



Surveying the Landscape: What is the Role of Machine Translation in Language Learning?

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Resumen

En este trabajo se presentan los resultados de las encuestas realizadas a los estudiantes en la Universidad de Duke (EE.UU.) en relación al uso de la traducción automática (TA) en los cursos de lenguas extranjeras, así como las percepciones del uso de la TA entre los instructores. En primer lugar, se ofrece una visión general del estado de la TA en los medios de comunicación nacionales y en el mundo académico, ofreciendo los investigadores una explicación del interés en la temática. En segundo lugar, se muestran los resultados de las encuestas realizadas entre 2011 y 2012 a los estudiantes e instructores, investigando los patrones de uso en el aprendizaje de idiomas y las percepciones sobre la utilidad de la TA. Nuestros resultados ponen en evidencia una gran discrepancia en cuanto a cómo profesores y estudiantes perciben la utilidad de la TA.

Palabras clave: traducción automática, tecnología, enseñanza y aprendizaje de lenguas extranjeras, integridad académica, Google Translate

Resum

En aquest treball si presenten els resultats de les enquestes realitzades als estudiants a la Universitat de Duke (EUA) pel que fa a l'ús de la traducció automàtica (TA) en els cursos de llengües estrangeres, així com les percepcions de la TA entre els instructors. En primer lloc, es presenta una visió general de l'estat de la TA en els mitjans de comunicació nacionals i també al món acadèmic. A més, els investigadors ofereixen una explicació del seu interès en la temàtica. En segon lloc, es presenten els resultats de les enquestes realitzades entre els anys 2011 i 2012 als estudiants i instructors, investigant els patrons d'ús a l'aprenentatge d'idiomes i les percepcions sobre la utilitat de la TA. Les nostres troballes evidencien una gran discrepància entre professors i estudiants pel que fa a la utilitat de la TA en l'aprenentatge de segones llengües.

Paraules clau: traducció automàtica, tecnologia, ensenyament i aprenentatge de llengües estrangeres, integritat acadèmica, Google Translate

Abstract

In this paper we present the results of surveys amongst undergraduate students at Duke University (USA) regarding their use of Machine Translation (MT) in L2 courses as well as the perceptions of MT amongst L2 instructors. First, we give an overview of the state of MT in national media as well as in academia and explain the impetus behind our own interest in MT. Second, we introduce the results of surveys administered in 2011-2012 to students and instructors, tracking patterns of usage in learning languages and regarding perceptions on the usefulness of MT. Our findings show that there is a great discrepancy between students and faculty regarding the usefulness of MT.

Key words: machine translation, technology, foreign language teaching and learning, academic dishonesty, Google Translate



1. Introduction

Machine Translation (MT) and specifically free online programs such as Google Translate are transforming the way students engage with a second language. Progress made in MT has caught the attention of administrators in the U.S. higher education arena. Notably, in January 2012, Lawrence Summers, former president of Harvard University, commented that “English’s emergence as the global language, along with the rapid progress in machine translation make it less clear that the substantial investment necessary to speak a foreign tongue is universally worthwhile”. A few years ago this discussion on the prevalence of Machine Translation would have been viewed, in the eyes of several commentators, as almost unthinkable. A *New York Times* article from 2001 quotes Stanford professor Martin Kay who notes that “progress in MT in the last 40 years has not been very great, and the next 40 years don’t look much better” (Youngblood 2001). And others go on to remark that MT has *hit a brick wall* and will never be used by the general public.

But this was before the debut of Google Translate. Today, 12 years after those pessimistic predictions, the translation market has exploded with smart phone apps such as Google Goggles, which can take a picture of a text and translate it on the spot, as well as start-up companies like DuoLingo, which employs crowd-sourced translation, where the public is invited to translate content and vote on translations. The increasing collaboration between Massive Online Open Courses (MOOC) and universities from around the world, resulting in thousands of students enrolled in the same course, has further pushed the boundary of translation technology. One such MOOC, Coursera, which has partnered with Duke University and other institutions, uses crowd-sourced grading and peer feedback that can be complicated by those who use unedited MT text to produce garbled feedback (Watters). Google Translate is featured in a video in which two women ordered Indian food in Hindi, using the website’s pronunciation feature (*Google Demo Slam*) and is widely used to read and produce language with Facebook friends. Google Translate even boasts its own Facebook page with over 230,000 *Likes* (*Google Translate*). In sum, translation has become an integral part of the communicative landscape in the personal and academic lives of many people.

Some observers have grown weary of the number of articles that tout the latest application that claims to revolutionize the language-learning market. Article after article regularly appear in the press, as one astute *New York Times* reader observed a few years ago, which claim that machine translation is just about to take over; that remarkable advances have been made; that MT will change the way everyday conversations are held; and although a few problems still remain, these are sure to be surmounted by megacomputers very soon (Gross 2001).

It is probably wise to take a middle road, acknowledging MT’s increasing prevalence and performance while casting a wary eye on outlandish predictions. But these days even the wary eye has to acknowledge that the translation landscape (machine or not) is being transformed. On October 25, 2012, Microsoft’s Chief Research Officer Rick Rashid showed off to 2,000 Chinese students a breakthrough in the company’s translation technology. Microsoft Researchers built a speech recognition system using speech from a native Chinese speaker along with an analysis of Rashid’s own voice based on previous talks he had given. When Rashid

spoke English to the audience the system combined all the underlying technologies to deliver his voice speaking in Chinese (*Speech Recognition*).

Our interest in MT at Duke University began through conversations with colleagues across campus on the impact of technology on learning patterns as well as an increased attention to MT in the media, as indicated previously. Looking at the changes in cultural patterns identified by Carole Barone in “The Changing Landscape and the New Academy”, we wondered how our pedagogies were keeping up with the shifts between the traditional and modern patterns of thinking. Are we using the best practices in pedagogy for students trained in new cultural patterns of multidimensionality, continuous change, flexible structures, collaboration and dynamic reconfiguration? Our discussions with colleagues revealed shared observations of and puzzlement over our students’ writing habits, notably their use of multitasking and multiple sources in drafting essays. We had observed that students write with multiple tabs open in their browser; they consult on-line dictionaries; and use almost exclusively on-line sources. But perhaps more important, we also suspected that students were using MT despite the Spanish Language Program’s written policy that states, “In my written assignments I will not use any computer software that compromises my learning process. This includes translation programs”.

