score on D5, unmarked scores for the other Dimensions	Texts belonging to this text type are typically informational expositions that are formal and focused on conveying information
Imaginative Narrative	romance fiction, general fiction, prepared speeches	high score on D2, low score on D3, unmarked scores for the other Dimensions	Texts belonging to this text type are typically texts that present an extreme narrative concern
General Narrative Exposition	Press reportage, press editorials, biographies, non-sports broadcasts, science fiction	Low score on D1, high score on D2, unmarked scores for the other Dimensions	Texts belonging to this text type are typically texts that use narration to convey information
Situated Reportage	Sports broadcasts	low score on D3, low score on D4, unmarked scores for the other Dimensions	Texts belonging to this text type are typically on-line commentaries of events that are in progress
Involved Persuasion	spontaneous speeches, professional letters, interviews	high score on D4, unmarked scores for the other Dimensions	Texts belonging to this text type are typically persuasive and/or argumentative

Data for the present research were taken from the Russian speeches at MSC**.** In the present research linguistic variation only in the Russian speeches in MSC was investigated. The current study is limited to the findings of MAT tagger 1.3.3.

V. MULTIDIMENSIONAL ANALYSIS TAGGER

The Multidimensional Analysis Tagger (MAT) is a computer program created by Nini (2019) to replicate Biber's (1988) tagger for the MD analysis of English texts. It is generally utilized in studies on text type or genre variation. It generates a grammatically annotated version of the selected text or the corpus as well as the statistics needed to perform a text-type or genre analysis. It reproduces the input text or corpus according to the linguistic features used in Biber's (1988) Dimensions and it displays its closest text type, as proposed by the patterns described in Biber (1989). It offers a tool for visualising the Dimensions features of an input text.

For example, the program adds tags to linguistic items to facilitate the identification of Biber's (1988) linguistic features, e.g. the word '*to*' used as an infinitive marker is differentiated from the preposition *to*. Examples of tags are: (1) indefinite pronouns (INPR): *anybody, anyone, anything, everybody, everyone, everything, nobody, none, nothing, nowhere, somebody, someone, something*; (2) quantifiers (QUAN): *each, all, every, many, much, few, several, some, any*; (3) quantifier pronouns (QUPR): *everybody, somebody, anybody, everyone, someone, anyone, everything, something, anything*. A full list of variables and tags is given below.

Next to the name of the variable is the tag used by the present tagger to identify it. An asterisk appears next to the name of the variables for which Biber (1988) manually checked the results. The present version of the tagger does not allow any manual intervention in the tagging process. However, the texts can be manually checked before the analysis takes place.

Past tense (VBD)

Perfect aspect (PEAS)

Present tense (VPRT)

Place adverbials (PLACE)

Time adverbials (TIME)

First person pronouns (FPP1)

First person pronouns (FPP1)

Third person pronouns (TPP3)

Pronoun it (PIT)

Demonstrative pronouns (DEMP)

Indefinite pronouns (INPR)

Pro-verb do (PROD)

Direct WH-questions (WHQU)

Nominalizations (NOMZ)

Gerunds (GER)

Total other nouns (NN)

Agentless passives (PASS)

By-passives (BYPA)

Be as main verb (BEMA)

Existential there (EX)

That verb complements (THVC)

That adjective complements (THAC)

WH-clauses (WHCL)

Infinitives (TO)

Present participial clauses (PRESP)

Past participial clauses (PASTP)

Past participial WHIZ deletion relatives (WZPAST)

Present participial WHIZ deletion relatives (WZPRES)

That relative clauses on subject position (TSUB)

That relative clauses on object position (TOBJ)

WH relative clauses on subject position (WHSUB)

WH relative clauses on object position (WHOBJ)

Pied-piping relative clauses (PIRE)

Sentence relatives (SERE)

Causative adverbial subordinators (CAUS)

Concessive adverbial subordinators (CONC)

Conditional adverbial subordinators (COND)

Other adverbial subordinators (OSUB)

Total prepositional phrases (PIN)

Attributive adjectives (JJ)

Predicative adjectives (PRED)

Total adverbs (RB)

Type-token ratio (TTR)

Word length (AWL)

Conjuncts (CONJ)

Downtoners (DWNT)

Hedges (HDG)

Amplifiers (AMP)

Emphatics (EMPH)

Discourse particles (DPAR)

Demonstratives (DEMO)

Possibility modals (POMD)

Necessity modals (NEMD)

Predictive modals (PRMD)

Public verbs (PUBV)

Private verbs (PRIV)

Suasive verbs (SUAV)

Seem/appear (SMP)

Contractions (CONT)

Subordinator that deletion (THATD)

Stranded preposition (STPR)

Split infinitives (SPIN)

Split auxiliaries (SPAU)

Phrasal coordination (PHC)

Independent clause coordination (ANDC)

Synthetic negation (SYNE)

Analytic negation (XX0)

The reliability of the program was tested on the Lancaster-Oslo/Bergen (LOB) Corpus, a one-million-word collection of British English texts compiled in the 1970s. Results indicate that MAT is mainly successful in replicating Biber's (1988) analysis. When MAT on the Brown corpus, a one million words (500 samples of 2000+ words each) of running text of edited English prose, significant differences can be observed between MAT scores and Biber's (1988) scores. However, MAT results on the Brown corpus indicate that the Dimensions found by Biber (1988) are still valid for those genres even when taking into account different texts. Results suggest that MAT can be used to analyze texts according to scores. Furthermore, it can also categorise a text for its text type, as provided by Biber (1989). AntConc is a useful tool in MAT for finding clusters (frequency patterns of word sequences of words within corpus or selected texts and calculating type token ratio (TTR). TTR is the ratio obtained by dividing the types (the

total number of different words, occurring in a text by its token (the total number of words). A high TTR indicates a high degree of linguistic variation while a low TTR indicates the opposite.

