
Leveraging L2 academic writing: Digital translanguaging in higher education

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Abstract: Although the literature on computer-assisted language learning has demonstrated that digital tools such as online translators and bilingual dictionaries offer affordances to second language (or foreign language) writers of English to solve linguistic (lexical and syntactic) issues, the extent to which digital technology supports multilingual students in producing academic texts has been underexplored. In this study, we investigate what digital technology enables and does not enable students to do in communicating their intended meaning in English by examining the writing experience of a multilingual student in an online higher education environment. The data was derived through screen sharing and online stimulated recall interviews and analysed using the concept of digital translanguaging, which focuses on meaning-making using one's entire meaning-making repertoire. The findings suggest that digital translanguaging offers many opportunities to expand the knowledge of vocabulary through self-learning. However, it also becomes evident that the success of working through lexical and syntactic issues is impacted by several factors, such as prior knowledge of the second language (L2), effective online search strategies, and awareness of digital reference resources for different purposes (e.g., online translators for literal and/or context-appropriate translations and language forums to seek advice about specific language issues from proficient speakers). We conclude by providing insights into instructional and strategic support to effectively assist multilingual students to offer greater opportunities to achieve their communication goals.

1. Introduction

The exponential growth in digital technology has catalysed the way students learn foreign languages in self-directed ways with little or no support from teachers or formal language instruction. Evidence from computer-assisted language learning (CALL) literature shows that texts produced by bi/multilingual students with the assistance of digital tools (e.g., online translators and online dictionaries) contain fewer errors (lexical and grammatical) compared to those composed without using these tools (Lee, 2020; Tsai, 2020). Several studies have shown how students use large repositories of information available in search engines (Yahoo, Google) to improve their writing by “checking sentence structures” (Wuttikrikunlaya et al., 2018, p. 117). Other studies have demonstrated the usefulness of online translators, including Google Translate, in developing lexical and syntactic knowledge and enhancing motivation in producing L2 texts (Alhaisoni & Alhasyony, 2017; Lee, 2020; Niño, 2009; Tsai, 2020; Wang & Ke, 2022). Similarly, research on online bilingual dictionary apps with links to features such as thesauruses, conjugators, and large volumes of corpus data has demonstrated that these functionalities have provided opportunities to expand vocabulary knowledge instantly by learning not only literal translations but also contextual meanings and verb forms of unknown words (Garcia & Pena, 2011; Li & Xu, 2015; Wuttikrikunlaya et al., 2018).

Although the above studies have offered many important insights into the affordances of digital resources for multilingual writers, the researchers have mainly adopted a product-oriented research design. They have largely drawn conclusions by looking at the final text produced with and without digital tools and comparing the number of grammatical and lexical errors in each version. A numerical analysis of data has made the meaning-making process invisible with details of how and why students used these tools and the kind of linguistic issues (lexical and grammatical) they could and could not resolve. We adopted a process-oriented approach to zoom in on the meaning negotiation process underpinning the multilingual and technology-mediated writing experiences using a digital translanguaging lens. The digital translanguaging concept offered a way to understand how the meaning maker draws on not only their multiple linguistic resources (mother tongue, other stronger languages) in their repertoire but also various digital reference resources (bilingual dictionaries and language forums) in the process of constructing

meaning in English. Conducted as part of a larger study (Koralage, 2022), the aspect we present here set out to investigate digital translanguaging practices in an online higher education context to understand the extent to which these practices expand the ability to communicate meaning.

The research questions that guided our investigation were:

1. What meaning-making resources, both linguistic (English, French) and digital (Google Translate, bilingual dictionaries), does the multilingual learner draw on to produce academic texts in an online higher education environment?
2. How does the student mobilise these resources to communicate the meanings she intends to convey?
3. What are the affordances and constraints of digital translanguaging in producing academic texts in English?

The findings show the affordances of online digital tools in collaboration with the student's multilingual resources enable her to fill her lexical gap in a way that would not be possible in an offline learning environment. However, her meaning-making process also reveals challenges in delineating a word that does not directly translate into the target language due to a lack of certain kinds of strategies and skills necessary to build a sound vocabulary knowledge. Our study provides implications for teachers to better support language learning through digital translanguaging.

