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Machine Translation and L2 Anxiety Among L2 Learners: Patterns, Motivations, and Pedagogical Implications

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This paper reports findings from an empirical study that investigated the relationship between machine translator (MT) use and second language (L2) anxiety. Previous research has documented widespread MT use among learners, especially in recent years; this increase can be explained not only by MT's accessibility and accuracy but also by students' favorable perceptions of MT functionality and the higher quality of their work when aided by MT. Fewer studies have focused on the psychological factors that may be driving learners' growing reliance on these tools. The present investigation examined MT use patterns, reasons for use, and L2 anxiety levels in lower-level and upper-level college students. The results revealed a high level of MT use by learners even at the more advanced level and high-frequency MT use among learners who reported more L2 anxiety. Furthermore, students reported anxiety and fear of judgment as predominant factors driving their MT use, which suggests that pedagogical practices that aim to lessen learner dependence on MT may need to focus on lowering student anxiety as well. Other factors mentioned by participants were saving time, getting good grades, and feeling more confident in their L2 accuracy. Ultimately, students expressed positive views towards MT as a tool for language learning, although their comments also suggest that they recognize it can undermine their L2 development. The discussion of the findings provides various suggestions for alternative teaching and assessment practices to combat learner anxiety and ensure MT use supports L2 learning.

Introduction

Since their inception years ago, automatic translators have become more accurate and commonplace, resulting in increases in their use by second-language learners (Jolley & Maimone, 2022). The recent development and accessibility of novel AI technologies introduce new challenges to this equation, although the underlying questions remain the same: How and why do language learners use machine translators (MT), and what impact does such use have on language learning? Previous research has documented learners' use of MT, finding that high percentages of college-level learners report using MT regularly (O'Neill, 2019a; Stapleton, 2005; Wei-yu Chen, 2020). Research has also found improvement in learners' written language production when MT is available to them (Garcia & Pena, 2011; Lee, 2019), but improvement in L2 writing does not persist when MT access is removed,

suggesting MT provides little to no real benefits to language acquisition (O'Neill, 2019a). This mirrors what many language instructors intuit naturally, that most students do not use MT in ways that support their language acquisition or their ability to use the L2 independently of automatic translators, even though most learners have this goal.

Furthermore, research has documented significant disconnects between student MT practices and instructor attitudes. Hellmich and Vinall (2021, 2023) conducted extensive research on foreign language instructor beliefs about machine translation, finding that many instructors view MT use negatively due to concerns about academic integrity and learning effectiveness. Academic integrity concerns raised by many instructors have been documented across multiple other studies. For example, Correa (2011) investigated instructors' perspectives on academic dishonesty in second language classrooms, finding that machine translation use was consistently viewed as a form of cheating that undermined learning objectives. Similarly, Stapleton and Kin (2019) examined both the accuracy of Google Translate and teachers' impressions of MT-assisted student work, finding that while MT accuracy had improved significantly, teachers remained concerned about its impact on authentic language production and assessment validity. However, Case (2015) has argued that machine translation represents a fundamental disruption to traditional foreign language learning methods, requiring educators to reconceptualize rather than simply prohibit its use. This perspective has also been supported by Larson-Guenette (2013), who found that German language learners' use of online resources, including translation tools, had become "reflexive," suggesting that prohibition policies may be ineffective against deeply ingrained digital habits.

One area that has not received much empirical attention is the potential relationship between language anxiety and MT use by second language learners. Anxiety about language learning can manifest in learner interactions that occur both in and outside of the language classroom, with classmates or native speakers (Horwitz, 2001). This anxiety can impact learners' performance and was the basis for Krashen's Affective Filter Hypothesis (Krashen, 1982). This hypothesis explains that classroom settings that promote low anxiety in students are most conducive to L2 acquisition (Stevick, 1976) because they do not activate what Dulay and Burt (1977) called the "affective filter," which was believed to prevent input from becoming intake and ultimately leading to acquisition.

The cognitive mechanisms through which language anxiety impairs second language performance have been investigated empirically. MacIntyre and Gardner (1991) conducted a study examining how language anxiety relates to other forms of anxiety and affects cognitive processing in both first and second languages. Importantly, their research demonstrated that language anxiety could be singled out from other types of anxiety and showed specific effects on second language tasks but not first (native) language tasks. Their study's findings are particularly relevant to understanding the cognitive processes underlying anxiety-driven behaviors among L2 learners. MacIntyre and Gardner (1991) found that language anxiety specifically disrupted cognitive processing when learners were operating in their second language, affecting both the processing and production of information.

Although years have passed since these theories were proposed, language anxiety persists in students and may explain why learners turn to external supports like machine translation. To address this possible connection, the present study investigates L2 learners' MT use and language anxiety by way of quantitative and qualitative measures, examining the frequency and reasons for MT use at multiple enrollment levels as well as the relationship between language anxiety and MT use. By investigating these questions, we aim to develop a more comprehensive understanding of the factors driving MT use and consider how pedagogical interventions that aim to reduce language anxiety might also reduce students' overreliance on MT and possibly even AI.