VI. RESULTS AND DISCUSSION

In this section MD analysis of the Russian speeches at MSC is made on the basis of MAT results. The following table illustrates the ratios of the six dimensions.

Table 4*. Dimension ratios*

Dimension	Ratio
1	-14.03
2	-1.9
3	5.82
4	2.51
5	2.06
6	0.78
Closest Text Type	Learned exposition

Table (5) shows the ratios of the variables in the Multidimensional Analysis tagger.

Table 5. *Variables ratios*

Variable	Score
Tokens	28556
AWL	5.07
TTR	234

Variable	Score
AMP	0.16
ANDC	0.57
BEMA	1.48
BYPA	0.15
CAUS	0.07
CONC	0.03
COND	0.18
CONJ	0.40
CONT	0.05
DEMO	1.20
DEMP	0.57
DPAR	0.02
DWNT	0.22
EMPH	0.47
EX	0.23
FPP1	2.85
GER	0.32
HDG	0
INPR	0.04
JJ	9.09
NEMD	0.31

Variable	Score
NN	22.00
NOMZ	4.86
OSUB	0.13
PASS	0.92
PASTP	0.07
PEAS	0.74
PHC	1.17
PIN	12.44
PIRE	0.09
PIT	1.00
PLACE	0.25
POMD	0.38
PRED	0.76
PRESP	0.21
PRIV	1.18
PRMD	0.80
PROD	0.08
PUBV	0.57
RB	3.19
SERE	0.30
SMP	0.05
SPAU	0.56

Variable	Score
SPIN	0.07
SPP2	0.18
STPR	0.04
SUAV	0.49
SYNE	0.17
THAC	0.11
THATD	0.09
THVC	0.41
TIME	0.51
TO	2.10
TOBJ	0.13
TPP3	0.63
TSUB	0.20
VBD	1.27
VPRT	5.22
WHCL	0.07
WHOBJ	0.01
WHQU	0.06
WHSUB	0.09
WZPAST	0.28
WZPRES	0.18
XX0	0.82

A measure of how many standard deviations below or above the mean or raw score is called z-score. It will be positive if the value lies above the mean and negative if it lies below the mean.

Table 6. *Z-score*

Variable	Score
AMP	-0.42
ANDC	0.25
AWL	1.43
CAUS	-0.24
CONC	-0.25
COND	-0.32
CONJ	1.75
DEMO	0.50
DEMP	0.23
DPAR	-0.43
DWNT	0.12
EMPH	-0.38
EX	0.06
FPP1	0.05
GER	-1.00
HDG	-0.46
INPR	-0.50
JJ	1.61

Variable	Score
NEMD	0.48
NN	1.11
NOMZ	1.99
OSUB	0.27
PHC	3.07
PIN	0.55
PIT	-0.04
PLACE	-0.18
POMD	-0.57
PRED	1.12
PRMD	0.57
RB	-1.91
SPP2	-0.59
SYNE	0.00
THAC	1.33
THVC	0.28
TIME	-0.03
TO	1.09
TOBJ	0.45
TPP3	-1.05
TSUB	2.00
TTR	1.42

Variable	Score
VBD	-0.90
VPRT	-0.74
XX0	-0.05
BEMA	-1.42
BYPA	0.54
CONT	-0.70
PASS	-0.06
PASTP	1.50
PEAS	-0.23
PIRE	0.18
PRESP	0.65
PRIV	-0.60
PROD	-0.63
PUBV	-0.37
SERE	7.25
SMP	-0.30
SPAU	0.04
SPIN	7000.00
STPR	-0.59
SUAV	0.65
THATD	-0.54
WHCL	0.10

Variable	Score
WHOBJ	-0.76
WHQU	0.67
WHSUB	-0.60
WZPAST	0.10
WZPRES	0.11
Underused variables	none
Overused variable	PHC [SERE] [SPIN]

The following figure indicates the low score (-14.3) of Dimension 1. It means the speeches are informationally dense.

