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A "Hands-On" Approach to Raise Awareness of Technologies: A Pilot Class and its Lessons

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Despite attempts to discourage the use of machine translation (MT), we have observed that students continue to rely on it. Are teachers powerless? We believe not! Consistent with a range of solutions proposed in previous publications, we hypothesized that a "hands-on" approach would be effective in helping students raise awareness of the benefits and limitations of machine translation. This approach strives to reframe machine translation from an object of interdiction to an object of critical reflection. Hence, we created, implemented, and evaluated a 50-minute online lesson during Fall 2020. Our aim was to guide students toward a critical awareness of various machine translation tools [Google Translate (GT), WordReference.com (WR), French dictionaries] by choosing carefully crafted machine translation examples and asking students to correct them in class ("post-editing"). We also tried to track any potential change in the students' representations via a confidential pre- and a post-survey, and an audio-record of the interactions in class. One of our main results is that a majority of the students had already built complex representations and clever usages of machine translation before the class, much more than what we had expected. This allows us to reflect on what kind of impacts can or cannot be expected from such a class and to discuss the benefits and limits of such an approach to better integrate translation tools into second language teaching.

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INTRODUCTION

The increased availability and use of machine translation (MT) technologies raises questions about the traditional ways we teach and evaluate the acquisition of foreign languages, especially when it comes to writing practices. Despite attempts to discourage the use of MT, we have observed that students of French at our university continue to rely on it when writing compositions, and even (in an online learning environment) when taking quizzes and exams. Instead of trying simply to discourage the use of translation technologies, we set out to understand whether working explicitly on college students' representations of the benefits and limitations of MT would help them, ultimately, reduce their use of automated translation tools, like Google Translate (GT), in favor of other tools which many consider more conducive to learning, such as online dictionaries. Rather than framing MT as an object of interdiction, what if it were an object of critical reflection? Can understanding the strengths and limitations of MT make students better L2 learners?

In what follows, we will first survey the promises of an iterative "hands-on" approach to addressing issues relative to the use of MT in language learning. How can we help students build more complex and nuanced representations of MT, and in turn, how can those representations help them adopt more responsible uses of MT, inside and outside the classroom? Next, we will describe the pilot class we taught to 18 students in a

second-semester French course at college level. Finally, we will use the surveys we conducted before and after the lesson, in addition to an analysis of class video recordings, to try to reframe the lesson plan accordingly. As we'll see, one of our main discoveries is that a majority of the students had already built complex representations and clever usages of machine translation (MT) *before* the lesson, much more than what we had expected. This allows us to reflect on the impacts that can or cannot be expected from such a class and to discuss the benefits and limits of such an approach to better integrate translation tools into language teaching.

PROMISES OF A PRACTICAL APPROACH TO INFLUENCE REPRESENTATIONS AND USES OF TRANSLATION TECHNOLOGIES

The Irresistible Appeal of Machine Translation Technologies for Students

The recent emergence of efficient, fast and easily accessible MT tools poses a challenge for language teachers: If students rely heavily on MT, do they still learn? As shown in previous studies, there is a great discrepancy between the unfavorable opinion that teachers have about the usefulness of MT (which is often forbidden in language curriculum under university policies), as compared to the more favorable opinion of students, who make great use of them despite their instructors' discouragement (Clifford et al., 2013; Hellmich & Vinal, 2021; Jolley & Maimone, 2015; Niño, 2009; O'Neill, 2019). There is especially a sense, among teachers, that the appeal of automated translation tools like GT is almost irresistible for students; with it, they gain time, avoid efforts, and improve their grades. As observed by Ducar and Schocket (2018), "For the generation of digital natives who grew up with a reflex to 'google' any question, turning to technology for answers is second nature" (p. 780).

Teachers fear not only for academic integrity, but also for learning. When relying on MT technologies, the hypothesis is that there are many learning-prone activities that students *do not* perform: students avoid the effort of creating original sentences in the target language; they avoid using vocabulary and grammar structures they are learning; and without looking up words in bilingual dictionaries, they do not reason about their various meanings according to contexts. A reduced amount of time spent manipulating the target language may hinder their learning process and have a negative impact on their future capacity to autonomously create original and relevant sentences in the foreign language. Kazemzadeh (2014) compared using GT for translation with using GPS for navigation: "[W]hile it certainly helps you reach your destination, it does not train you how to get from point A to point B autonomously" (p. 42). Moreover, if "linguistic boundaries [are] made permeable by online automated translation," it can cause "learners' decreased access to and awareness of context, connotation, contingency in language use" (Kern & Malinowksi, 2016, p. 205). Yet, the exact effects of MT on foreign language learning are still to be precisely documented.