Having decided to conduct a survey of MT use amongst our undergraduate students, we first sought to understand if and how students were using MT with the intention of developing best practices, which is still ongoing. Our position from the beginning of our inquiry into this subject has been to think how we can partner with students in the exploration of MT instead of prohibiting its use, which ultimately will entail a change in our program policy stated above.

This paper will put forth and analyze data collected in 2011-2012 regarding the use of MT by Duke University undergraduates studying French, Italian, Spanish and Portuguese (see Appendix 2). Also to be considered will be the perception of MT by second language (L2) professors at Duke and other 4-year institutions (See Appendix 3). The following studies in second language acquisition (SLA) have laid the groundwork for the consideration of the discussion of MT in the language class. As a whole, these studies engage in an age-old debate: how to incorporate technological innovations without compromising academic performance. Though some encourage more in-class writing in the wake of such translation technologies (Luton 2003), calls for greater recognition of the role that technology can play in second language writing pedagogy are articulated by Stapleton and Radia (2010). Lewis (1997) and García (2010) articulate how MT can be incorporated to enhance students’ critical thinking in a foreign language, an idea that is supported by the results of our student surveys. The post-editing process, how students can engage with and improve a translation produced via MT, has been explored by La Torre (1999), Belam (2002), Kliffer (2005), and Niño (2008). Still other studies investigate the intersection of plagiarism and MT, as articulated by Somers (2006) and Correa (2011). It is precisely this concern about plagiarism that comes through in the faculty survey that we administered. Ana Niño’s (2009) survey of students’ and professors’ perceptions of MT has served as the basis for our own investigation at Duke, which addresses her observation that a survey of a broad spectrum of language students (not just advanced

learners) would provide a more accurate picture of the state of MT use in the language classroom.

Finally we would be remiss to omit Garrett's (1991) study that urges technology researchers to ask the following question and to relay the answer to readers when investigating any use of technology amongst students: "What kind of software, integrated how into what kind of syllabus, at what level of language learning, for what kind of language learners, is likely to be effective for what specific learning purpose?" (75). The data we've gathered will serve as a first step in this process of establishing best practices.

The description that follows presents the background to our interest in MT, discusses how three surveys on MT were designed and distributed, presents and analyzes the data collected and finally puts forward conclusions and looks to future research directions. Among the more surprising results of our surveys are that students rely on MT tools as dictionaries and to double-check their work, while at the same time are critical of these online tools. And there is a large discrepancy between students and faculty regarding the usefulness of MT in language learning. Given students' rather sophisticated interaction with MT tools, we ultimately question if these tools should continue to be taboo in language programs. This very issue of the prohibition of MT tools is something that we will look to in future research as we seek to understand students' perceptions of the value of MT and its ethical use in academia.

2. Survey of Spanish Language Students

The first phase of our study was implemented within the Spanish Language Program and included 356 Spanish language students enrolled in first through fifth semester Spanish courses. We obtained approval for our protocol from the Duke IRB and received permission from the Spanish Language Program Director to distribute the survey during class time. We distributed a paper version of the anonymous survey in class to ensure a high rate of return. We focused the questions in this 2011 survey on how students research and compose a second language writing assignment (see Appendix 1).

We asked a general question if the student had used MT in some way, and it was interesting to discover that 76% of the students responded Yes. Students then were asked to identify how they had used MT by selecting all that applied from a list of four options, and they reported a wide range of uses as indicated in Figure 1.

When asked the rate of usage of MT for Spanish class, the largest group (59%) reported using MT several times a month as compared to 30% who used it several times a week and 3% who used it daily. Of the MT users, 89% reported

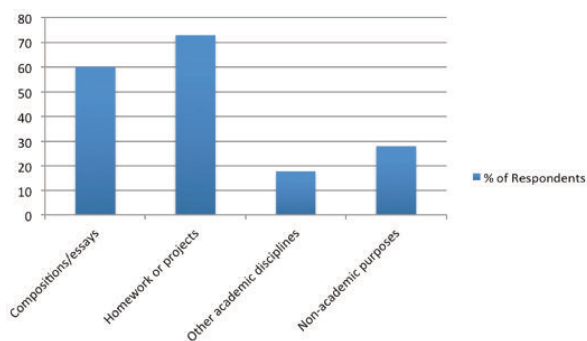


Figure 1: For what purposes have you used MT?

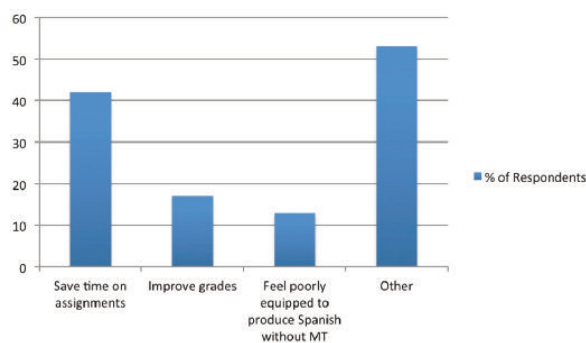


Figure 2: Why do you use MT?

that they found MT helpful in the language learning process. Figure 2, below, indicates how students identified why they use MT among four options.

One of the most surprising results of this survey was that *other* included translation of instructions and the process of double checking their own translation (proofing the human translation). Another unexpected result was the students' perception of the accuracy of MT; 78% indicated that MT was *somewhat accurate*.

After completion of phase 1 of this study, we concluded that more research was needed since it became apparent that students are using MT for academic assignments in a variety of ways. Our assumption was flawed that they were using MT for essays or formal writing projects. We entered phase 2 ruminating on some of the following questions: How do language learners use and perceive the helpfulness of the use of MT? How should we constructively engage in conversation with our students on the use of MT, especially when they already have a healthy skepticism for the accuracy of the tool?