Figure 1. *Dimension 1*

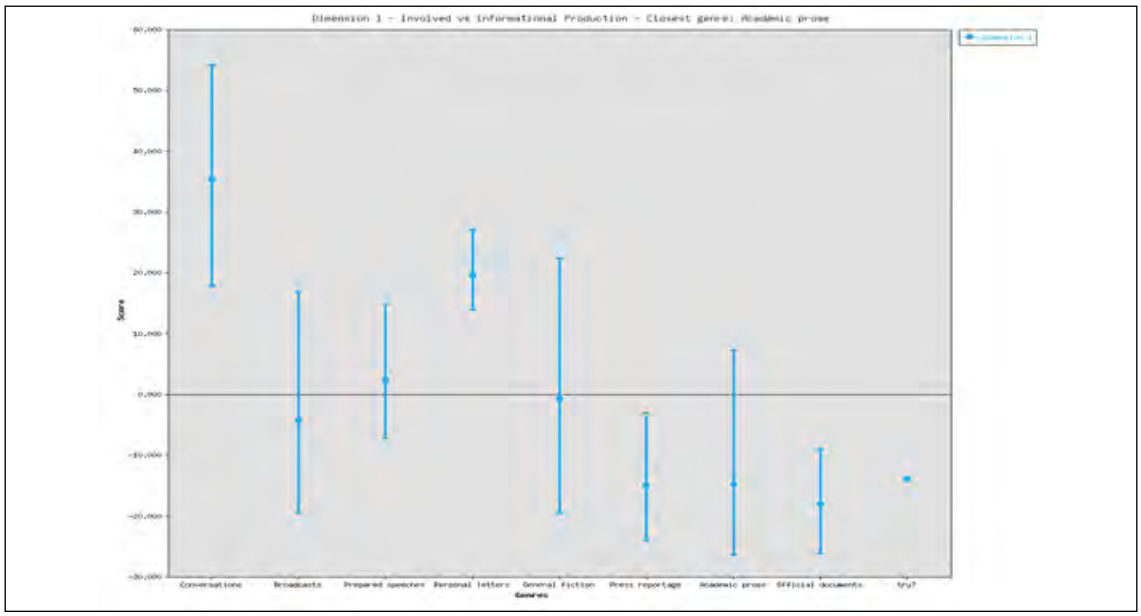
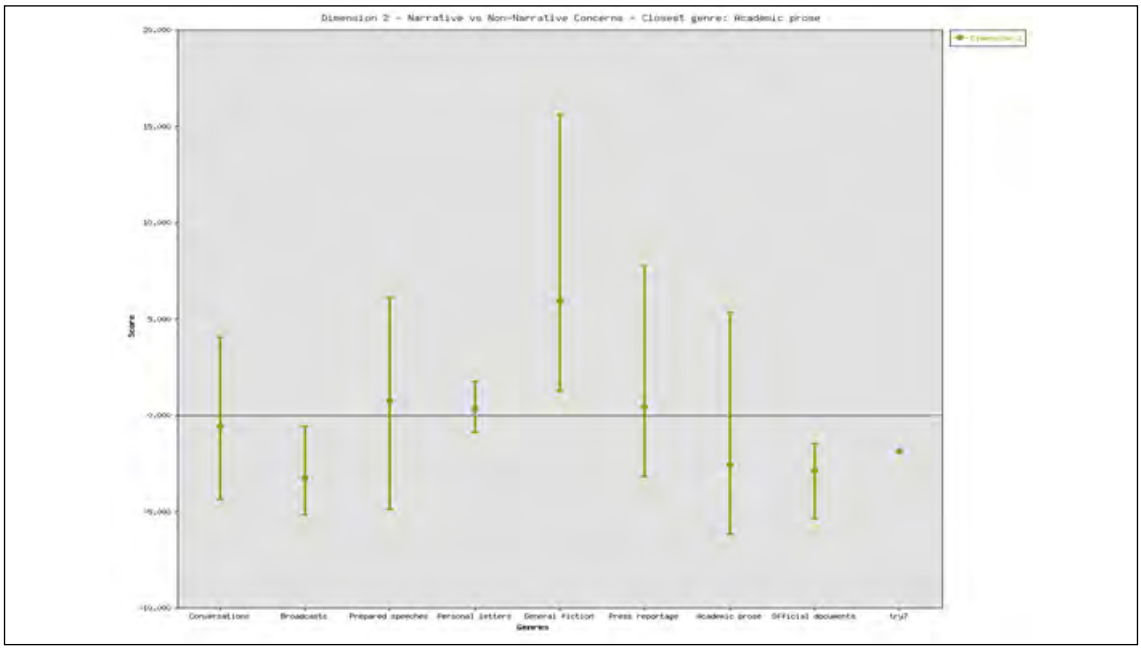


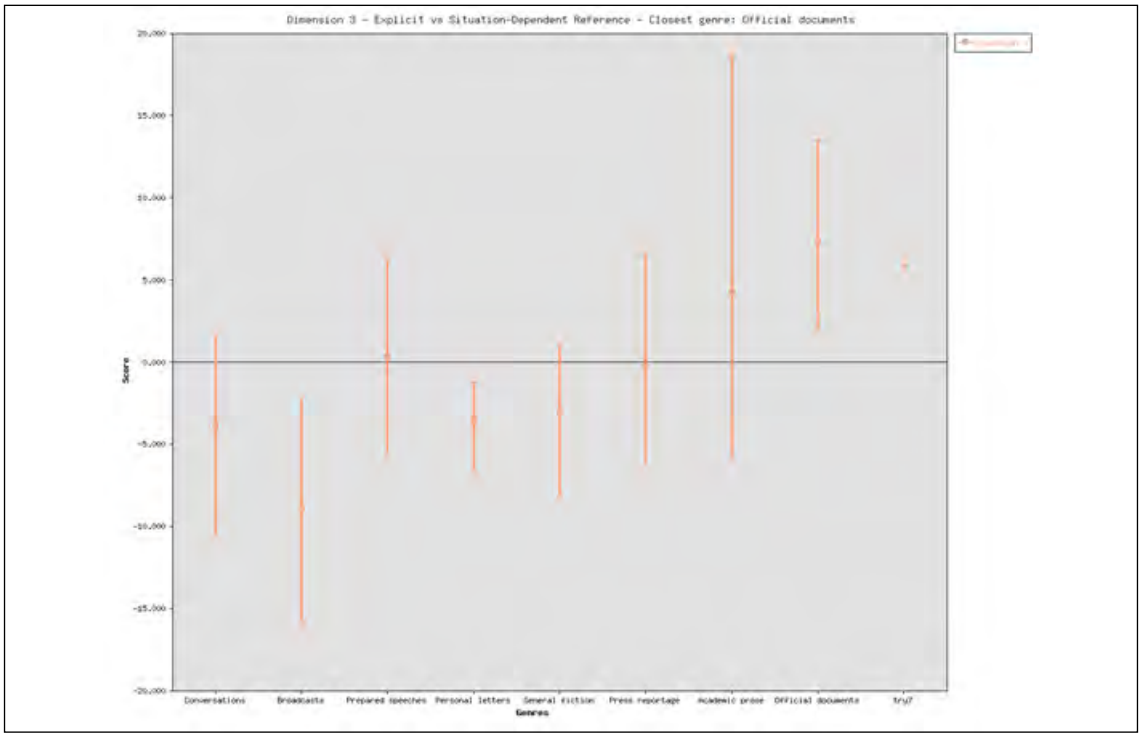
Figure (2) indicates a low score (-1.9) of Dimension 2. This low score is a feature of non-narrative speeches.