A Common Solution: The Prohibition of MT

To address these issues and to keep students efficiently engaged in their learning trajectories, a common solution is to discourage or even to forbid the use of MT technologies for students. Students of French at our university must read and sign an honor code before they complete online language quizzes in the lower division (first two years of L2 classes), and at the beginning of each new semester, when they learn that the

use of GT is not authorized when writing their essays (*compositions écrites*). And yet, the interdiction seems to be only mildly dissuasive. Teachers of French have informally observed that the skill of writing essays (at home) has dramatically improved over the years (due to the probable use of MT), whereas the skill of writing in class has not improved as much. Students still struggle with word order, prepositions, orthography and the use of simple grammar structures when these tasks are not solved by automated translation tools. This is a widely documented phenomenon, as shown by multiple studies (Correa, 2011; Ducar & Schocket, 2018): using yet-to-be-learned verb tenses or vocabulary, avoiding typical mistakes, producing complex sentences, etc.

A new pedagogical question therefore emerges, more crucial than ever: "Is it possible to deter students from overusing this technology?" (Ducar & Schocket, 2018, p. 779), that is to rely exclusively or primarily on it to perform written and comprehension tasks in the target language. An appeal to students' moral sense might not be enough to go against the tide, as observed by Kern and Malinowski (2016):

> Social media, collaborative writing, multimedia appropriation and mashups, identity play and anonymity are among the many phenomena of contemporary online life and learning that have led to doubts about the stability of boundaries that had previously seemed solid notions of 'the author' and related notions of 'authenticity' and 'plagiarism', for instance. From a teacher's perspective, the blurred boundaries that accompany the use of new technologies confront us with new questions concerning how we define and assess learning, where we situate accountability, and how we instill in our students a sense of moral responsibility in the use of those technologies. (p. 205)

The pedagogical question can then be reframed as follows: How do we encourage and teach responsible ways to use machine translation technologies? Instead of deterring use, how do we teach responsible use?

Influencing Representations of MT to Influence Usage

Many have suggested that teachers would do better to incorporate such technologies into their classrooms than to fight them (Correa, 2014; Ducar & Schocket, 2018; Enkin & Mejías-Bikandi, 2016; Jimenez-Crespo, 2017; Niño, 2008). We have also chosen this approach, striving to reframe machine translation from an object of interdiction to an object of critical reflection. Psychological studies on the use of technologies (Rabardel, 1995) have shown that people develop specific "schemes of usage" when using tools in concrete situations, including representations of the benefits and limitations of each tool depending on the situation. These representations are only partially conscious, even as they orient people's future activity. Therefore, if we want to influence students' use of technology, it is fruitful first to try to bring awareness of these schemes, and second to influence the representations they have of these technologies.

Our goals were therefore to help students build more complex mental and shared representations of MT in order to help them adopt more responsible and learning-prone uses of MT, inside and outside of class. We wanted students to walk away with a broader understanding of *what happens* (and in turn, *how they learn*) as they use dictionaries vs. machine translation. As a first intent based on our conception of students' points of view, we wanted them to move away from a "Google Translate has all the answers" or "GT helps me learn French" kind of representation to build more nuanced, learning-prone representations such as "online dictionaries offer more complex and accurate translations

of idioms and concepts, whereas GT is faster yet unilateral", or "GT does not help me learn French as much as dictionaries." In order to help them shift their practices, we wanted to motivate students to think globally about the recourse to MT: "What does it help me achieve?" "What can't it help me achieve?" "In what circumstances is MT more of a hindrance than a resource?"

A PILOT-CLASS WITH FIRST-YEAR STUDENTS OF FRENCH

Developing an Iterative and "Hands-on" Approach

In this regard, it seemed useful to follow an iterative class design process working through repetitive and repeated small steps, such as we did, consistent with the Successive Approximations Model (SAM) (see Allen & Sites, 2012). In this regard, evaluating the pilot-class leads to changes, in a repeated loop.

We first selected a "hands-on" approach to address the question of MT. This approach is derived from the principles of active learning (Meyers & Jones, 1993) and a Piagetian perspective on learning (Duckworth, 1964), in which emphasis is placed on students' activity as a way to help them build and revise representations in order to influence their future activity. Building upon a range of solutions proposed in previous publications (Correa, 2014; Ducar & Schocket, 2018; Enkin & Mejías-Bikandi, 2016; Niño, 2008), our 50-minute lesson asked first-year language students (in a second-semester French course) to manipulate, using specific translation tools [Google Translate (GT), WordReference.com (WR), French dictionaries], a strategically selected set of words and sentences from English to French, and/or from French to English.