3. Survey of Romance Language Students

In phase 2 we expanded our team of researchers to include two colleagues from the French Language Program and one colleague from the Duke Thompson Writing Program. We designed a new survey to distribute to all Duke U. language students enrolled in first to fifth semester courses in Spanish, French, Italian and Portuguese. We requested permission from each Language Program Director to use class time to distribute our survey and they agreed. Because of the increased target population we decided to use an electronic survey designed in Qualtrics. Per our approved IRB protocol, the individual instructor was contacted by email requesting the participation of his/her language course sections. It was the responsibility of the instructor to arrange access to computers for his/her students for an in-class distribution and implementation of the 2012 survey. The instructors either requested that students bring their laptops to class or the instructor reserved a language laboratory and held class in that venue in order to have access to computers. On the assigned dates, the instructors distributed an email from the research team that provided details of the study, clearly indicated the voluntary nature of participating, and requested the informed consent. If the students chose to participate they responded to the anonymous survey during that class time.

The following is an overview of the results of our online survey that included 905 respondents. With a 77% rate of response the data demonstrate clear trends in the types of usage of MT among undergraduates (see Figure 3). Only

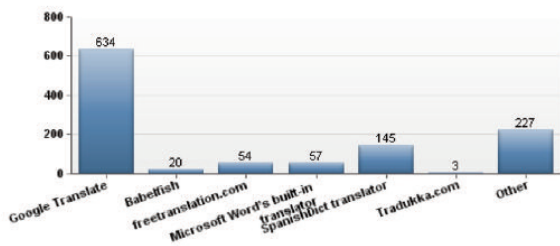


Figure 3: Which MT program(s) have you used to support your language learning in [language]?

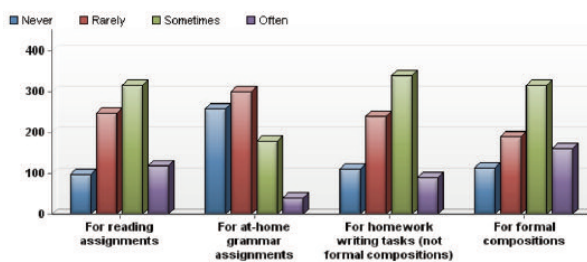


Figure 4: How often have you used MT?

12% of the respondents indicated that they never used MT to support their language learning for the current class. Of the self-identified users, their frequency of MT use for language learning in the current language class was: sometimes 39%, often 32%, and rarely 17%. The majority of MT users, 81% of respondents, use Google Translate as the tool to support their language learning as indicated in Figure 3.

The popularity of Google for language learning is outlined in Chinnery (2008). The value of the Google brand to the undergraduate student, in particular, cannot be overstated. ECAR's 2012 survey of undergraduate students and information technology notes that 33% of students cited Google as being "the one website that they couldn't live without"—this, in comparison to 5% who cited the university library website (Dahlstrom 2012, 38). The ECAR survey also revealed that students' "interest in having more technology skills or training by far exceeds their interest in having new, more or 'better' technology" (19). This confluence—the high interest in Google products coupled with a demand to be trained in existing technologies—makes all the more clear the need to address openly with students and in an engaged manner the benefits and drawbacks of MT.

4. Types of MT Usage

In order to understand the patterns of MT usage we surveyed the students on the type of translations they transacted. As anticipated, students use MT by translating from English into the target language (96%). There are high rates of usage of MT for several of the designated categories of grammatical and stylistic functions: vocabulary (91%), idiomatic expressions (36%), transition words or connectors (31%), verb tenses (29%), and word order (20%). Students reported that they used MT to work with individual words or short chunks of text: translate individual words (89%), short phrases of 5 words or less (62%), full sentences (16%), short paragraphs (7%). Furthermore, students indicated the trend of sometimes or rarely using MT for the following tasks: reading assignments, at-home grammar assignments, homework and writing tasks, formal compositions (see Figure 4).

In an attempt to better understand the multi-directional use of MT (English to target language and vice-versa), the study included two questions targeted to specifically identify students' habits. Students chose from a list of options (choosing all that applied) and had the possibility of writing-in additional uses. The three most common practices for translating from *English* into the *target language* are to check vocabulary and grammar (54%), writing (43%), and pre-writing (42%). The results for the other categories on the pre-selected list include: preparing for oral assessment (35%), revising (27%), other (15%). Eleven percent of MT users indicate that they do not use MT for English to target language translation in any of these ways. The 4% of responses that explained *other* uses include MT assistance with individual words and vocabulary; and this usage is corroborated in an additional question from the survey reported above and also in the results from the 2011 survey of Spanish language students.

Although 96% of students indicated in a previous question that they used MT to translate from *English* into the *target language* it is apparent from the following question that over half, if not more of the students, also use MT to translate from the *target language* into *English*. When students translate from the *target language* into *English* they use MT for: reading a text (60%), understanding instructions (55%), double-checking what they wrote (51%), understanding audio or video (14%). Six percent of respondents do not use MT for translation from the *target language* into *English*. Of the 4% of respondents that explained a different use not provided on the options list, most indicated use associated with looking-up individual words. It is noteworthy that students tend to use the translation tool as a dictionary. Also, the interest in using MT in order to understand instructions and to double-check work echo the results from the 2011 survey.

5. Students' Perceptions of MT

Overall there is a healthy awareness of the limitations of MT from our students. Sixty-three percent of the students think that MT is sometimes helpful in learning language in contrast to 31% that perceive it as always helpful and 6% as rarely helpful.

When asked to identify specific ways the students find MT helpful (could select multiple answers), 85% of the respondents reported that MT helps increase vocabulary (see Figure 5). All the other categories registered much lower rates of helpfulness.