Figure 2. *Dimension 2*



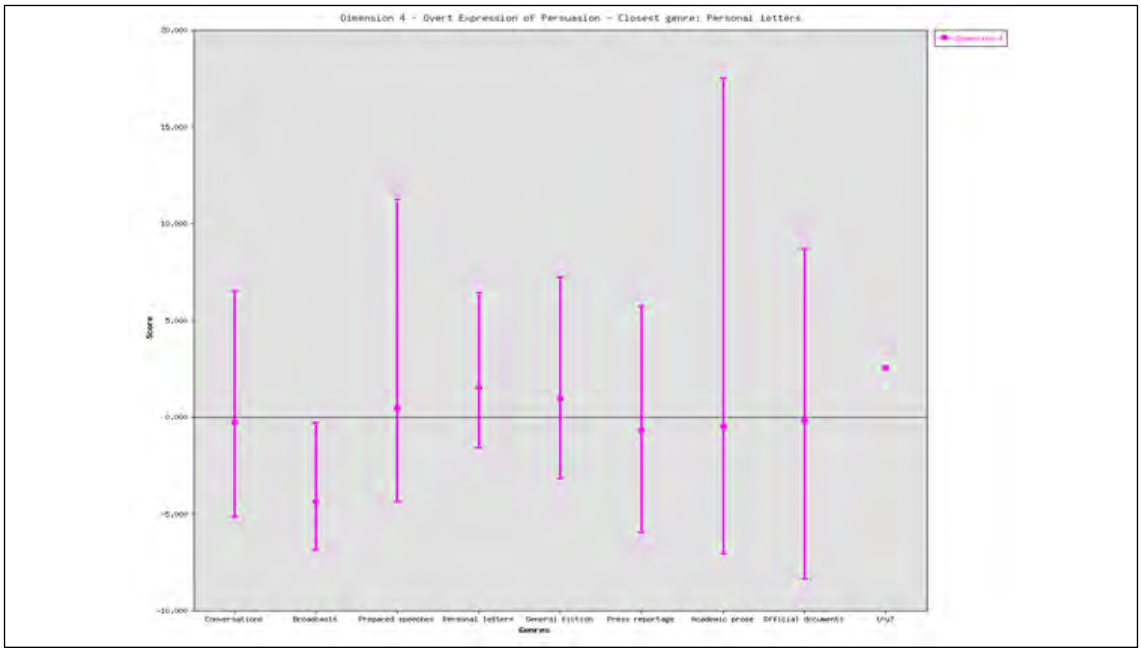
Dimension 3 in Figure (3) indicates a high score (5.82). This means that the speeches are not dependent on context, as if it is close to academic prose.

Figure 3. *Dimension 3*



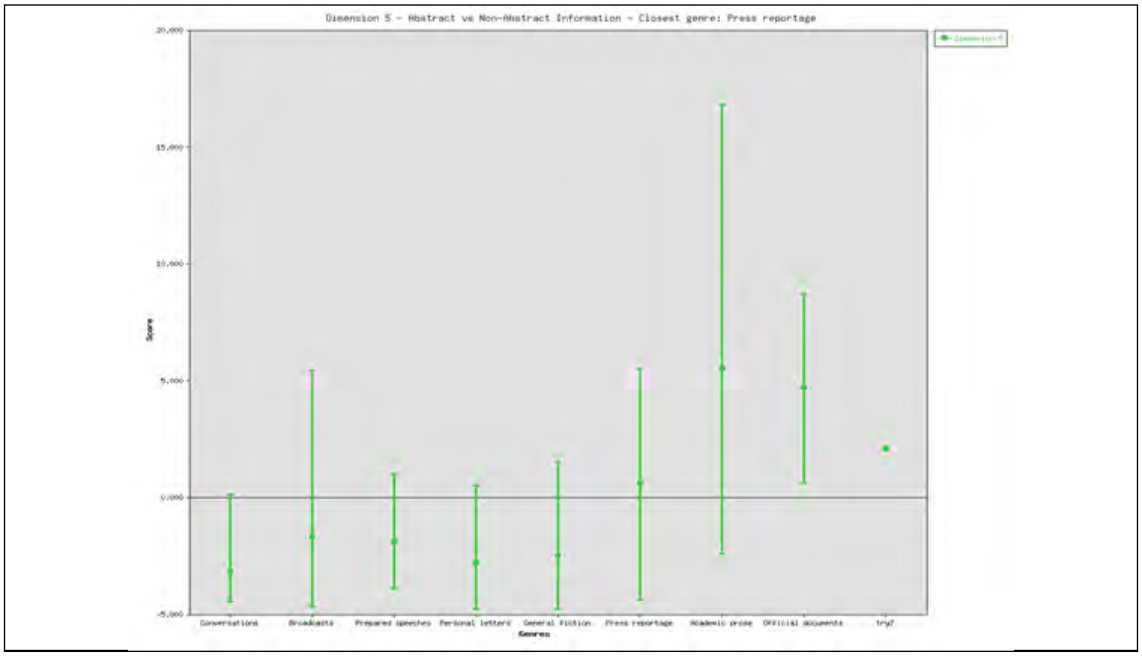
In the following figure Dimension 4 indicates a high score on this variable. It shows that the speeches explicitly mark the speakers' points of view. Texts belonging to this text type are typically persuasive in the Russian speeches.