Literature Review

Existing research has explored MT use by language learners, documenting the frequency with which students use automatic translators, the extent of their use, and specific learner characteristics that predict use. As technology has advanced from early rule-based systems to current neural machine translation models introduced in 2016, students' access to MT tools and the accuracy of their output has significantly increased (Jolley & Maimone, 2022); this confluence has led to widespread dependence on MT among language learners, with multiple studies consistently showing that many language learners report using MT frequently, particularly for writing tasks and vocabulary lookup. O'Neill (2019a) found that 87.7% of intermediate Spanish and French students reported using online translators for graded work at least sometimes, even when prohibited by instructors. Jolley and Maimone (2022) note that MT has become a commonly used tool for many L2 learners even when it is prohibited by their instructors. Wei-yu Chen (2020) reports that L2 learner dependence on MT ranges from the use of such tools to look up individual words or short phrases to translating longer segments. Furthermore, while some studies report higher use among lower-proficiency learners (Stapleton, 2005), others have found that more advanced learners also tend to use MT for checking individual words and even translating longer segments (Wuttikrikunlaya et al., 2018). This widespread use pattern aligns with findings from Clifford, Merschel, and Munné (2013), whose survey data revealed that 76% of undergraduate students reported using machine translation, with many engaging in strategic, critical use of MT tools. The high levels of use are surprising in light of the same students' documented awareness of MT limitations, as 78% indicated they consider MT to be only "somewhat accurate," and given that 77% of their instructors indicated disapproval of its use.

Several studies have investigated the impact of MT on language learning and performance outcomes, and most suggest that student writing performance improves with the use of MT. For instance, Garcia and Pena (2011) found that MT helped students write faster and produce more fluent and natural writing with fewer errors. Similarly, Lee (2019) found significant improvements in students' writing quality when using MT for revision, with a decrease in both lexical and grammatical errors. Despite these apparent benefits, studies are scant that provide evidence for long-term language development resulting from MT use. In a rare study, O'Neill (2019a) examined whether students who used Google Translate (GT) in a training module would perform better afterward when not allowed access to GT anymore. Although benefits were seen with GT use, the results showed that participants' performance without GT returned to initial levels and, in some cases, got worse. These findings suggest that MT can be used to improve language output but may undermine the learning goals of an activity and could even impede learners' deeper language development. Additional studies are needed to further examine the long-lasting impact of MT use on language learning.

In terms of the reasons that L2 learners list for their use of MT, researchers have identified its ease of access, speed, and convenience. Niño (2020) found that students use MT primarily because it is freely available and easily accessible via computers, tablets, and smartphones. The study notes that regardless of their language ability level, students utilize MT as an online language resource for both comprehension and production purposes. The convenience of MT's integration into social media platforms and various apps makes it "omnipresent" and "unavoidable" in students' everyday lives (Niño, 2020, p. 2). Additionally, Fredholm (2015) reports that students choose MT because it is fast and convenient compared to traditional dictionaries. The study found that students felt that looking up words in dictionaries was too time-consuming, especially under time constraints. Students valued MT's speed for quick translations of phrases and words. Many students relied on MT for help with sentence construction, which they reported as one of the most difficult aspects of writing in Spanish.

They appreciated that MT could provide instant feedback on acceptable sentence structures (Fredholm, 2015).

Beyond convenience factors, research has identified multiple motivational factors driving MT use. Vinall, Wen, and Hellmich (2023) investigated L2 writers' uses of MT and other online tools, finding that students employ these resources strategically for different writing tasks, depending on proficiency level and assignment types. Their research revealed that students often use MT not simply as a shortcut, but as part of a complex toolkit for language production that includes dictionaries, grammar checkers, and even peer consultation.

Nonetheless, psychological motivations for MT use have received limited empirical attention. While Selcuk et al. (2019) found results suggesting MT use could mitigate learner anxiety, and Jolley and Maimone (2022) noted that “low learner confidence and high levels of anxiety related to L2 writing may be other motivating factors for using MT,” the relationship between learners' emotional states and machine translator use in the L2 remains underexplored. This gap is particularly significant given research in L2 motivation theory, which emphasizes the central role of emotions in language learning behaviors. Teimouri (2017) investigated language learners' emotional experiences through the L2 motivational self system, finding that different types of self-discrepancies resulted in distinct emotional reactions. In his study of 524 Iranian EFL learners, Teimouri found that anxiety was associated with “ought-to L2 selves” (learners who experienced externally imposed obligations related to language learning), while joy was linked to “ideal L2 selves” (learners for whom language learning was a personally meaningful goal). Importantly, shame was found to correlate with all types of L2 self-discrepancies, but most strongly with externally imposed expectations.