2. Literature Review

The digital translanguaging perspective has been informed by the expanded view of translanguaging (Vogel et al., 2018). Translanguaging has been defined as “the deployment of a speaker's full linguistic repertoire without regard for watchful adherence to the socially and politically defined boundaries of named (and usually national and state) languages” (Otheguy et al., 2015, p. 281). Challenging the boundaries between named languages, this concept has foregrounded how students draw on their unitary linguistic repertoire that comprises features of all named languages in the process of meaning-making and communication. This body of work has demonstrated that multilingual students tend to mobilise their varied mother tongues and other stronger languages to promote academic engagement, make learning “more efficient and effective”, and “reduce the cognitive load” (Carroll & van den Hoven, 2016, p. 151; Mazak et

al., 2016), when learning in a second or foreign language in higher education contexts.

The burgeoning scholarship of digital translanguaging has challenged the perceived boundaries between linguistic (English, Spanish) and digital semiotic resources (online dictionaries, bilingual dictionaries, search engines). The proponents of digital translanguaging have argued that technology on its own does not have independent agency but “in the coming together of human and technology elements” (Vogel et al., 2018, p. 94), specific actions or meanings (e.g., literal and contextual, collocations, nuances) are produced, which become integrated into the student’s repertoire in a way that makes it difficult to categorise whether the features that went into the meaning-making once belonged to named languages, technology, or any other resource.

Currently, a handful of studies have mainly focused on school and out-of-school practices. For instance, Vogel et al.’s (2018) study of a Grade 6 Chinese and English bilingual student’s use of an online translator to produce a text in English demonstrates that their participant’s meaning-making practices went beyond copy-pasting of the machine-generated output. Vogel et al. show how the participant processed the translations accessed through machine translators using his knowledge of Chinese and English for evaluating and producing his text by “rewrite[ing] aspects he did not deem adequate” (p. 102) to achieve his expectations of accuracy. In the process of engaging with machine-generated translations, the authors demonstrated how new understandings of ‘accurate’ language get embodied in the process and become part of his full semiotic repertoire.

Other studies, for instance, by Schreiber (2015) and Kim (2018), have focused on identity construction through digitally mediated mixed language practices. For instance, Schreiber (2015), in his study of a Serbian hip-hop artist on a social network site (Facebook) has demonstrated how the artist’s multilingual digital practices allowed him to make a “unified expression of identity” (p. 69) rather than separate identities for different languages (English and Serbian) in his repertoire.

While the previous research on digital translanguaging has demonstrated that all the meaning-making resources of multilingual learners support when learning in a non-mother tongue language, there is a dearth of research on the challenges they may encounter despite mobilising their entire unitary repertoire. By learning more about students’ digital translanguaging processes and the

limits of working on their own, teachers can help them develop more effective practices in a way that builds on their whole linguistic repertoires.

3. Research site, design, and methods

This research took place in a massive open online course (MOOC) platform hosted by an Australian university in partnership with the Coursera MOOC provider. Due to space constraints, we have chosen to look at one multilingual participant, Maya (pseudonym), who speaks three languages, Arabic, French, and English, in the context of the present study. When Maya participated in this study, she was a 20-year-old female in her third year of medical school in Morocco. She stated that her mother tongue was an Arabic dialect. She identified French as her second language, which she started learning at school from grade one. In addition to French, she said she learned English as a subject from grade three. The complexity of her technology-integrated meaning-making process captures a rich demonstration of literacy practices to understand the affordance and constraints of digital translanguaging.

The participant was enrolled in the MOOC subject titled *Music is life-changing!* She was an amateur pianist and stated that she enrolled in this MOOC subject mainly because she was interested in the course content. She also revealed that she was also keen on practising English while learning the content because she hardly had the opportunity to do so in everyday life. It was a short course running for six weeks, covering a new module each week. The student watched pre-recorded video lectures in her own time, and the instructor posted a weekly discussion forum, which was an optional task. This MOOC subject was for free and did not have the English language proficiency requirement (IELTS/TOEFL) or prior academic qualifications as a prerequisite for enrollment.