Figure 4. *Dimension 4*



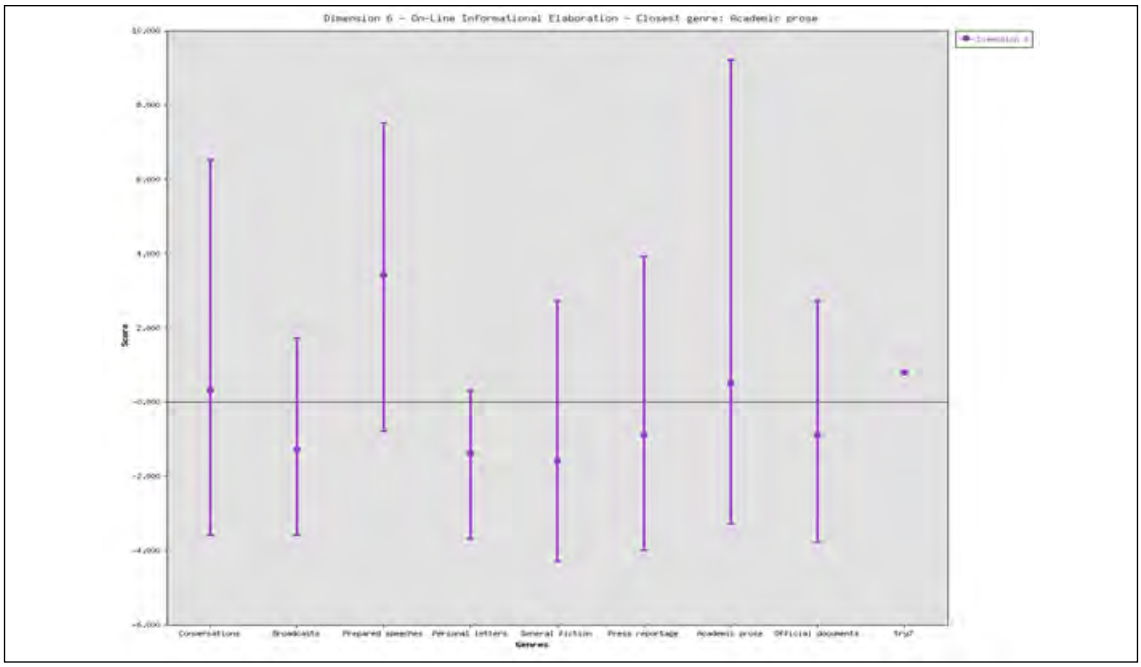
Dimension 5 in Figure (5) is measured (2.06). This indicates that the speeches provide information in a technical, abstract and formal way.

Figure 5. *Dimension 5*



In the following figure Dimension 6 is (0.78). This indicates that the speeches are informational.

Figure 6. *Dimension 6*



The following figure indicates that the text type of the Russian speeches is learned exposition. The whole features of the dimensions indicate that the Russian leaders chose to use a text type close to academic prose.

Figure 7. *Text Type*

The study argues that the linguistic variations found in the Russian speeches in MSC are numerous and include six dimenisions according to MD analysis. Thus, the model of multidimensional analysis has proven reliable in dererming the text type used in the Russian speeches. As results indicate, learned exposition is the text type of the Russian speeches in MSC as provided by MAT analysis.

VII. CONCLUSION

Ten years before the launch of the 2022 Russian invasion of Ukraine, the Russian speeches at the Munich Security Conferences were revealing moments of Putin's later intentions. Expository genre has been used to inform Western leaders about intentions to wage war on Ukraine and legitimize it. Putin's speech in 2007 was an implicit declaration of war and Western leaders fail to recognize the situational and discourse analyses of the speeches.

Russian speeches are informational as there is Low scores on D1. This variable indicates that the text is informationally dense. **D3** a high score indicate that the text is not dependent on the context, as for example academic prose. A high score on this Dimension means that the text presents many nominalizations. This type of discourse creates conciseness, objectivity, formality and thematic connections which help speakers achieve their goals. **D5** High scores on this variable indicate that the text provides information in a technical, abstract and formal way, as for example in scientific discourse. A high score on this Dimension means that the text presents many passive clauses and conjuncts (among other features).