Although studies have not explicitly examined the relationship between L2 anxiety and MT use, Selcuk et al. (2019) found results that suggest MT use could mitigate and lessen learner anxiety. They looked at how Turkish high school EFL students utilized Google Translate (GT) during a seven-week collaborative writing task on Facebook and found that GT was especially helpful for those who felt less confident in their English abilities. As one participant explained: “As I feel that I do not have enough English knowledge, I used Google Translation to start writing in English. Otherwise, it's really hard for me to produce sentences in English from my mind.” Another participant alluded directly to how GT had helped reduce their anxiety about writing in English: “I was feeling anxious about writing in English earlier. I am now using Google Translate to start with my writing. It really helps me, and I feel more confident with myself.” They also found that GT usage was higher among those who received lower grades, which could indicate greater use by those with less perceived English proficiency. As noted by Jolley and Maimone (2022), who provide a comprehensive look at MT use in the previous literature, no other studies have been performed that examine how “low learner confidence and high levels of anxiety related to L2 writing may be other motivating factors for using MT” (Jolley & Maimone, 2022, p. 30).

To address this gap, the present study is guided by the following research questions:

- Do lower-level and upper-level learners differ in their frequency of and reasons for MT use?
- Do learners who report higher levels of L2 anxiety at the intermediate and advanced levels also report more frequent MT use?
- When asked explicitly, do intermediate and advanced L2 learners perceive a relationship between their L2 anxiety and their MT use?

Methodology

Study 1 – Initial Survey Study

An initial study was performed to determine the frequency of MT use and reasons, some related to L2 anxiety, cited by L2 learners at different enrollment levels. Participants in the preliminary study were 122 L1 English speakers who were undergraduate students at a medium-sized liberal arts institution in the Southern United States and enrolled in Spanish, French, German, or Chinese classes. Of the 122 participants, 8 reported no use of MT for class assignments, so they were excluded from the data analysis. Of the remaining 114 students included in the statistical analyses, half (n=57) were enrolled in lower-level classes (first and second semester), and half (n=57) were enrolled in upper-level classes (fifth and sixth semester). In general, students in the lower-level classes were primarily in the class to fulfill a university-wide requirement or to get general education credit for the class. Students enrolled in the upper-level classes were generally majors and minors in the language they were taking, motivated by intrinsic factors like a love of the language or a desire to learn to speak or understand the language. Most participants (n=93) were in their first two years of college, with n=28 in their third or fourth year. Seventy-two of the participants identified as female, 49 identified as male, and 1 identified as non-binary. Multiple languages, levels, and classes were included to provide a broad understanding of students' MT use across multiple languages and instructors.

Participants filled out an online questionnaire with questions about their basic demographic information, their frequency of MT use, and the reasons they use MT for class assignments.

In this initial study, frequency of use was reported using four multiple-choice options that ranged from "almost every assignment" (4), "frequently" (3), "every now and then," and "very rarely" (1). To make comparison easier, answers on the high end of the Likert scale (fours and threes) were recoded as "frequent use," and answers on the low end of the scale (twos and ones) were recoded as "infrequent use." Students were also given multiple drop-down options and a fill-in-the-blank option to use when responding to the question of why they use machine or computer-based language platforms and were able to mark all that applied. The options provided were "get a better grade on an assignment," "complete an assignment that seems too difficult," "save time," "for learning or to better understand vocabulary or grammar," and "not be judged when I make mistakes in a second language." Their responses were calculated as percentages of students at each level who selected each option.

Study 2 – Anxiety Scale Study

A second group of learners was used to collect data that explored more in-depth L2 learners' language anxiety and its relationship to MT use. Participants in the second group were 51 L1 speakers of English enrolled in college French or Spanish classes. Seventeen participants were included from intermediate-level classes (third and fourth semesters), and 34 participants were included from upper-level classes (fifth and sixth semesters). Ten additional students had originally participated, but 3 were excluded because they were international students, and 7 were excluded because they were not L2 learners but instead identified as native speakers of the target languages (Spanish and French). The 51 remaining participants had been studying Spanish or French for an average of 4 years.

The instrument that examined anxiety related to MT use consisted of three parts: The first section included a subset of 15 questions taken from the Foreign Language Classroom Anxiety Scale (Horwitz, et al., 1986) in which participants used a 5-point Likert rating scale that asked them to choose a number to represent how much anxiety they feel using their second language in different contexts, with options that ranged from 1 (strongly disagree) to 5 (strongly agree). The second section of the instrument included questions about the frequency of participants' MT use for whole sentences, phrases, or paragraphs. The four answer options given were "for less than 25% of assignments," "for 25-50% of assignments," "for more than 50% of assignments," and "for every assignment." Again, frequency of use was recoded such that those who reported more frequent use were treated as a single

category. This was possible because only one participant reported use “for every assignment.” Independent samples t-tests are statistical analyses that examine whether the means of two unrelated groups are significantly different from one another. When the anxiety levels of those who reported 25-50% MT use and more than 50% MT use were compared, the independent samples t-tests revealed no significant difference in the anxiety levels of those who reported 25-50% MT use ($M=3.11$, $SD=.60$) and more than 50% MT use ($M=3.24$, $SD=.79$), $t(32)=-.527$, $p=.602$, so these two categories were also combined into a single “more than 25% of assignments” category. This left primarily two categories of MT use: infrequent (“less than 25% of assignments”) and frequent (“more than 25% of assignments”).”