After selecting a multilingual participant, in the first phase, an initial online semi-structured interview was conducted to get to know the sociolinguistic details and other demographic information of the participant. In our second meeting, the participant was requested to select a discussion forum prompt assigned by her instructor and write a response in real-time via Skype, as the participant was based in Morocco and the researchers were in Melbourne. She was informed that she could draw on any meaning-making resources of her choice.

In the second phase, the entire writing process was video recorded using the screen-sharing technique. The video clips were analysed to trace the sequence of online navigation paths to identify online search strategies, such as keyword formulation techniques and quotation mark use, to solve her linguistic issues. This phase was fundamental in identifying the specific linguistic and digital resources the student employed to resolve her linguistic problem.

The third phase entailed conducting online stimulated recall interviews, one immediately after the writing task and two follow-up interviews of approximately 45 minutes. The Stimulated recall interviews (SRIs) revealed the rationale and decisions behind drawing on multilingual and digital resources (GT, bilingual dictionaries) and delineating the meaning negotiation process. The recall interviews were coded based on the 'communication goals' such as eliciting unknown words/phrases and delineating contextual meanings. The semi-structured interviews aided in clarifying any doubts and questions that emerged during the former stage to build a deeper understanding of her meaning-making practices.

The data derived through each phase were transcribed and analysed using digital translanguaging as an analytic tool. From a digital translanguaging perspective, it is important to focus on the joint affordances linguistic and digital resources offer for the learner rather than look at what each offers in isolation. In this study, the student mobilised multiple languages and digital tools to work through a lexical issue. Therefore, it was necessary to examine the joint affordances language and digital resources offered to grasp how she progressed until she reached a solution. Hence, we traced the online navigation paths to track the sequence of online lookups to capture how she built her knowledge of the lexical item in each successive search in constructing the meaning she intended to communicate. The final phase of analysis involved identifying the affordances and constraints despite harnessing the entire meaning-making repertoire.

4. Analysis and findings

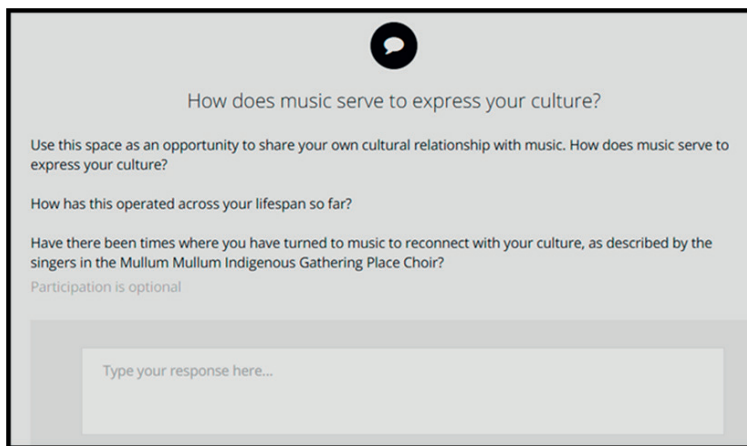
This section is organised by providing a brief sociolinguistic profile of the participant, followed by a short description of the writing prompt and the response text undertaken during the task. Next, a deep analysis of her complex meaning-making practices has been provided, unpacking varied linguistic and digital


resources the participant harnessed and how she juxtaposed them during the writing process. The analysis is intertwined with the stimulated recall data to provide a rich and comprehensive account of the decisions underpinning her meaning-making practices. The section concludes with a summary of the affordances and constraints digital translanguaging offers for the writer.

4.1. The writing task: Question prompt and the response text

Maya chose to answer the question prompt given below the 6th unit of the Music is Life-changing! subject. The question consisted of three parts, as shown in Figure 1.

Figure 1. Discussion forum question for week 6.





How does music serve to express your culture?

Use this space as an opportunity to share your own cultural relationship with music. How does music serve to express your culture?

How has this operated across your lifespan so far?