REFERENCES

Bhatia, V. K. (1993). *Analysing genre: Language use in professional settings*. Longman.

Biber, D. (1988). *Variation across speech and writing.* Cambridge University Press.

Biber, D. (1989). A typology of English texts. *Linguistics*, 27(1), 3–43.

Biber, D. (1993). Representativeness in corpus design. *Literary and Linguistic Computing, 8*(4), 243-257

Cao Y., Xiao R. (2013). A multidimensional contrastive study of English abstracts by native and non-native writers. *Corpora*, 8(2), 209–234

Couture, B. (1986). Effective ideation in written text: A functional approach to clarity and exigence. In B. Couture (ed.), *Functional approaches to writing: Research perspectives* (pp. 69-91). Ablex.

Crystal, D. (1991). *A Dictionary of Linguistics and Phonetics*. Oxford, UK: Basil Blackwell.

Devitt, A. J., Reiff, M. J., & Bawarshi, A. (2004). *Scenes of writing: Strategies for composing with genres*. Longman.

EAGLES (Expert Advisory Group on Language Engineering Standards). (1996, June). *Preliminary recommendations on text typology.* EAGLES Document EAG-TCWG-TTYP/P. [Available at http://www.ilc.pi.cnr.it/EAGLES96/texttyp/texttyp.html]

Fairclough, N. (1992). *Discourse and social change*. Cambridge, UK: Polity Press.

Friginal, E. & Mustafa, S. S. (2017). A comparison of U.S.-based and Iraqi English research article abstracts using corpora. *Journal of English for Academic Purposes*, *25*, 45–57

Garner, S., Nesi, H. & Biber, D. (2019). Discipline, level, genre: Integrating situational perspectives in a new MD analysis of university student writing. *Applied Linguistics*, *40*(4), 646–674.

Gray, B. (2013). More than discipline: Uncovering multi-dimensional patterns of variation in academic research articles. *Corpora, 8* (2), 153–181.

Halliday, M. A. K. (1978). *Language as social semiotic: The social interpretation of language and meaning*. Edward Arnold.

Halliday, M. A. K., & Hasan, R. (1985). *Language context and text: Aspects of language in a social semiotic perspective.* Oxford University Press.

Halliday, M. A. K., & Matthiessen, C. (2004). *An introduction to functional grammar* (3rd ed.). Edward Arnold.

Hammond, J., Burns, A., Joyce, H., Brosnan, D., & Gerot, L. (1992). *English for social purposes: A handbook for teachers of adult literacy.* National Centre for English Language Teaching and Research, Macquarie University.

Huang, C.-T. James. (2013). Variations in non-canonical passives. In A. Alexiadou & F. Schaefer (eds.), *Non-canonical passives*, 95-114. John Benjamins.

Nesi, H., & Gardner, S. (2012). Genres across the disciplines: Student writing in higher education. Cambridge University Press.

Nini, A. (2019). The Multi-Dimensional Analysis Tagger. In T. Berber Sardinha & M. Veirano Pinto (eds), *Multi-Dimensional Analysis: Research Methods and Current Issues* (pp. 67-94). Bloomsbury Academic.

Paltridge, B. (1996). Genre, text type, and, and the language classroom. *ELT Journal, 50* (3), 237–243.

Steen, G. (1999). Genres of Discourse and the Definition of Literature. *Discourse Processes*, 28 (2), 109–120.

Stubbs, M. (1996). *Text and corpus analysis*. Oxford: Blackwell.

Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge University Press.

Swales, J. M. (2004). *Research genres*. Cambridge University Press.

Received: 30 March 2024

Accepted: 23 December 2024

Book review

Bello Díaz, Rafael Emlio, & Bello Llinás, Karen (Eds.). *Manual de Neuroeducación y Neurociencias del Bilingüismo*.

Vice-Ministry of Supervision, Evaluation and Control of Educational Quality, Government of the Dominican Republic, 2022, 348 pages.

Reviewed by Alba Vivancos Sánchez
al403486@uji.es
Universitat Jaume I, Castellón de la Plana (Spain)

The book *Manual de Neuroeducación y Neurociencias del Bilingüismo* (Handbook of Neuroeducation and Neuroscience of Bilingualism) is written by Dr. Rafael Emilio Bello Díaz, professor of Neurosciences and Geriatrics at the Catholic University of Santo Domingo, and Dr. Karen Bello Llinás. However, the publication of the book is the responsibility of the Vice-Ministry of Supervision, Evaluation and Control of Educational Quality -of which Bello Díaz was Vice-Minister- from the Government of the Dominican Republic.