In an additional open-ended question that prompted students to list other ways they found MT helpful, most students indicated *double-checking* work. Other ways students

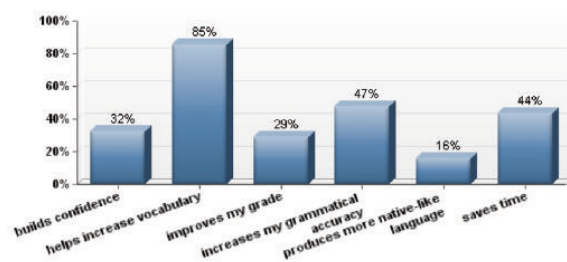


Figure 5: In what way or ways do you find it helpful? (check all that apply)

Categories of Error Detection	Examples of Student Responses
Students' personal knowledge of language	<ul style="list-style-type: none"> · "I know what the sentence or words should be and they don't quite match up". · "Based on my studying of the language, I am able to detect errors in verb conjugations and other grammatical areas".
The product is in contradiction with the textbook	<ul style="list-style-type: none"> · "It was not necessarily an error, it just doesn't match completely with what we have learned in class or what the book says". · "Because my knowledge of French grammar agreements and the definitions in the textbook said they were wrong".
What the MT produced is in a contradiction to what was learned in class or from the instructor	<ul style="list-style-type: none"> · "it translated something differently than what I was taught in class". · "Because we had learned about the error". · "Word placement [was] different from previously taught order in class". · "[It was] Different from what we learned in class. Checked another MT site and was different".

Table 1: Identifies three categories for how students explained how they knew that there was an error in MT.

Type of Evolution	Examples of Student Responses
Decreased Use (32%)	<ul style="list-style-type: none"> · "In high school, many of my assignments were corroborated using MT but upon arriving at Duke there have been a host of other materials available to help my language study so I have not had to rely on MT". · "I know more now and don't need it as much". · "I tend to trust them [MT] less".
Increased Use (19%)	<ul style="list-style-type: none"> · "Language is more difficult to understand now and so I use it more for directions and reading". · "As my classes have gotten harder I've used it more often". · "As I have to write longer essays, I have become more dependent on MT".

Table 2: Please describe how your use of MT has changed over time during your language study.

find MT helpful include: using MT as a dictionary (specifically MT is easier than a dictionary), and for increasing comprehension.

Students were asked to identify when it is most useful or appropriate to use MT and the clear favorite is MT use as a dictionary (see Figure 6). The students indicated all options that represent their perception of MT usefulness. The other responses include: pre-writing, while writing, editing, revising, double-checking what they wrote in the foreign language, reading directions, reading comprehension of a text revising, and preparing oral assessments.

These results show the same preferences for use of MT as a dictionary identified previously.

In 2011, 78% of students indicated that MT was *some-what accurate* and the 2012 survey provided further proof of students' awareness of limitations in regard to the accuracy of MT as indicated by the 91% of users who reported that they had detected an error when using MT. Table 1 identifies three categories for how students explained how they knew that there was an error in MT.

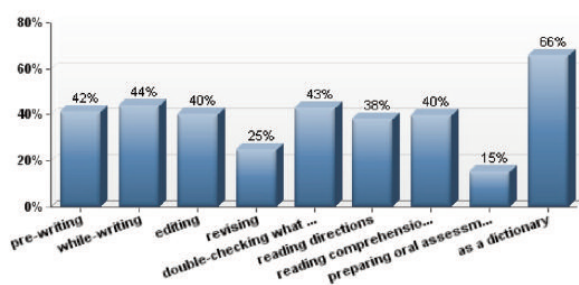


Figure 6: Based on your experience with MT, when is it most useful or appropriate to use this tool? (check all that apply)

6. Evolution in Students' MT Usage

The final piece of the 2012 study is related to how students track their use of MT throughout their years of language learning. Approximately half of our language students believe that their use of MT has stayed the same during their language study. To a lesser degree students report decreased use and even fewer students report increased use of MT throughout their semesters of language study. Table 2 provides some examples of student explanations for the change in usage.

Rank	Tenured/Tenure track	35%
	Regular-rank instructor/ Lecturer	49%
	Visiting faculty/Adjunct	9%
	Other	7%
Teaching experience	1-3 years	5%
	4-10 years	9%
	11 or more years	86%
Levels primarily taught (multiple answer allowed)	Elementary	52%
	Intermediate	76%
	Advanced	69%
Language taught	Spanish	70%
	French	19%
	Italian	9%
	Portuguese	2%

Table 3: Instructors' Profile

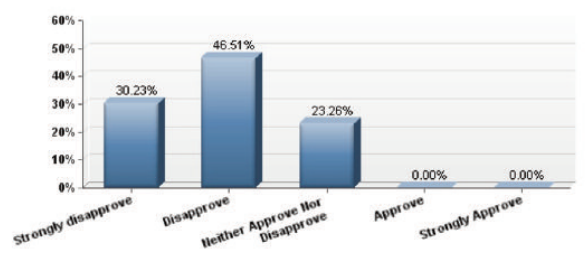


Figure 7: To what degree do you approve the use of MT by your students?

The anticipated outcome that the use of MT would increase as students progressed into more advanced levels of language study is present in our findings but it is not the students' dominant evolutionary path. It is interesting to see that a third of students report a declining use of MT as the students' language skills broaden. This is an area that we would like to further study since how or when students tend to maintain, increase or decrease their use of MT perhaps influenced by language knowledge or error detection in MT will inform future best practices. It will be imperative to discover if there are patterns of evolution in use of MT as students' progress in their language study.

Frequency	Count	Percentage
Frequently	2	5%
Infrequently	17	40%
Never	24	56%

Figure 8: As an individual how frequently do you use MT for academic purposes?

Frequency	Count	Percentage
Frequently	3	7%
Never	17	40%
Infrequently	23	53%

Figure 9: As an individual how frequently do you use MT for non-academic purposes?

7. Instructors' Perceptions of MT

As a third phase, in the fall of 2012 we turned our attention to how our colleagues perceived the growing use of MT among their students. We wanted to have a better understanding of faculty attitudes and perceptions towards the new tools, and to contribute to the current research on faculty perspectives regarding the use of MT as a pedagogical tool (Correa 2011; Niño 2009). In order to gather data, an e-mail requesting participation on an anonymous online survey was distributed to several US institutions of higher education. Forty-three faculty members responded. Thirty of them taught Spanish, 8 French, 4 Italian, and 1 Por-