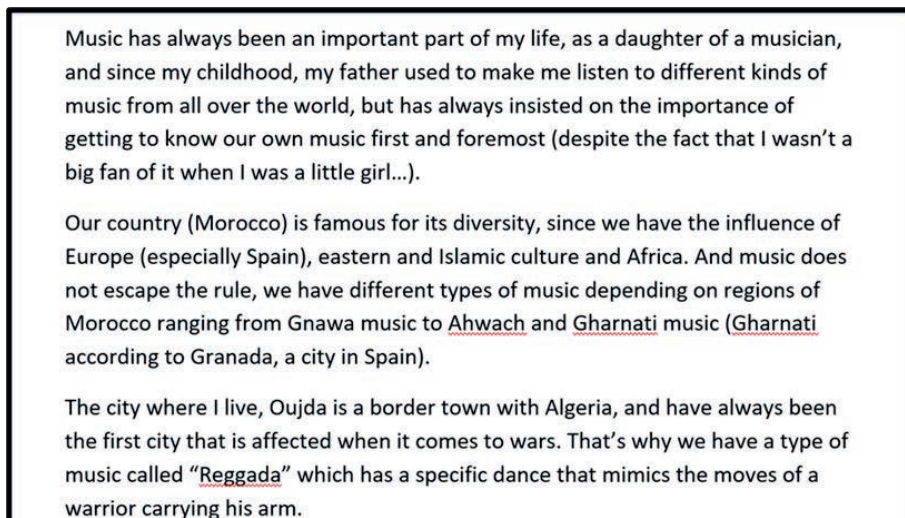
Have there been times where you have turned to music to reconnect with your culture, as described by the singers in the Mullum Mullum Indigenous Gathering Place Choir?

Participation is optional

Type your response here...

This question required Maya to write a self-reflective answer by sharing her thoughts and experiences about how music served to express her culture in light of the lectures and readings assigned for Unit 6 (see Figure 2).

Figure 2. Maya's response text.



Music has always been an important part of my life, as a daughter of a musician, and since my childhood, my father used to make me listen to different kinds of music from all over the world, but has always insisted on the importance of getting to know our own music first and foremost (despite the fact that I wasn't a big fan of it when I was a little girl...).

Our country (Morocco) is famous for its diversity, since we have the influence of Europe (especially Spain), eastern and Islamic culture and Africa. And music does not escape the rule, we have different types of music depending on regions of Morocco ranging from Gnawa music to Ahwach and Gharnati music (Gharnati according to Granada, a city in Spain).

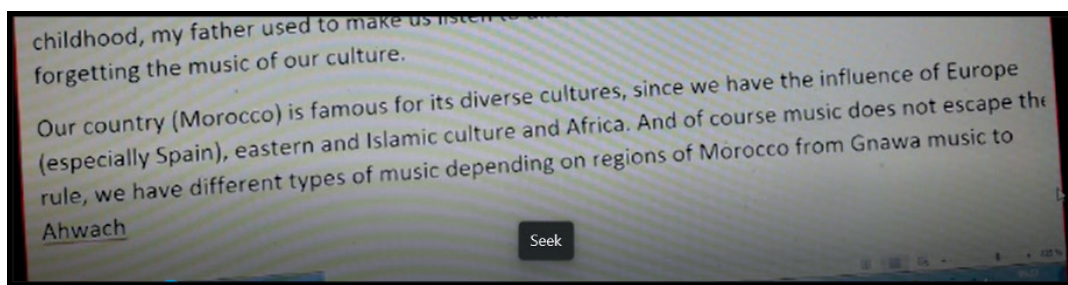
The city where I live, Oujda is a border town with Algeria, and have always been the first city that is affected when it comes to wars. That's why we have a type of music called "Reggada" which has a specific dance that mimics the moves of a warrior carrying his arm.

During the writing process, she drew on two linguistic resources, French and English, and multiple digital resources, including an online bilingual dictionary and a language forum, to self-resolve a lexical issue she encountered. Her meaning-making process has been illustrated below.