Beyond his political work, we can highlight that Bello Díaz graduated in Medicine from the Autonomous University in Santo Domingo in 1976. He would later emigrate to Buenos Aires, where he discovered his interest in research, predominantly in Neurosciences, but also in other areas such as Geriatrics, Critical Medicine, Diabetology and Nutrition. In 2018, he published the book Neurosciences and Learning in co-authorship with his daughter, Dr. Karen Bello Llinás, with whom, in 2022, he would publish the present object of the review. This handbook on neuroeducation and neurosciences of bilingualism is structured as follows:

DOI: https://www.doi.org/10.6035/languagev.8586

- Chapter 1: *Cerebro y lenguaje* (Brain and language)
- Chapter 2: *Bilingüismo y cerebro* (Bilingualism and brain)
- Chapter 3: *Neurociencias y bilingüismo* (Neuroscience and bilingualism)
- Chapter 4: *Bilingüismo* (Bilingualism)
- Chapter 5: *Mente bilingüe* (The bilingual mind)
- Chapter 6: *La lengua como medio de comunicación de los pueblos* (Language as a mean of popular communication)
- Chapter 7: *Aprendizaje del cerebro y su repercusión en el proceso de adquisición enseñanza de la lengua extranjera en la educación bilingüe* (Learning and repercussion on the acquisition process. Foreign language teaching in bilingual education)
- Chapter 8: *Neurolingüistica: cómo el cerebro bilingüe aprende palabras* (Neurolinguistics: how the bilingual brain learns words)
- Chapter 9: *Bilingüismo y funciones ejecutivas* (Bilingualism and executive functions)
- Chapter 10: *Conclusiones* (Conclusions)

These chapters can be classified into three sections. The first section includes two introductory chapters; the second section revolves around the brain and bilingualism (Chapters 1, 2, 3, 4 and 5), and the third section focuses on other areas associated with language, such as learning, neurolinguistics and other functions.

The **Presentation** opens by linking the growing interest in bilingualism to factors such as emigration, globalization and the diffusion of new technologies that make a large amount of information available to the public. Already in this section it is introduced that, given the complexity of the study of neurolinguistics and the variety of study approaches (anatomy, cognitive psychology, language pathologies, etc.), this manual intends to approach the subject from all possible perspectives. This is followed by a series of considerations from the Ministry of Education of the Dominican Republic, which serve as a pretext for the Vice-Ministry of Evaluation, Supervision and Control of Educational Quality to produce and publish this manual.

The **Introduction** is a summary of how, historically, research in neurolinguistics has evolved. Thanks to advances in study techniques, bilingualism has gone from being considered in the late nineteenth and early twentieth centuries as an impairment in intellectual growth, to being conceived as a tool for increasing mental flexibility (Peal and Lambert, 1962).

Chapter 1, entitled Brain and language, introduces the foundations of neurolinguistics, emphasizing the neurological locations of language in the brain. It is a more developed historical introduction, starting with Whitaker (1998) and going through Broca and Wernicke's areas, explaining the association of passive communicative activities with Wernicke's area, as well as that of active activities with Broca's area.

After going into more depth about the areas involved in language production, the authors go on to differentiate four types of communication: written production, listening comprehension, written comprehension and oral production. The latter is detailed in more depth when dealing with language pathologies. The components that are affected in cases of aphasia and how they are affected are discussed. The chapter ends with a short introduction to the relationship between memory and language, with emphasis on operative memory.

Like the previous chapter, **Chapter 2** begins with a brief historical contextualization that postulates the interest of neuroimaging, with special reference to positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) techniques in the 1990s (Klein et al., 1995).

The authors present the hypothesis of distinct neuroanatomical organizations, which emerged in the 19th century to explain different models of language processing (e.g. inhibitory model, integrated neurolinguistic model and lateralization model). Later on, the neural basis of linguistic control is discussed, which leads to the theorization of bilingual production models. Finally, the chapter ends with a summary of the mapping process in monolingual reading.

Chapter 3 is introduced on the pretext that structured second language learning alters brain structure (Osterhout et al., 2008). The authors describe how the

psycholinguistic tradition observed that it is necessary to first learn the basic concepts in L1 before starting to learn L2, and how today, thanks to the advent of the encephalogram (EEG), we can record learning even in the first few hours. This is followed by a brief explanation of the functioning of the brain of a multilingual infant, a study that has made great progress in a short time thanks to non-invasive magnetoencephalography (MEG). According to the research presented in this manual, an infant who learns L1 and L2 simultaneously learns both languages in the same way as a monolingual would. The difference lies in the increased brain activity and plasticity, which is explained by the increased content load in correlation with the monolingual.

This chapter also discusses the impact on the executive functions of adolescent bilinguals, which has been approached more from a social point of view, referring to the benefits in personal development. Here the question of the definition of bilingualism and its types is introduced. The answer is multifactorial, as it depends on the learning mode, age and, above all, the sociological context of the speaker. The authors argue that, in pedagogical contexts, it is important to define bilingualism as a vehicle for learning, without forgetting the need for the affective bond, which allows for beneficial results at the social level by influencing the development of identity.

Chapter 4 commences with the presentation of different types of bilingualism measurement tools. Theoretical perspectives give way to an explanation of the declarative memory model (more related to late bilingualism) and the procedural model (related to early bilingualism). Among other types of bilingualism, individual bilingualism is separated from social bilingualism, and here the authors take the opportunity to contextualize the concept of diglossia (different social functions and domains of use for each language).

Chapter 5 seeks to answer the hypothesis of compartments, that is how are several languages stored in the brain, as presented in previous sections. For this purpose, after a brief contextualization in which the authors go through studies such as that of Siguán (2001), it is concluded, citing Paradis (2000), that there are two subsystems that are

integrated into a larger one. In this sense, it is argued that both languages operate under the same central processing system (Núñez, 2007).

Subsequent sections of the chapter focus on the relevance of neuroscientific advances, such as near infrared spectroscopy (NIRS), while the last sections are devoted to the sociocultural and psychological aspects of bilingualism. The chapter ends with a section that refers to the growing need and consequent quest for multilingual education, which brings with it different teaching modalities.