Limitations and restricted benefits of MT use
<ul style="list-style-type: none"> · "I explain how the MT can be an asset in certain ways, but show them the pitfalls as well, usually by typing something in Spanish and showing them how wrong it can come out in English. At upper levels though we work with it as a tool sometimes, so that they learn its strengths and weaknesses. My colleagues, though, pretty much view the whole thing as the devil and write it off". · "I just mention that writing a text in English and running it through a translator is not acceptable. It is OK to use it to check phrases though, which can be hard to find in a dictionary". · "I want them to be aware of how counter-productive it can be: if they use MT just for a few words, expressions, they might learn something...but can also be misleading because French is a contextual language..." · "...I tell them to proceed with caution and to limit use of MT to sporadic consultation. It is not necessarily their friend". · "That if they become dependent on them, it will not help them LEARN the language...I highlight the importance of the cultural contexts for accurate translation, and how those are not considered by free translation software available online..." · "That it is against the Honor Code for our courses..."
Use of MT equates plagiarism and goes against the Honor Code
<ul style="list-style-type: none"> · "It is not allowed when completing a graded writing assignment". · "As related to ANY activities of the class, it is risking a violation of the Honor Code". · "Not to use it because it's cheating". · "I inform them that it is plagiarism and violates the school's honor code". · "...I now tell them that I can always see if the translation was made by a machine, and that I consider it a break of the honor code. However, I am not as sure as I pretend to be in front of my students. Sometimes it is very difficult to tell the difference, unless we compare the work with an in-class work, so being able to establish the student's skills".
MT use not being a substitute for learning a foreign language
<ul style="list-style-type: none"> · "I would tell them that part of the purpose of learning Spanish is to integrate the language into their own knowledge base... that machine translation, while perhaps useful in limited circumstances, is no substitute for knowing something. Would they use "machines" as a substitute for other discourses or social/business situations?" · "...I tell them that they don't learn while using it". · "That the point of homework is to have them practice expressing meaning in the target language, this is a process, like building up their muscles and if they use a translator they have lost this opportunity to practice..." · "...I tell them that the process of learning a language in a course setting is based on practice (coming to class, doing homework, engaging in real self-effort) I compare using a MT to asking a friend to do their work for them".
MT tools and a dictionary are not the same
<ul style="list-style-type: none"> · "...I explain that is better for them to use a dictionary, this way they will learn the different meanings a word can have". · "...try to steer them to something more useful like Wordreference". · "...We talk about its limitations as a dictionary (usually comparing an example of using Google translate vs. something like Wordreference as a dictionary)".

Table 4: If you talk to your students about the use of MT, what do you tell them?

Not allowed for graded assignments
<ul style="list-style-type: none"> · "...no help of any kind allowed, including online translators, for any written work submitted for a grade". · "YOU MAY NOT USE A TRANSLATION PROGRAM when you write graded work for this class. It is not only a violation of the Honor Code, but also it interferes with your development as a writer. These programs are highly inaccurate as well".
Violation of Honor Code / Academic Dishonesty
<ul style="list-style-type: none"> · "You may not use any computer translator and/or online translator program, it is considered cheating. If your instructor concludes that you have used such program you will automatically receive a 0%, the first time. The second time you will be reported directly to the college". · "...any work that is not your own is a violation of the academic honesty". · (in red font) "The use of computerized or web-based translators/dictionaries is not only painfully obvious and detrimental to your grade, but is an infraction of the honor code as well. If in doubt, ask your instructor".

Table 5: Sample policies on academic dishonesty in the language classroom.

Yes	<ul style="list-style-type: none"> · "Helpful in writing courses or when reading". · "It is quicker than a dictionary and doesn't interrupt the flow of the students' speech".
No	<ul style="list-style-type: none"> · "If it works, the job is done for the student. If it is not correct, the student is exposed to incorrect input presented as correct". · "Learners rarely possess the knowledge necessary to judge the output of an MT and so cannot reject it when it is wrong or learn from it when it is right".
Depends	<ul style="list-style-type: none"> · "Could be, if students are well directed to how and when to use it". · "For difficult or problematic phrases". · "It can assist students with their learning...It exposes the students to structures in the two languages. Through it they can get some focus on form...raises awareness of language use". · "Well used, it could help to learn vocabulary, syntax..."

Table 6: Do you find MT a useful tool for language learning? Please explain.

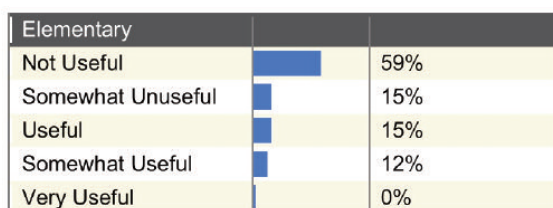


Figure 10: How useful is MT for the language learning process at the elementary level?

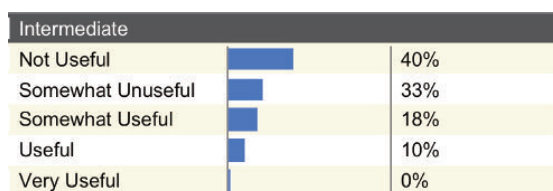


Figure 11: How useful is MT for the language learning process at the intermediate level?

tuguese. The rest of the demographic information collected is illustrated in Table 3.

The relationship between MT and academic dishonesty has always been the primary concern among second or foreign language faculty, who must constantly question what constitutes cheating or try to find answers to why students cheat or how to avoid dishonesty among language learners. The use of MT as an indicator of academic misconduct and the general role of MT tools in the foreign language is widely debated and is regarded as controversial among faculty and administrators alike. Therefore, to determine faculty views on the subject, one of the first survey questions the participants were asked was whether students' use of MT is equated with cheating. Forty-two percent answered *yes*, 37% chose the *other* category, and 21% selected *no* as their answer. The most frequent reason for choosing *other* was that it depended on the type of assignment in addition to the frequency or context of use. Some also mentioned that they considered it cheating when, after having used MT tools, students presented assignments as their own work.

Figure 7 illustrates the degree of faculty approval of the use of MT by their students. Fully 77% of faculty selected the *disapprove* or *strongly disapprove* option and 23% *neither approve nor disapprove*. It is worth noting that no faculty member selected *approve* or *strongly approve*.

With regard to their own personal use of MT, either academic or non-academic, the results were quite conclusive as shown in figures 8 and 9. Only 5% of the faculty reported a frequent use of such tools for academic purposes and 7% indicated frequent use for non-academic purposes.