The third section of the instrument presented participants with an open-ended question, designed to be answered in sentence or paragraph format, asking students to explain whether or not they believed there was a relationship between their MT use and their feelings of foreign language anxiety. Participant responses on the Anxiety Scale were averaged and used to calculate a mean overall language anxiety score for each student. These, along with participants’ responses about the frequency of their MT use, were used to explore the potential relationship between feelings of anxiety and frequency of MT use. Students indicated their anxiety level using a Likert rating scale that ranged from 1 to 5, with higher numbers corresponding to greater anxiety levels. Participants’ answers to the explicit question about this relationship were analyzed both quantitatively (through vocabulary coding) and qualitatively. Additional information about this process is provided in the following section.

In the case of both sets of participants, a student investigator attended the beginning or end of a class period, and faculty were asked to leave the room before students started to complete the questionnaires. This was done to ensure students felt they could answer honestly (in some of the classes, MT was prohibited).

Qualitative Data Analysis

The qualitative analysis of the Anxiety Scale Study was based on the open-ended responses to the following question: “Do you believe that lack of confidence and/or anxiety around foreign language learning leads you to use MT more? Please, elaborate.” The researchers followed a systematic coding approach designed to identify patterns in students’ self-reported relationships between MT use and L2 anxiety. All open-ended responses were compiled into a single document. Responses ranged from single sentences to multiple paragraphs, with an average length of approximately 3-4 sentences per response. Initial reading revealed that most participants provided substantive responses that addressed the relationship between their MT use and foreign language anxiety. The qualitative analysis followed Braun and Clarke's (2022) approach to thematic analysis, involving familiarization with the data, generating initial codes, searching for themes, reviewing and defining themes. We read through all responses line-by-line to identify recurring themes and concepts. During this phase, any words, phrases, or concepts related to emotions, motivations, and MT usage behaviors were marked for potential inclusion. The coding approach was both deductive and inductive. Deductive codes were developed based on the study's theoretical framework, focusing on anxiety and MT use, including predetermined categories such as “anxiety/fear of judgement,” “lack of confidence/self-doubt,” and “use of MT for better grades/for learning.” Inductive codes emerged from the data itself, such as specific emotional vocabulary used by students, e.g., “terrifying,” “panic,” “embarrassment.” Similar codes were grouped together and consolidated into broader thematic categories.

The coding was conducted by both authors who reviewed each other's coded responses and thematic categorization to enhance analytical rigor. Regular collaborative discussions ensured consistency in interpretation and thematic development.

Results of Study 1

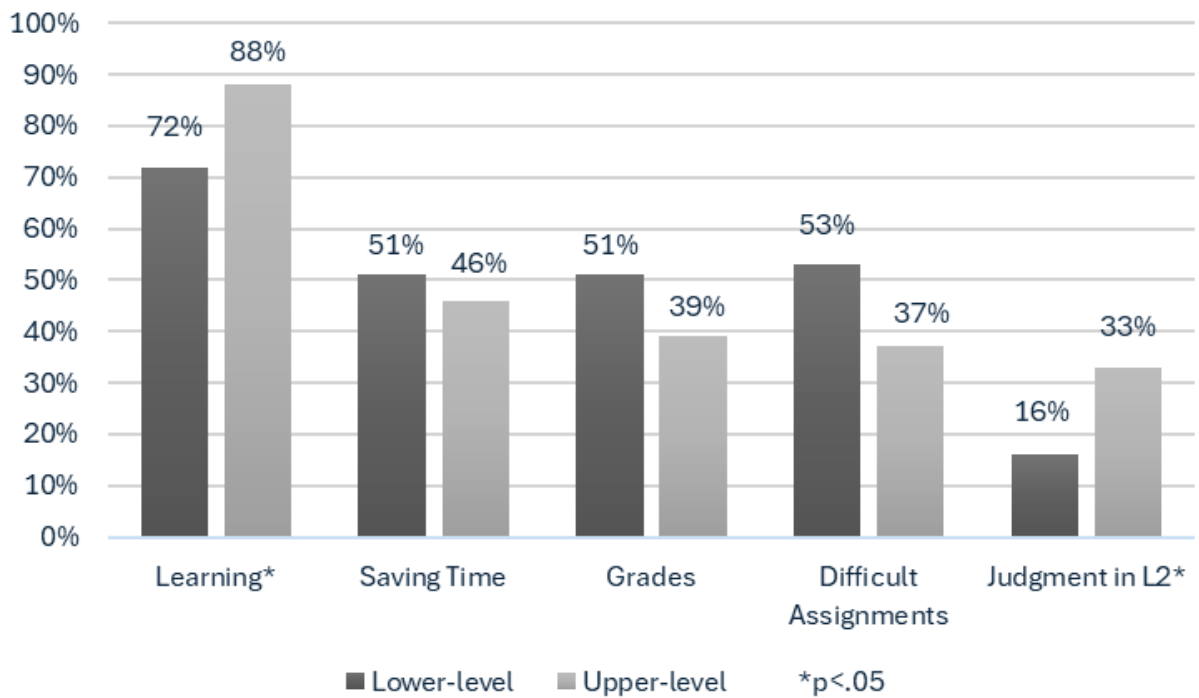
The results provided in Table 1 show the frequency of use by learners separated out by level, revealing that approximately half (n=58) of participants in the initial study reported frequent MT use, and upper-level students (54.3%) reported slightly more frequent use than lower-level learners (52.6%).