In contrast with other MT classes described in the literature (Correa, 2014; Enkin & Mejías-Bikandi, 2016; Niño, 2008), we did not intend to teach or practice any specific grammar structures in this class; our main focus was to address the question of MT tools' relative benefits and limits. We also tried to track potential change in students' representations and reported/intended uses via a confidential pre- and a post-survey, as well as video recordings of the interactions in class.

To craft our lesson, we relied on a few assumptions based on the literature. First, most of our activities with technologies are not fully conscious (Piaget, 1974; Rabardel, 1995), so it can be helpful for students to first become aware of their uses of MT—and those of their peers—in a non-judgmental manner, such as through group discussions about their experiences with MT. Starting with one's experience is also a good way to engage in class activities.

Second, organizing "post-editing" (Correa, 2014) translation activities in class, in which students are asked to correct GT mistakes with online dictionaries and their own knowledge, can provoke a change in representations, which can be described as an increase in metalinguistic awareness:

> Pedagogical activities, such as translating a popular song from English into the target language and then comparing students' version with GT's, can emphasize the fact that translations are rarely verbatim reproductions of the original text and that the act of translating does not simply involve substituting words in one language for those in another (Ducar & Schocket, 2018, p. 789).

We hoped to show students that even GT algorithms cannot replace the complex understanding capacity that humans use and build when they interact, which allows them

to take contexts, dialects, cultural norms and many other pragmatic aspects of communication into account. This is a way to help students gain awareness of the ambiguities of translation, which is far more complex than a one-to-one correspondence (Bland et al., 1990), such as the one promoted by GT. According to Kern (2012), it is important to devote time and attention to the development of language awareness, and "with regards to communication, it involves thinking of ways of preparing learners […] to deal with more than the sanitized communication scenarios presented in their textbooks and ways of encouraging their tolerance for real-world cross-cultural conflict, contradictions and paradoxes" (2012, p. 9). Examining faulty MT output should therefore help students develop explicit knowledge of how a language works (Bialystok, 1981), which has been proven to enhance learning (Correa, 2011).

Pilot Class Lesson Plan

Our 50-minute online pilot class was conducted via Zoom for second-semester students of French at the college level (first year of L2 learning) in order to target the objectives stated above which are repeated here. The first objective is to help students build more complex representations of MT which leads to the second objective of helping them adopt more responsible and learning-prone uses of MT, inside and outside of class. A synthesized version of the lesson plan can be found in Appendix 1.

Introduction

We began with an introductory 7-minute small group discussion of students' uses of and exposure to MT, in French, before discussing it in the whole group. This was supposed to bring students' own practice into consciousness and to create a collective sense of engagement with the topic of MT. The questions asked included:

- What technologies and websites do you use to help you write and translate in French?
- Do you use Google Translate, online dictionaries? What are their advantages and limits?

We then briefly introduced the objectives of the class, reframed for the student audience, which were to experiment and discuss different ways to use MT technologies in order to enhance learning. We also quickly presented the tools which were to be discussed via screensharing (GT, WR, and a French online dictionary), without any specific training, and gave a few humorous examples of erroneous MT (with pictures found online). For example, in one of the pictures, a French food store sign read "stranger wines" instead of "foreign wines."

Post-Editing

In small groups the students then engaged in two "post-editing" exercises (Correa, 2014), that is, revising GT output with the use of other tools like WR, from French to English and from English to French. We asked them to compare the translations produced by the different tools, and to correct them if necessary.

During the first exercise, we focused on four simple, yet polysemic, French words (*coup*, *bas*, *passer,* and *temps*), which all have various possible translations and asked students to use GT to translate them back and forth between the two languages.

Table 1
Students' instructions for the first translation exercise

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1) **Google Translate vs. online dictionaries (10')**

1.1. Using Google Translate, translate the following words (French to English), and then take the English translation provided and translate it back into French. Record what happens.

> « *coup* »
> « *bas* »
> « *temps* »
> « *passer* »

Discussion: what happened? Why?

1.2. Now, using WordReference.com, look at the possible translations for the same words:

https://www.wordreference.com/fren/

« *coup* »
« *bas* »
« *temps* »
« *passer* »

Discussion: what is the difference with Google Translate? Which tool is the best for translation?

When using GT, *coup* gave 'stroke', which then gave *accident vasculaire cérébral* ('medical stroke') when translated back into French. *Coup* is a 'stroke' of a paintbrush, or a 'knock' at the door, not a medical stroke. We then asked students to look for the same words in online dictionaries such as WR and Le Robert (a French-only dictionary), and to observe their own experience.