Some of the open-ended questions elicited more extended responses. For the question regarding how frequently faculty talk to their students about the use of MT for academic purposes, 72% chose *at least once a semester*, 19% *depends*, and 9% reported *never*. Some of the explanations for never talking about it included that the professor hadn't thought about or thought it was not a relevant topic in their course. As explanations for *depends*, faculty reported that a discussion of MT depends on the course or the assignment. The survey included a follow-up question to find out what students were told when instructors talked to them about the use of MT. Faculty reported focusing on the topics on Table 4.

These responses show a clear split not only with respect to the way faculty members perceive how students should be informed, but also concerning the role of MT in language teaching and learning. On one hand we find those who see MT as a tool that has value, but also limitations of which students need to be aware. On the other hand there are those who see MT as counter-productive to the learning process or perceive its use as plagiarism, or a violation of their institution's honor code or language program policies. It is important to point out, however, that some faculty members in this latter group drew a clear distinction between allowing looking up a word or idiomatic expression versus translating complete sentences or paragraphs, and also made an emphasis on not allowing MT tools on written graded assignments.

To follow up on the topic of academic dishonesty, the survey included this question: Does your Language Program or your syllabus address the use of MT? Sixty-three percent answered *yes* and 37% answered *no*. Those who answered *yes* were asked to attach their program's policy. Either a clear emphasis on the violation of the honor code or academic dishonesty, a specific prohibition of such tools for graded assignments, or mention of both stood out as the

State of the profession	<ul style="list-style-type: none"> · “As I prepare to retire after 31 years of teaching, I am sad to say that students are more anxious than ever to take the easy way out for any assignment, even if that includes having a machine do all the work. I place machine translation in academics right up there with buying essays from the internet and having a tutor or someone else write an assignment for someone. It offends my sense of academic integrity”. · “Honestly, I think that in 20 years only people who like languages will take them. In 25 years universities will cease to have language requirements and in 50 years only the best universities will teach languages at all. I am glad to live now because I don't think my skills are going to be valued for too much longer”. · “I believe MT might threaten more the lesser taught languages. MT will not replace the need for Spanish or French in the US, but it might replace the very occasional need of needing to know Russian, for example”.
Favorable view of MT	<ul style="list-style-type: none"> · “it has great potential... we as educators need to realize the difference between tools that are threatening and tools that are - potentially - useful...we need to change our viewpoint and figure out how to use them to our advantage”. · “I think we need to learn how to accommodate its existence and work with students on the best way to use MT”. · “I don't think they threatened the profession, but I think they do need to be taken into account because they exist and you cannot tell a person not to go and take the cookie in the jar if the cookie is there. You need to teach them about it. When to use it or not”. · “Tools like Google Translate are, at least for major languages, becoming better and better, and we can't pretend they don't exist”. · “Another learning tool”.
Unfavorable view on MT	<ul style="list-style-type: none"> · “It depends on the development of MT. As it is now it is not yet a good tool”. · “I think it will get hard and harder to ensure that writing is, in fact, a student's own work. That troubles me. That they won't develop as writers (think: calculators and basic math...)”.
Limitations to MT	<ul style="list-style-type: none"> · “...MT is no comparison to how the human brain processes language”. · “... MT simply cannot replace all that goes with being bilingual and bicultural”.

Table 7: What role do you think MT will play in the future of the second language teaching profession?

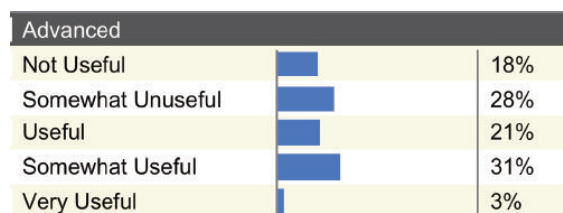


Figure 12: How useful is MT for the language learning process at the advanced level?

major points addressed in all policies provided. Table 5 models some responses.

To the question regarding if MT is useful for language learning, 7% answered *yes*, 33% *no* and 60% chose *depends*. In all instances the survey asked to provide an explanation. Table 6 reflects the main answers collected.

Concerning the perception of the usefulness of MT for the language-learning process at different levels, the percentages reported for elementary and intermediate levels indicate that faculty view machine translation tools as *not useful* or *somewhat unuseful* for learning a language at these two levels. See Figures 10 and 11.

Results for the advanced level (see Figure 12) show that instructors regard MT at this level as more *useful* or *somewhat useful* (54%) versus 46% that perceive it as *not useful* or *somewhat unuseful*. According to the results from the survey and research literature, there seems to be a general consensus that MT could be used effectively in advanced courses, when students are proficient enough to see the pitfalls and learn from them.

The last two questions of the survey asked faculty if MT was a possible threat to the teaching profession and what

role MT will play in the future in the discipline. To the first question regarding the degree to which MT threatens the second language teaching profession, 62% responded *not at all*, 29% *somewhat* and 10% *very much*.

The most salient and recurring replies collected for the last question regarding the role of MT in the future of the second language teaching profession are found in Table 7 below.

These answers show us, once again, two fundamentally different approaches to MT and language learning. On one hand, we find faculty who see MT as a burden or as a tool unsuitable for language learning, and who fear that MT will contribute to the elimination of language programs. On the other hand, we find faculty who envision the greater integration of MT in the foreign language learning process and who demand the acknowledgment of the existence of such tools by the teaching profession.

8. Conclusions

The growing interest in the role that MT plays in the foreign language classroom is a natural reaction to a changing society that is becoming increasingly globalized, and where languages play a very important part. As a direct consequence of this growing multiculturalism, the use of translation in the classroom is undergoing a revival, and specifically translation tools on the web have become a very recurrent topic among academic discussions. With them, several questions regarding their use have arisen. Questions such as: Which stance (if any) are language programs adopting or looking to adopt in the face of this new reality? Are current MT tools useful for the foreign language learning process? Does its use constitute academic dishonesty? Do MT tools entail a threat to the second/foreign language profession?