Table 1
Frequency of MT Use According to Enrollment Level

	Lower-level	Upper-level	Total
Infrequent MT use	30 (52.6%)	26 (45.6%)	56 (49.1%)
Frequent MT use	27 (47.3%)	31 (54.3%)	58 (50.8%)
Total	57	57	114

Figure 1 presents the reasons for MT use indicated by learners at each enrollment level. The numbers reveal that avoiding judgment was the least cited reason for MT use, whereas learning vocabulary and grammar was by far the most cited reason for both lower-level and upper-level learners. Respondents in the lower-level classes selected saving time, getting better grades, and completing difficult assignments more frequently than upper-level learners, who more frequently selected learning and avoiding judgment in the L2.

Figure 1
Percentage Of Participants At Each Enrollment Level Who Selected Each Reason For MT Use



An analysis of variance (ANOVA) is a statistical method used to determine whether two or more group means are significantly different, in this case comparing the frequency with which lower-level and upper-level students cited each reason. The results of the one-way ANOVAs revealed that the learner's enrollment level was a significant predictor for MT use related to learning $F(1, 112)=4.51$, $p<.05$ and related to avoiding judgment $F(1, 112)=4.85$, $p<.05$, indicating that upper-level learners reported these two reasons with significantly more frequency than lower-level learners did.

Results of Study 2

The mean anxiety levels according to the frequency with which participants reported using MT are provided in Table 2. An independent samples t-test compared the mean anxiety scores of learners reporting less MT use and more MT use statistically, revealing that those who reported less MT use had a significantly lower mean anxiety score ($M=2.77$, $SD=.56$) than those who reported more MT use ($M=3.15$, $SD=.67$), $t(48)=-2.01$, $p<.05$.

Table 2

Mean Anxiety Level Of Participants According To Reported MT Use

MT use reported	n	Mean anxiety level (SD)
Less than 25% of assignments	17	2.77 (.56)
More than 25% of assignments	33	3.15 (.67)

This finding suggests that those who use MT the least also reported the lowest foreign language anxiety levels, whereas those who use MT more frequently for completing their assignments reported higher anxiety levels when using their L2. The present study did not examine the directionality of this relationship, so it is not clear whether those who experience higher anxiety levels are more prone to frequent MT use, for instance as a mechanism for mitigating or lessening that anxiety (which would align with Selcuk et al., 2019), or if the use of MT adds to learners' anxiety, or both.

Quantitative data provide further insights into the relative prevalence of different factors influencing student dependence on MT. Just as the data presented above represented students' self report, so this section focuses on student perceptions and perspectives. Table 3 presents four broad categories mentioned by students. According to the qualitative data, anxiety and fear of judgment, occurring in 27 instances, was the most pervasive factor, followed by lack of confidence (19), using MT for better grades (13), and lastly, using MT for learning purposes (7).

Table 3
Results Of Quantitative Analysis Of Coded Vocabulary From Open-Ended Question

Factor	Specific Vocabulary Used by Students	Instances	Total Number of Instances
Anxiety/fear of judgment	anxiety nervous/nerves worry stress fear judgment terrifying panic embarrassment	8 5 2 3 3 2 1 1 2	27
Lack of confidence/self-doubt	lack of confidence not confident self-doubt unsure second guess inadequate	6 3 4 3 2 1	19
Use of MT for better grades/less effort	better grade succeed impress professors faster less effort	8 2 1 2 1	13
Use of MT for learning purposes	to learn the language to understand the language learning tool fantastic way of learning	3 2 1 1	7

These qualitative results, presented below, are organized around the four broad themes that were present in the quantitative analysis.