4.2. Digital translanguaging practices: Delineating ‘ranging from’

During her writing task, on one occasion, Maya paused for a moment after writing the sentence, ‘And of course music does not escape the rule, we have different types of music depending on regions of Morocco from Gnawa music to Ahwach’ (see Figure 3). Next, she opened a new browser on her computer and conducted an online search to elicit ‘ranging from’ as illustrated below.

Figure 3. Pausing just before looking up ‘ranging from’



During the (post-writing) stimulated recall interview, when inquired about the reason for her online search, she explained that at the moment of writing, she did not recollect the phrase ‘ranging from...to...’, which she considered was more appropriate for her context but only remembered, ‘from...to...’. In search of the missing phrase, Maya conducted three online searches in a row with three different search terms. When asked why she had to lookup three expressions to derive the phrase, Maya explained that it is a French phrase that does not directly translate into English. Thus, this meaning-negotiation process vividly captures the additional challenges and struggles some language learners must go through when delineating expressions or meanings that are not directly transferrable across or translatable to and from languages.

Her first move involved formulating an equivalent term in French, ‘allant de jusqu’à’ (from...to...) and looked up a bilingual dictionary called Linguee, hoping to derive ‘ranging from’ (see Figure 4). This demonstrates that she naturally turns to the stronger language, French, to learn corresponding features in

English. This aligns with the translanguaging perspective that posits multilingual speakers use similar features from their unitary repertoire to learn new features or, in this case, hard-to-recollect lexical items in English.

Figure 4. Searching for ‘allant de jusqu’à’ (from... to...) in Linguee (screenshot retaken in 2020)

The screenshot shows the Linguee website interface. At the top, there is a search bar with the text 'allant de jusqu'à' and a magnifying glass icon. Below the search bar, there is a section titled 'Dictionnaire français-anglais' which lists the search term with its grammatical information: 'allant m' (with a speaker icon and a circled 'i'), 'kick n' (with a circled 'i'), 'allant adj' (with a speaker icon and a circled 'i'), and 'vigorous adj' (with a circled 'i'). Below this, there is a section titled 'Sources externes (non révisées)' which displays a list of bilingual sentences. Each sentence is presented in two columns: the French sentence on the left and the English translation on the right. The search term 'allant de jusqu'à' is highlighted in yellow in the French sentences. The sources are listed at the bottom of each sentence pair, including 'eur-lex.europa.eu', 'leroy-somer.com', 'csc-ca.org', and 'arabhumanrights.org'. The copyright notice '© Dictionnaire Linguee, 2020' is visible at the bottom right of the dictionary section.

Linguee is not an online translator but a sophisticated corpus-based bilingual dictionary that consists of two sections: a dictionary section delivering definitions bilingually in different language pairs (over 200 pairs) and another section called External Sources, providing a corpus of bilingual sentences consisting of search terms with a link to every sentence directing the reader to the original source from which that sentence is quoted.

Further, when asked why she used a bilingual dictionary, Linguee, instead of an online translator or a dictionary, she stated,

Because it was an expression, it is difficult to find the translation for expression in dictionaries. I look at Linguee for translations, especially of a [sic] expression, not just words. Because words, it is easy to find translations even in Google. In Linguee, you find translations of complete expression [sic],

and you find it [sic] in the context. They give you lots of phrases where you have the use of this word and you choose the best one that suits you.

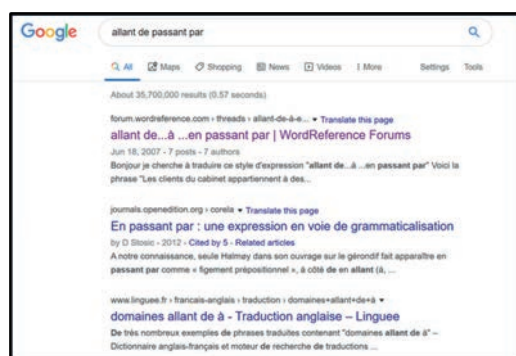
The dictionary section of Linguee confirmed her first point when it translated ‘allant’ as ‘kick’ (noun) (and the adjective form as ‘vigorously’), which was not congruent with the contextual meaning ‘from...to...’ given under Linguee’s External Sources. Maya’s strategy of consulting example sentences in French and English in this specific dictionary indicates that it enables her to garner translations of expressions, the knowledge of which informs decision-making. As a multilingual speaker with little opportunity to acquire different layers of meanings attached to target language words and expressions (e.g., nuances, culture-specific and colloquial meanings and idiomatic expressions) through everyday interaction with native or proficient speakers of English, this example shows how online resources provide a target language-rich environment for language learners.