We presented in this article both how our students and colleagues are engaging with MT, uncovering some of the surprising and nuanced ways that both faculty and students are thinking about this emerging and improving technology. Limitations in this research include the ambiguity in some of the survey questions that allowed students to include online dictionaries as part of their responses and also the possibility of student participants hiding their full participation with MT due to Duke policies regarding MT usage in language coursework. However, with the data we have collected and presented here, we feel we can begin to address the reality of MT use amongst our students. According to the data students use MT regularly to look up one word, translate instructions, and to double-check their work. Students perceive MT to be helpful in their language learning, especially acquisition of vocabulary, but are conscious that MT produces errors. To this last point, it is encouraging that students are critically assessing the output of the MT tool. This is a skill that should be fostered as a part of our instruction in best practices. We want our students to question linguistic constructions and to monitor cultural competency and if the MT tool provides yet another venue through which we may develop these critical skills, is it not advantageous to integrate this tool into our discussions rather than to prohibit it as taboo?

Faculty are skeptical of a positive impact on language learning but do not see it as a threat to the profession. There is a trend with professors indicating MT is more useful in advanced level courses but overall there are many opinions on how it should (not) be integrated and what constitutes academic dishonesty.

Looking ahead, we seek to question the current policy in the four language programs within the Department of Romance Studies at Duke University that prohibits the use of MT in language course assignments. The language programs distribute this policy through text included in syllabi and the departmental reaffirmation of the Community Standard (Duke's version of an honor code). Some instructors explicitly discuss this rule and others do not. A few advanced level instructors incorporate a brief overview of MT in discussions on developing writing skills but there is no standardized treatment beyond the equating of the use of MT to improper conduct and therefore its use being in violation of the Community Standard. Is this what is best for the students? When the calculator was introduced it was viewed as a tool that would destroy the development of students' math skills. The prevalence of the calculator could not be denied, and therefore educators had to create best practices that integrated this new tool into the learning process—this is what needs to be done within second language acquisition in regards to MT. We put forth this study in hopes of contributing to the international dialogue regarding best practices in integrating MT into the language acquisition process.

What can we take away from the explosion of MT use amongst our students? Regardless of the usefulness of any one translation program, these applications and programs are here. They are pervasive. They are being actively promoted. They are being actively updated and tweaked. They are garnering widespread attention and, most importantly, they are being used by our students. ECAR observes that the use of smart phones for academic purposes almost doubled from 2011 to 2012, and this increased ownership of smart phones (and tablets) goes hand-in-hand with rising use in translation apps. Like the ECAR researchers, we are keenly

interested in students' relationship with digital technology. But we are also very interested in and should be concerned about the perception of administrators, especially in light of recent conversations on the radical transformation that higher education will go through in the wake of new technologies (Foderaro 2012). A plenary session at the 2012 American Council on the Teaching of Foreign Languages highlighted the anxiety that educators feel about the rise of machine translation, as the question and answer session was peppered with comments and concerns regarding MT and its effect on the profession (Feal 2012). Questions regarding the continuing need for language educators in light of MT make it all the more essential that as language teachers we position ourselves to become leaders in these discussions and work with our colleagues as we articulate a strong voice to advocate for languages and language learning.

Future research will lead us to conduct a more targeted investigation, one that seeks to understand students' perceptions of the value of MT and its ethical use in an academic environment. We are also seeking to continue to understand if and how language instructors talk about MT with their students and how they themselves interact with this technology. In terms of our own language programs at Duke, we'll be looking to see how we can better address its use—that is, how can we empower students to use MT at different stages in their language development. And finally, we are very interested in engaging in dialogue with language colleagues as to how to move forward in confronting the reality of MT use by undergraduate students. Ultimately, our policies on MT use within language programs need to be proactive and pedagogically forward thinking to develop the best language learning experience possible.

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Appendix 1: Survey of Spanish Language Program students at Duke University

1. What Spanish course are you enrolled in?

- Spanish 1
 Spanish 2
 Spanish 14
 Spanish 63
 Spanish 76
 Spanish 101
 Spanish 102

2. Complete each category below with the answer that best describes how you write the first draft of a Spanish composition/essay:

Composing process

- I compose only using pen and paper
 I only compose using a computer
 I compose both with pen and paper and on the computer

Dictionary

- I use only a print dictionary (in the textbook or another source)
 I use only an online dictionary
 I use both print and electronic tools
 I do not use a dictionary

Grammar/Spell Check

- I use a word processor such as MS Word grammar/spell check to identify errors
 I do not use a word processor to identify errors

Research

- I research only in the library in print materials
 I research only on the internet
 I research both in print materials and online
 I do not need to research

Use of sources

- I clearly distinguish between what I write and what I copy from other texts with proper citations
 Sometimes I include text copied from another source without identifying the source
 I do not use additional sources

Types of online sources

- I only use online sources that are recommended by my instructor (Wikipedia is not recommended)
 I use Wikipedia as my main source of information
 I use a mix of online sources (Wikipedia and others)

3. Machine Translation (MT) is any software program – such as Google Translate – that translates a string of words in context from one language to another. Have you ever used MT?

- Yes
 No

4. If you answered No, then you are done with the survey. Thank you for participating!

For what purposes have you used MT? (Check all that apply)

- For preparing compositions/essays for Spanish class
 For preparing homework or projects for Spanish class
 For academic projects in other disciplines
 For non-academic purposes. (Please specify):

If you do not use MT for Spanish class, then you are done with the survey. Thank you for participating!

5. Which MT programs have you used for your Spanish language assignments? (Check all that apply)

- www.google.translate.com
 www.spanishdict.com
 www.studyspanish.com
 Other (please specify):

6. How often have you used MT in your Spanish language class this semester?

- Every day
 Several times a week
 Several times a month

7. Which language do you translate into Spanish?

- English
 Other language (please specify): _____

8. Do you find MT helpful in learning Spanish?

- Yes
 No

9. How accurate is the MT program that you use for translating into Spanish?

- Accurate
 Somewhat accurate
 Not accurate
 Unsure

10. Why do you use MT? (Check all that apply)

- To improve grades
 To save time on assignments
 I feel poorly equipped to produce Spanish without MT
 Other (please specify): _____

11. Has MT increased your confidence in your Spanish?

- Yes
 No

Explain:

12. Do you feel that your grades in Spanish this semester have been affected by your use of MT?

- Yes – positively affected
 Yes – negatively affected
 No

Appendix 2

Survey of Undergraduate Students in Romance Studies Department's Language Programs at Duke University

Q1 Which course are you currently enrolled in? Select your language of study, and then choose the course you are currently enrolled in.