Anxiety and Fear of Judgment

A prominent theme that emerged from the analysis of the open-ended question posed to students was their anxiety around learning and being evaluated in the foreign language classroom, which they reported drives much of their MT usage. Students expressed fears of “sounding dumb,” making mistakes, and being judged by their peers and instructors. As one student admitted, “I am afraid that I won't create proficient sentences, or I do not know the proper vocabulary to say what I want in order to succeed, so sometimes I will translate small parts.” Another revealed, “It is always terrifying to speak up and make a mistake, and the ability to use machine translation helps me to ensure I am using correct grammar.” This anxiety manifested in the use of MT tools to check work beforehand and, in doing so, alleviate anxiety, as reflected in comments like “It just helps me to make sure I am speaking correctly. It is always terrifying to speak up and make a mistake and the ability to use machine

translation helps me to ensure I am using correct grammar;” “I often feel like the anxiety I get around learning my foreign language in class translates to when I'm doing assignments and makes me doubt my abilities;” and “when people get anxious especially about being judged for their level of understanding/speaking they would rather just translate/produce using AI to avoid embarrassment even if that wouldn't happen.”

Lack of Confidence and Self-Doubt

The qualitative data suggest that the fear of making errors in front of others and the feeling of being scrutinized contributed to students' lack of confidence in their L2 abilities. This included self-doubt and the use of MT to avoid saying something that might be incorrect. As one student explained, “I often use machine translation even when I know how to say something in another language because it's very reassuring to get the affirmation that what I will be saying is correct. Once I know this, I no longer feel the stress or worry that what I'm going to be saying could possibly be incorrect.” Other comments that highlight students' self-doubt include “I've used Google Translate because I don't feel confident in my own knowledge of the language,” and “When I use machine translation/AI tools, it's because I want to be right or make sure that I was right in my own translation.” Even at higher levels, students reported pressure to speak fluently and the need for MT to feel more confident in their abilities, with one noting, “I feel like because I am in a higher level of Spanish and it's my minor that I should be ahead and speak more fluently. Using extra tools helps compensate for any mistakes or imperfections.” Another upper-level learner wrote,

“I think that because I am not confident in my own ability to speak Spanish, I resort to using these tools, because they do help with things that I do not know, but they also help me feel more sure of the things that I already know.”

Use of MT to Learn

While some students said they use MT to learn, for instance, to understand difficult texts or to find single-word translations, most of these instances reflected a desire to save time and complete assignments more efficiently and quickly, as opposed to truly building their language skills. For instance, students commented that they use MT to find a word they can't remember, to understand questions that are being asked, to help them “grammatically,” and “to just confirm it means what I think it means.” Even when students claimed they used MT tools to aid their learning, their comments often revealed two clear issues: first, an underlying sense of insecurity, self-doubt, and lack of confidence in their second language abilities; and second, a potential misalignment between students' perception of language learning as immediate task completion versus the gradual skill development that language acquisition requires.

Use of MT to Get a Better Grade/Reduce Effort

Ultimately, many of the student comments mentioned the use of MT tools to get higher grades, turn in better work with less effort, and ensure successful academic performance (also referred to as academic standing). The pressure to succeed was palpable, with comments like “[learners would use MT] especially when it affects your grade” and “I think that people would rather just receive a good grade at the start, instead of having to redo it and resubmit it.” Comments recognized the trade-off of time saved over the actual acquisition of second language skills when students mentioned using AI to get assignments done “faster even though it won't help them learn the language;” and “using machine

translation is a form of wanting to complete the assignment and instead of taking the time to work and learn the material you use the MT to help you with the work.” Such statements suggest that at least some students realize and acknowledge that relying on MT does not help them acquire second language skills. Instead, it can inhibit their learning process. This realization is an important point to highlight, as it demonstrates some level of self-awareness among students about the potential drawbacks and limitations of MT usage. Even if students use MT tools frequently, statements along these lines indicate many understand it is counterproductive for actual language learning.

Ultimately, the positive correlation found between students’ reported anxiety levels and their frequency of MT use was corroborated and deepened by the open-ended reflection data. Specifically, four overarching themes related to anxiety emerged and appeared again and again in student responses: anxiety and fear of judgment, lack of confidence, and the primacy of good grades or reduced effort over L2 learning. The meaning of these and other results will be discussed in the following section.

Discussion

Our findings align with broader research on instructor-student disconnects regarding MT use. As Vinall and Hellmich (2021) note in their analysis of MT use by students and instructor identity, many educators find themselves “down the rabbit hole,” experiencing challenges to their professional identity and agency. Addressing MT use in language education requires not only pedagogical innovation but also a paradigm shift in language teaching as a result of the changing technological landscape.

Regarding our research question on the reasons given for MT use according to frequency and learner level, we found generally high rates of MT use regardless of learner level. Advanced students cited learning vocabulary and grammar and avoiding judgment more frequently than lower-level learners, whose use was motivated primarily by getting good grades, saving time, and being able to complete difficult assignments. These results are surprising as they differ from previous findings (Selcuk et al., 2019; Stapleton, 2005) and suggest that the pervasive use of MT in both novice and advanced learners is not limited to those with extrinsic motivations, low L2 ability, or low confidence in the L2. The fact that upper-level learners reported as much MT use as their lower-level peers is particularly alarming, as it challenges assumptions that MT dependence naturally diminishes as language proficiency increases. It could also be indicative of changing trends among learners, perhaps the result of remote high school language learning during the COVID-19 pandemic. Another possible explanation is that MT technology has been highly accurate for almost a decade now (Jolley & Maimone, 2022), meaning it has been available and effective for the entirety of most college-aged students’ language learning careers.