During the interview, when we inquired about the search outcome, she commented,

I read some examples in Linguee.com. It was not what I wanted. I didn’t find the word ‘ranging from’, it was the word I looked for. ‘From...to...’ I know it already. I didn’t find the right expression in French, so I tried a different phrase, ‘allant de passant par’.

As such, she entered the new French term, ‘allant de passant par’ (ranging from...to...) in the search box. The search engine tweaked her expression and prompted several alternative terms from which she selected ‘allant de...à ...en passant par’ (ranging from) to browse through (see Figure 5).

Figure 5. Search results suggested by Google in response to the search terms ‘allant de passant par’



Accepting the first suggestion, Maya consulted a language forum hosted by the WordReference bilingual dictionary. Although Maya is producing a text in English only for her MOOC subject, her recurrent practice of drawing on French demonstrates that she considered it as a resource that eases her into academic discourses in English, her less proficient language. However, as alluded to earlier, this particular example shows that despite French being resourceful, it can be of limited value when some French expressions do not directly translate into or exist in English, which is true of any second or foreign language. Her time-consuming and rigorous effort to coin several search terms approximating the intended English phrase, sometimes assisted by Google prompts, makes us wonder how much further she can go for a successful outcome.

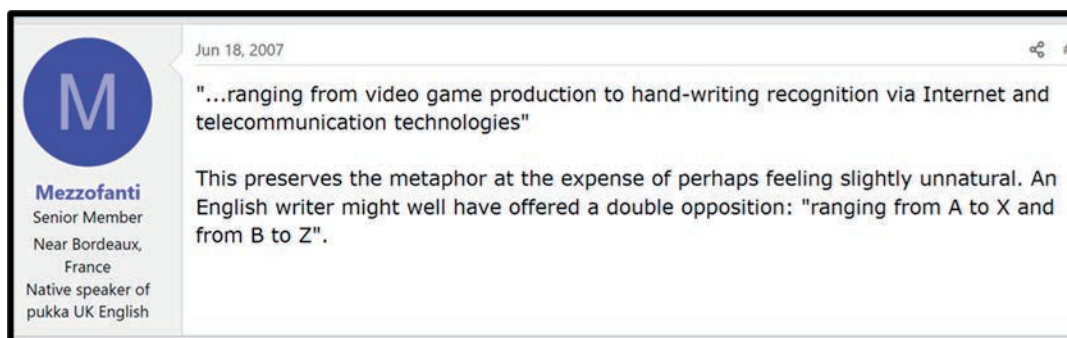
The language forum she browsed through provided a space to ask and answer questions related to language issues from a community of moderators who are either native speakers or highly proficient speakers in the languages they moderate (e.g., French/English, Spanish/English). Maya did not ask a question from forum members, but she instantly found an archived discussion thread related to her query that helped her resolve her linguistic problem (see Figure 6).

Figure 6. Threaded discussion titled ‘allant de...à...en passant par’ in the language forum hosted by WordReference.com

The screenshot shows a forum thread on WordReference.com. The thread title is "allant de...à...en passant par". The first post is from user Lizzie54, dated June 18, 2007. The post asks for help translating the French expression "allant de...à...en passant par". The second post is from user Gil, also dated June 18, 2007, suggesting "and through" but asking for native opinion. The third post is from user Mezzofanti, dated June 18, 2007, suggesting "...ranging from video game production to hand-writing recognition via Internet and telecommunication technologies" and explaining that this preserves the metaphor at the expense of feeling unnatural. The fourth post is from user P, dated June 18, 2007, asking "How about 'as well as' or 'including'".