Q2 Throughout this survey, the term "Machine Translation" is used. Machine Translation (MT) refers to any software program – such as Google Translate – that translates a word or words from one language to another.

Q3 Have you used MT to support your language learning for this class (in class, outside of class)?

- Often (1)
 Sometimes (2)
 Rarely (3)
 Never (4)

If Never Is Selected, Then Skip To End of Survey

Q4 Which MT program(s) have you used to support your language learning in _____?

- Google Translate (1)
 Babelfish (2)
 freetranslation.com (3)
 Microsoft Word's built-in translator (4)
 SpanishDict translator (5)
 Tradukka.com (6)
 Other (7) _____

Q5 I use MT to translate _____. (check all that apply)

- individual words (1)
 short phrases of 5 words or less (2)
 full sentences (3)
 short paragraphs (4)
 other (please explain) (5)

Q6 When have you used MT to translate from English into _____? (check all that apply)

- pre-writing (outline, brainstorm) (1)
 writing (first draft, final draft) (2)
 editing (checking vocabulary and grammar) (3)
 revising (based on faculty or peer feedback) (4)
 preparing for oral assessment (presentation, exam, interview) (5)
 other use (explain) (6) _____
 I do not use MT in this way (7)

Q7 When have you used MT to translate from _____ into English? (check all that apply)

- understanding instructions (in a textbook, in a writing prompt, etc) (1)
 reading a text (2)
 double-checking what you wrote (3)
 understanding an audio or video recording (4)
 other use (explain) (5) _____
 I do not use MT in this way (6)

Q8 For which grammatical or stylistic functions have you used MT? (check all that apply)

- vocabulary (1)
 idiomatic expressions ("it's raining cats and dogs") (2)
 verb tenses (3)
 word order (noun-adjective placement) (4)
 transition words or connectors (5)
 other (6) _____

Q9 How often have you used MT?

- Never (1) Rarely (2) Sometimes (3) Often (4)*
 For reading assignments (1)
 For at-home grammar assignments (2)
 For homework writing tasks (not formal compositions) (3)
 For formal compositions (4)

Q10 From which language do you translate into _____?

- English (1)
 Other (2) _____

Q11 Do you find MT helpful in learning _____?

- Always helpful (1)
 Sometimes helpful (2)
 Rarely helpful (3)
 Never helpful (4)

Answer If Do you find MT helpful in learning Spanish/French/Italian... Never helpful Is Not Selected

Q12 In what way or ways do you find it helpful? (check all that apply)

- builds confidence (1)
 helps increase vocabulary (2)
 improves my grade (3)
 increases my grammatical accuracy (4)
 produces more native-like language (5)
 saves time (6)

Answer If Do you find MT helpful in learning the language that you ... Never helpful Is Not Selected

Q13 Other ways you have found MT helpful not listed above:

Q14 Have you ever detected an error in a MT?

- Yes (1)
 No (2)

Answer If Have you ever detected an error in a MT? Yes Is Selected

Q15 Please explain how you knew that there was an error in machine translation.

Q16 Based on your experience with MT, when is it most useful or appropriate to use this tool? (check all that apply)

- pre-writing (1)
 while-writing (2)
 editing (3)

- revising (4)
- double-checking what you wrote in the Foreign Language (5)
- reading directions (6)
- reading comprehension of a text (7)
- preparing oral assessments (8)
- as a dictionary (9)

Q17 Has your use of MT changed over time during your language study? (this might include courses at Duke or elsewhere)

- increased (1)
- decreased (2)
- stayed the same (3)

Answer If Has your use of MT changed over time during your language... stayed the same Is Not Selected

Q18 Please describe how your use of MT has changed over time during your language study.

Appendix 3: Survey of professors' views on MT

For the purposes of this survey, Machine Translation (MT) is defined as any program (such as Google Translate) that translates a string of words (phrases, sentences or paragraphs) from one language to another. We do not consider Word Reference and other on-line dictionaries to be examples of MT.

Q1 Which language do you primarily teach?

- French
- Italian
- Portuguese
- Spanish

Q2 What is your rank at the college or university where you teach?

- Tenured or Tenure-Track Faculty
- Regular Rank Instructor or Lecturer
- Adjunct or Visiting Faculty
- Graduate Student
- Other (please indicate)

Q3 How long have you been teaching a second language?

- 1-3 years
- 4-10 years
- 11+ years

Q4 What levels do you primarily teach? Choose all that apply.

- Elementary
- Intermediate
- Advanced

Q5 Do you equate a student's use of Machine Translation with cheating?

- Yes
- No
- Other (please explain)

Q6 To what degree do you approve the use of MT by your students?

- Strongly disapprove

- Disapprove
- Neither Approve Nor Disapprove
- Approve
- Strongly Approve

Q7 As an individual, how frequently do you use MT for academic purposes?

- Frequently
- Infrequently
- Never

Q8 As an individual, how frequently do you use MT for non-academic purposes?

- Frequently
- Infrequently
- Never

Q9 As a language professor how frequently do you talk with your students about the use of MT for academic purposes?

- Never (please explain why)
- At least once a semester
- Depends (please explain)

Q10 If you talk to your students about the use of MT, what do you tell them?

- Q11 Does your Language Program or your syllabus address the use of MT?
- Yes (if so, please explain or cut and paste your policy here)
 - No

Q12 Do you find MT a useful tool for language learning?

- Yes (please explain)
- No (please explain)
- Depends (please explain)

Q13 How useful is MT for the language learning process in the elementary level?

- Not Useful
- Somewhat Unuseful

- Useful
- Somewhat Useful
- Very Useful

Q14 How useful is MT for the language learning process in the intermediate level?

- Not Useful
- Somewhat Unuseful
- Useful
- Somewhat Useful
- Very Useful

Q15 How useful is MT for the language learning process in the advanced level?

- Not Useful
- Somewhat Unuseful
- Useful
- Somewhat Useful
- Very Useful

Q16 To what degree does MT threaten the second language teaching profession?

- Not at all
- Somewhat
- Very much

Q17 What role do you think MT will play in the future of the second language teaching profession?