It is also possible that as students progress in their language studies, those in higher-level classes may be using MT for more complex tasks, perhaps to meet higher expectations or to handle more sophisticated language production for which they might not feel prepared. This highlights the need not only for ongoing guidance on effective MT use but also for a more scaffolded approach to language instruction. Frequent MT use likely hinders the development of important language skills, such as the ability to construct sentences independently or to express complex ideas in the target language. Instructors should be aware of this risk and consider implementing strategies to encourage more independent language production. Additionally, the widespread adoption of MT across levels suggests that simply prohibiting MT use is not an effective pedagogical strategy. Because students in the present study expressed positive attitudes towards MT, they may be open to guidance from instructors on effective usage and limitations.—The high percentage of students, especially at lower

levels, using MT to save time, get better grades, and complete difficult assignments points to potential issues with current assessment practices and workload as well. To combat this, instructors might consider reevaluating their assignments and grading criteria to ensure they are promoting genuine language learning rather than encouraging reliance on MT. Additional information about teaching strategies that would address this need is provided in the pedagogical implications section.

Regarding the second research question on the connection between anxiety and MT use, it was found that students with higher L2 anxiety levels also reported more frequent MT use, and their qualitative reflections that addressed the third research question connected this use to a lack of confidence and fear of judgment. These findings confirm what was observed by Bahri and Mahadi (2016), Selcuk et al. (2019), and Niño (2009), that student perceptions show that MT bolsters confidence and reduces anxiety about language learning. Academic pressures may also be creating an environment for students where MT use is all but required for them to feel comfortable. The fact that the present study found that advanced learners were even more likely to use MT due to feeling judged in the L2 than lower-level learners is concerning because it suggests that even as students progress in their language studies, anxiety and fear of mistakes persist, which makes them more likely to use technology that undermines their learning. This not only underscores the need for additional research on the topic but also the importance of creating a supportive classroom environment that encourages risk-taking and views errors as a natural part of the learning process.

Additionally, self-doubt, anxiety, and perceived pressure to perform at a high level may lead students to rely on MT as a crutch. Based on their comments, students seem aware and willing to sacrifice actual language learning in favor of guaranteed good grades, saving time, and the confidence boost that MT affords them. Despite these comments, we question whether MT use actually bolsters student confidence or whether it is a stopgap that helps students with specific tasks in the moment without improving their overall confidence or learning in the language. Because of its pervasive nature even at advanced levels, we suspect that MT use begets MT use, with students becoming more and more reliant on it to perform tasks in the language they are learning. This seems likely in light of previous findings that MT use is higher among students who receive lower grades (Selcuk et al., 2019) and that it improves learners' performance on writing tasks, but does not result in better writing ability if access to MT is removed (O'Neill, 2019a). As noted by Jolley and Maimone (2022), additional empirical research is needed to determine whether MT actually contributes to students' language learning beyond the apparent benefits seen in their MT-assisted language production and student perceptions of its benefits.

Pedagogical Implications

The findings of this study suggest that addressing anxiety-driven MT use requires a multifaceted pedagogical approach that moves beyond prohibition toward thoughtful integration and anxiety reduction. The strong relationship between L2 anxiety and MT use highlighted in this study aligns with Horwitz's (2001) call for creating less stressful environments where students can use the L2 more freely without constant fear of evaluation. Here we outline specific pedagogical interventions supported by empirical research that can help educators work productively with student MT use while addressing the underlying anxiety that drives their overreliance.

Growth-Oriented Assessment Practices

The students' focus on grades and error-free output observed in this study suggests that traditional assessment practices may inadvertently increase anxiety and MT dependence. Alternative assessment

approaches that emphasize progress over performance have shown promise in reducing language anxiety. Ducar and Schocket (2018) recommend implementing formative assessments that focus on communication over accuracy, while Blum and Kohn (2020) argue for mastery-based grading that reduces performance anxiety. Assessment tools that trace learning journeys rather than just evaluating the final products can help shift student focus from the anxiety of perfection to long-term development.

Error Reframing and Risk-Taking Encouragement

Given students' expressed fears of "sounding dumb" and making mistakes, educators might develop more explicit strategies for reframing errors as learning opportunities. Horwitz (2001) suggests that acknowledging the difficulty of language learning and normalizing mistakes can reduce anxiety. Practical approaches include error analysis activities where students examine common mistakes (in MT output), collaborative error correction that removes individual spotlight, and reflection activities that help students recognize progress despite imperfections.