In this thread, Maya found the following post where a member had translated the ‘allant de...à ...en passant par’ as ‘ranging from’ (see Figure 7).

Figure 7. The forum post bearing ‘ranging from’, extracted from Figure 6



During the stimulated recall interview, when we enquired why she used a forum, she explained:

In forums, human beings explain. This is why I want to use this forum. It is more helpful. When persons like [unclear] have the same problem, they give you the right translation that you are looking for.

Similar to her previous response on the choice of a corpus dictionary, this quote implies that Maya finds “human” translations more credible than machine-generated translations to avoid possible mistranslations. Although Maya runs into issues during writing due to her limited knowledge of vocabulary and lack of spontaneity, her capacity to build the missing lexical knowledge by tapping into her stronger language and an array of digital resources demonstrates that she is not disadvantaged as these provide affordances to compensate for her linguistic needs.

Although she was able to elicit ‘ranging from’ through the language forum, her search did not end there as she conducted one final search to verify the accuracy of this phrase. She entered the third French term, ‘domaines allant de à’ (ranging from), which was recommended by the search engine (see Figure 5) to browse through Linguee (see Figure 8).

Figure 8. Linguee search results for ‘domaines allant de à’ (ranging from)

The screenshot shows the Linguee website interface. At the top, there is a language selector for 'français ↔ anglais' and a search bar containing the text 'domaines allant de à'. Below the search bar, the dictionary entry for 'domaines' is shown, including its plural forms and related terms like 'allant' and 'vigorous'. The main section, 'Sources externes (non révisées)', lists several examples of the phrase 'domaines allant de à' used in various contexts, such as policy advocacy, health, and science, with corresponding English translations and source links.

Having confirmed the accuracy, Maya toggled back to the Word page to resume her writing, integrating it into her own sentence. This final search illustrates that Maya does not accept online linguistic information blindly without evaluating and verifying the accuracy.

In the larger study, Maya engaged in solving six similar linguistic issues and when asked how often she would come across issues when composing a writing piece, she commented by saying,

We don't speak or write in English, it is very rare, we only speak some words, I use my English when I travel, and that's all and when I speak with you.

While her “very rare” use of English clarifies the reason for her lack of spontaneity and fluency prompting similar searches, when we inquired whether online searches like this help to remember words and phrases, or it is likely that you will look up the same words when you write a similar text again, she revealed,

I think it helps us a lot. I learn new words, and I remember some words, just looking for them. Some words like ranging

from, I won't look for them again. So, I think it is very helpful.
But some words, yes, I forgot them [sic].

Her response shows that for a student like Maya, who is a medical student pursuing her studies in French, this way of implicit learning seems to help fill lexical gaps and retain some words in her memory, as suggested in, "I remember some words, just looking for them".

4.3. Summary of Maya's digital translanguaging processes

In sum, Maya's meaning-making experience reveals that she fluidly shuttles in and out of her second and target language (French and English) during online navigations and is capable of drawing on her own multilingual strengths to mitigate her lexical issues. Her choice of digital tools indicates her knowledge of various digital resources that suit different purposes, for instance, to derive contextual meanings and human translations as opposed to automatic and literal translations. Furthermore, her use of these digital resources demonstrates they activate different types of thinking in the process of meaning negotiation. For example, the bilingual dictionary activates not only her French and English but also her metacognitive skills of skimming, scanning, and evaluation required to process authentic bilingual sentences to decipher the contextual meanings. Her cognitive engagement shows that she does not take the easy way out by relying on or copying and pasting content uncritically but applies care in verifying accuracy through cross-checking for communicating the intended meaning to the level of accuracy she requires. Her meaning-making process illuminates that all the linguistic features complement and act as a stepping stone for learning new features. Even though her momentum of writing may be hindered due to lexical gaps, this experience shows that she is not dissuaded or disengaged as a result of the missing lexical knowledge. Instead, working in a low stake and low-anxiety environment, she engages in multiple attempts to learn by looking up new search terms and receiving immediate feedback on every effort. Thus, the ubiquity and the on-demand nature of digital tools and the affordances of her multilingual resources, in combination, motivate her to produce texts in English while still learning that language.