Chapter 6 emphasizes on the social aspects of bilingualism from a neuroscience perspective. The creation of a translingual identity is linked to the understanding of the world (the so-called worldview), which is responsible for encoding and constructing the representation to store it in brain memory. After defining these bases, we go on to describe the psychological and social consequences of bilingualism. Among these is the consolidation of relational dynamics in social groups and collective cohesion, a theory of Vygotsky (1979), who considers language as a modulator of thought and the value system.

Chapter 7 opens with a review of two terms together: language and emotion, giving way to the concept of *emotional intelligence*, first coined by Mayer and Salovey (1995). According to Salas (2003), learning will be optimal if two key circumstances are present: a non-threatening environment and an environment that stimulates risk-taking. This is how the authors connect emotions with the school learning environment. This is specifically important in language learning, if we consider a language as a way of looking at the world.

For risk-taking to be contemplated without the threat deteriorating the pace of learning, two types of motivation must follow one another: intrinsic (seeking satisfaction within oneself, supported by curiosity or self-esteem) and extrinsic (arising from wanting to avoid punishment or through the pursuit of a reward). The chapter ends with the basic definitions of aspects that the authors considered important in the classroom, such as metacognition, learning style, attitude (understood here as a reflection of motivation), and the role of the teacher and the student.

At the beginning of **Chapter 8**, which deals with Neurolinguistics, it is shown how, thanks to the technique of event-related potentials, it is possible to monitor the learning of new words. Thanks to this technique, a cognitive difference between early and late bilinguals has been discovered. Furthermore, the authors also refer to the importance of the environment. These circumstances generate different cognitive functions in bilingual speakers, separating them into balanced speakers, developing speakers, speakers with productive competencies, speakers with receptive skills, etc. The chapter finishes with the exposition of several clinical studies in relation to lexical and phonetic use, as well as morpheme learning.

Chapter 9 focuses on a series of case-control studies testing the executive and cognitive functions of language learners in monolingual contexts. This is followed by a classification of positive and negative effects of bilingual education. Among the positive aspects are the learning of new cognitive strategies, increased cognitive control and the development of metalinguistic awareness. Among the negative aspects are the difficulties in speakers with language problems, the decrease in verbal fluency given that the cognitive field is wider, and finally, linguistic interference.

The last section of this chapter is devoted to bimodal bilingualism (sign language and spoken language), where the lack of studies on the subject is discussed. Some authors argue that there are no executive benefits in cases of bimodal bilingualism, whereas they share key similarities such as lexical processing or double activation.

The concluding chapter of this book includes a proposal for new investigations focusing on microanatomical levels. Likewise, it also deals with the consideration of social conditions and the previous knowledge of the students on the design of language lessons.

All in all, each chapter of the book presents between fifteen and twenty subtopics, offering a diverse exploration of neurology and bilingualism without adhering strictly to a single thread of study. While this structure may seem fragmented at times, it allows for a detailed examination of specific aspects within the field. The wealth of cited information throughout the text enhances its credibility, making it a valuable resource for research purposes despite any stylistic shortcomings.

Although the progression of the book is not always immediately clear, this may be an intentional choice, reflecting its design as a handbook. Beneath its dense theoretical content, there is a discernible structure, subtly connecting the sections. This careful balance between depth and breadth ensures its utility for readers (e.g. learners, scholars) seeking a comprehensive yet rigorous guide to the subject.

REFERENCES

Klein, D., Milner, B., Zatorre, R. J., Meyer, E., & Evans, A. C. (1995). The neural substrates underlying word generation: a bilingual functional-imaging study. *Proceedings of the National Academy of Sciences of the United States of America*, *92*(7), 2899–2903. https://doi.org/10.1073/pnas.92.7.2899

Mayer, J. D., & Salovey, P. (1995). Emotional intelligence and the construction and regulation of feelings. *Applied and Preventive Psychology, 4*(3), 197–208. https://doi.org/10.1016/S0962-1849(05)80058-7

Núñez, E. (2007). ¿Tienen ventajas cognitivas los bilingües sobre monolingües? *Lingüística*, *47*, 76–85.

Osterhout, L., Poliakov, A., Inoue, K., McLaughlin, J., Valentine, G., Pitkanen, I., Frenck-Mestre, C., & Hirschensohn, J. (2008). Second-language learning and changes in the brain. *Journal of neurolinguistics*, *21*(6), 509–521. https://doi.org/10.1016/j.jneuroling.2008.01.001

Paradis, M. (2000). The Neurolinguistics of Bilingualism in the Next Decades. *Brain and Language, 71,* 178–180. https://doi.org/10.1006/brln.1999.2245

Peal, E., & Lambert, W. (1962). The Relation of Bilingualism to Intelligence. *Psychological Monographs*, *76*, 1–23. Northwestern University Press. https://doi.org/10.1037/h0093840

Siguan, M. (2001). *Bilingüismo y lenguas en contacto*. Alianza Editorial.

Vygotsky, L. S. (1979). *The development of psychological higher processes*. Crítica.

Whitaker, H. (1998). Neurolinguistics from the Middle Ages to the Pre-Modern era: Historical Vignettes. In B. Stemmer & H. Whitaker (eds.), *Handbook of Neurolinguistics* (pp.27-54). Academic Press.

Received: 16 December 2024

Accepted: 16 December 2024