MT Integration

Rather than prohibition, research supports pedagogical models that integrate MT strategically while building learner awareness of its limitations and growing their ability to recognize contexts when its use is appropriate. Jolley and Maimone (2022) propose the "Integrate-Educate Model" that accepts the inevitability of MT use among digital natives and seeks to integrate MT as a learning tool. This approach includes teaching students to evaluate MT output quality and identify common error patterns (Ducar & Schocket, 2018), designing tasks that use MT output as starting points for linguistic analysis and improvement (Jiménez-Crespo, 2017), as well as providing clear guidelines about when and how MT can be used effectively for different types of assignments (O'Neill, 2019b).

Several researchers have also demonstrated the effectiveness of post-editing approaches where students work with MT output to improve accuracy. Garcia and Pena (2011) found that students developed metalinguistic awareness through correcting MT errors, while Lee (2020) showed that revision-focused MT activities improved both writing quality and grammatical understanding. These approaches can transform MT from a crutch into a learning tool by requiring students to engage critically with language structure.

Scaffolded Support Strategies

The persistence of anxiety and MT use even among advanced learners suggests that scaffolding must be ongoing rather than front-loaded. Given the self-doubt expressed by students at all levels, educators need systematic approaches to building L2 confidence. Vinnall and Hellmich (2022) recommend starting with low-stakes, collaborative activities where MT use is transparent and discussed, gradually moving toward independent production. This might include peer translation activities where students compare their translations with MT output, group discussions about when MT is most or least helpful, or reflection journals documenting changing relationships with MT over time, among others.

Finally, the present study has also found that individual classroom interventions may be insufficient without broader institutional support for anxiety-reducing grading practices. Despite being enrolled in classes that adopted some form of alternative grading, with a focus on progression and incremental improvement rather than performance, many students in the present study did not seem to consider language learning as a gradual process that involved incremental skill development and

learning from one's mistakes. Therefore, it may be that students in the present generation need more than piecemeal efforts in individual classes to diminish their language and performance anxiety significantly. It is also possible that students' focus on attainment and grades results from institutional policies and practices that still require traditional grades to be submitted at the end of each term. This could mean that significant institutional commitment and an overhaul of current language instruction models are required to divert student focus away from grades and back to learning. Hence, successful anxiety reduction may require programmatic commitment to consistent messaging about the learning process, coordinated assessment practices across courses, and sustained support for growth-oriented mindsets.

Limitations and Future Directions

Several limitations should be acknowledged when interpreting the findings of this study. First, the sample was drawn from a single medium-sized liberal arts institution in the Southern United States, which may limit the generalizability of findings to other institutional contexts, geographic regions, or educational systems with different academic cultures and MT policies. The sample size of the second study ($n=51$) may not have been large enough to capture a full picture of the relationship between frequency of MT use and L2 anxiety, or to document all themes and factors motivating learners to rely on MT. The participants were predominantly L1 English speakers studying mostly European languages (Spanish, French, German) and Chinese, and results may not apply to learners from different linguistic backgrounds or those studying other target languages. Furthermore, the study employed self-report measures for both MT use frequency and anxiety levels, which may be subject to social desirability bias or inaccurate self-assessment. Students may have underreported MT use due to institutional prohibitions or overreported anxiety levels due to the study's focus on this relationship. Additionally, while the study found that higher anxiety correlates with more frequent MT use, it is unclear whether anxiety drives MT use, MT use increases anxiety, or both processes occur simultaneously. Finally, the qualitative analysis relied on student perceptions and self-reported motivations, which may not fully capture unconscious or complex decision-making processes around MT use. Students' ability to accurately reflect on and articulate their emotional states and learning behaviors may vary, potentially affecting the comprehensiveness of the qualitative findings.

Future research should address these limitations while expanding our understanding of the complex relationships between technology use, emotion, and language learning. Several promising directions emerge from this study's findings. For instance, longitudinal studies could be done to track students' MT use patterns, anxiety levels, and language development over time and potentially establish causal relationships between these factors, examining how these relationships evolve as learners progress. Replicating this study across diverse institutional contexts, geographic regions, and cultural settings would also enhance its generalizability and reveal how different educational cultures and MT policies influence the relationship between anxiety and MT use. Studies including learners from diverse L1 backgrounds and studying different target languages would broaden our understanding of these phenomena.

Given the pedagogical implications identified in this study, future research should empirically test specific interventions designed to reduce language anxiety and promote strategic MT use. Such studies could examine the effectiveness of alternative assessment practices, scaffolded MT integration models, and anxiety-reduction techniques in real classroom settings.

These future directions could contribute to a more comprehensive understanding of how emotion, technology, and language teaching and learning intersect in contemporary educational

contexts, ultimately supporting more effective, inclusive and humane approaches to second language education.

Conclusion

The findings of this study have significant implications for pedagogical practice in language education, particularly regarding the need to address anxiety-driven MT use through systematic interventions. It suggests that breaking the cycle of anxiety-driven MT use requires a multifaceted approach: implementing growth-minded grading practices, developing scaffolded language instruction, and fostering supportive learning environments. While such systematic changes demand significant institutional commitment, they offer promising solutions for improving both the experience and outcomes of second language learning in higher education.

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