5. Discussion: Affordances and constraints of digital translanguaging

Although Maya's lack of spontaneity impacts the momentum of composing her text, her approach to mitigating the lexical issue suggests that she has an abundance of other resources to support her. Her way of drawing on her knowledge of French and English and digital skills enables her to learn words on her own, in a way that may not be possible in an offline environment.

Further, the literature has suggested that it takes years of learning to develop academic language proficiency (Duff, 2010; Hyland, 2019; Nation, 2003) to comprehend and communicate discipline-specific concepts and how this is a significant challenge for students whose L2 is still developmental. This situation is exacerbated in higher education contexts where lecturers provide content-specific feedback leaving students to figure out language-specific problems for themselves. In a context where the language demand is high, the ubiquity of online digital resources and their multilingual facilitation allows students to benefit through their stronger languages.

However, Maya's meaning-making process and cognitive engagement also reveal that the kind of linguistic information on which she built her vocabulary understanding does not warrant a comprehensive knowledge of the word/phrase. A comprehensive knowledge of a word, according to Nation (1990), consists of developing knowledge of eight elements, including meaning (denotations, connotations), grammatical behaviour, collocations (word associations), and register (formal, informal), among others. Although Maya's consultation of sample sentences retrieved from the Web and the language forum allowed her to make some sense of the meaning and use of the phrase in question, her practices raise questions about how much further she can go to expand all dimensions of vocabulary knowledge proposed by language experts (Larsen-Freeman, 2001; Nation, 2003; Nunan, 2015). That is, despite all her knowledge repertoires are activated with digital tools, in an English as a foreign language (EFL) environment with little or no contact with the target language, Maya can always encounter some challenges in learning how to use language in context without explicit support or guidance from a teacher or a more capable person. Having now learned about the participant's metalinguistic and metacognitive knowledges and digital translanguaging practices and processes, in the section below, we outline the implications for teachers of students like Maya when teaching vocabulary.

6. Pedagogical implications

This study provides insights into processes to assist multilingual students in learning a second language by tapping into their repertoire of multilingual and digital resources. Maya's process of vocabulary learning reveals that she mainly had to rely on example sentences and the advice from a language forum. The literature on corpus-based language learning has highlighted that corpus or sentence consultation entails "pattern-hunting" (Kennedy & Miceli, 2010, p. 31) and "discovery learning" (Chambers, 2005, p. 120), in the process of which incorrect inferences or hypotheses can be formed and internalised. The literature also indicates certain attributes, such as the target language proficiency level and the ability to cope with the high lexical load to determine the success of corpus consultation outcomes (Yoon, 2016). Considering the challenges involved in learning vocabulary by relying on example sentences, this study emphasises the importance of introducing specific digital tools which can support different aspects of language learning and providing learning training on how to use them for optimal benefits. For instance, reference resources dedicated to grammar and vocabulary teaching will help students grasp multiple meanings attached to words, learn verb forms, spoken form (how to pronounce it), register (suitability for formal or informal use) and collocations, details of which will inform them about how, when, where and with whom to use a word in real-life communication.

Maya's practice of learning new English vocabulary through French indicates the importance of activating students' metalinguistic knowledge by encouraging them to select linguistic features of certain languages that are similar to their target language. Likewise, our evidence indicates the need to encourage students to use their metacognitive knowledge of skimming, scanning, inferring, and evaluating to confirm the appropriacy of newly learned L2 features through cross-checking them with other digital tools.

In a similar vein, our study highlights the significance of teaching effective online lookup strategies to amplify learning in collaboration with digital tools. Maya's capacity to coin three corresponding search terms in French and experiment with the search engine's prompts enabled her to get at the phrase she intended. Formulating different search terms with a different combination of words, trying out different words in the same

word family (importance, important) (Herington, 2002; Lai & Chen, 2013; Li & Xu, 2015; Wuttikrikunlaya et al., 2018), and searching them in inverted commas to find an exact text match on the Web (Acar et al., 2011) are some of the practices that have a strategic importance in retrieving linguistic information most relevant to one's search.

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