During the second exercise, we asked students to translate three full sentences with GT, then to correct them with the use of online dictionaries:

1. "The party was a flurry of activity!"
2. "*Mon petit garçon est sage, il ne fait pas beaucoup de bêtises !*"
3. "*Que veux-tu, je l'aime !*"

We carefully crafted examples in which GT fails (wrong pronoun, wrong idiomatic expression, or wrong meaning) in order to highlight the added value of online dictionaries. One of the idiomatic expressions, *que veux-tu*, which could be translated by other idioms in English such as 'what can I say' is not easily translated by online dictionaries.

Finally, we corrected their translations and discussed the lessons drawn from the exercises together as a class, synthesizing the observations made by students, and thinking together about the implications for L2 learning. We will give examples of these activities in section 4.4

Adaptation

We believe that such a lesson plan could be adapted to any level of L2 learning, and to any language. In order to build relevant activities, teachers may have to choose specific examples so GT will generate erroneous word and phrase sets. The false words and phrases activity is meant to try to undermine students' confidence in GT. It is well known that GT struggles with metaphorical meanings, levels of formality, the use of tenses (e.g., present progressive, more widely used in English than in Romance languages) and pragmatic subtleties that are contextual/cultural, etc. "[S]ince GT's rules are based on frequencies and associations, words that have more than one meaning […] and lower-frequency idioms still present problems […] because the translation technology typically produces the highest-frequency occurrence, as opposed to the more accurate option," as observed by Ducar and Schocket (2018, p. 783).

Pilot Implementation and Iterative Design

In line with our iterative design process, we first implemented the pilot-class with students of second semester of French who came from various backgrounds, studied in different disciplines and were in different years at university, from first year of college to doctoral students). We chose the slightly advanced beginner level because we wanted students to be fluent enough to understand our examples of GT errors as well as the added value of online dictionaries.

We evaluated the pilot-classes with a sample a of 15 students who gave their written consent to participate in our study (13 women and two men). Fourteen responded to the online confidential pre-survey, and five responded to the online confidential post-survey, administered via Google Forms right before and after the class. We also recorded the classes in order to transcribe and analyze participating students' comments during the class itself. The surveys aimed at collecting information on the potential impacts and relevance of the class, in order to adapt its design in the future.

Data Analysis

We analyzed our data by doing thematic coding, given the categories that were relevant to this study: students' self-reported uses of MT before the class; students' effective uses of technologies inside the class; students' intended uses of technologies after the class; students' representations of MT's benefits and limits before and after the class, as expressed through the questionnaires and in-class discussions. We were particularly attentive in tracking any significative change in these representations in or after the class. Our quantitative analysis of the questionnaires remains limited to ratios, due to the very low number of respondents, 14 for the pre-survey, five for the post-survey.

PILOT-CLASS'S IMPACT ON STUDENTS' REPRESENTATIONS AND USES OF TECHNOLOGIES

Our evaluation of the pilot-class aimed at identifying potential impact, but also its relevance given students' previous uses of MT, in order to adapt our lesson plan for future classes. Despite the small number of participants and the exploratory nature of our data, we have been able to identify a few potential effects of the pilot-class. We first present the data we collected on what were the students' practice and representations of MT before the pilot-class. We then analyze how the students responded to the activities proposed during the online pilot-class such as their activities, productions, reactions, questions, and difficulties. We finally try to assess the possible impact on students' representations of technologies,

based on the indicators we were able to collect such as students' verbalizations and questions, differences in pre/post-survey. We will discuss, in section 5, the changes we made after the evaluation.

A Majority of Students were Already Experienced Users of MT

We were surprised by the sophistication and complexity of the uses of MT that students expressed *before* the pilot class, during the pre-survey, and during the initial group discussions in the Zoom classes.

First, a majority was already using MT on a regular basis, coupling GT with online dictionaries such as WR and with other websites (TurEng, conjugator.reverso.net.) The pre-study showed that none of the students had never used GT; that two thirds of them reported using it "sometimes"; and that one third reported using it "regularly".

Second, the use of GT was often coupled with online dictionaries, since a majority (85%) of the students used online dictionaries "regularly", as opposed to "not often" for a minority (15%), so the main case seems to be a common use of GT coupled with online dictionaries. The question remains then whether through our lesson we have convinced the 15% of students who rarely used online dictionaries to use them more.

Students were using MT for a variety of goals, in a variety of situations, academic or not, i.e., reading, writing emails to French-speaking friends, writing assignments, listening to songs, interacting with French speakers, traveling, relying on what appeared to be a complex web of representations of the compared benefits and limits of each tool. We present these uses and representations of GT and online dictionaries in Table 2 and Table 3 below, built from students' answers. More detailed versions of the tables, with quotes from the students, can be found in Appendixes 3 and 4.

Table 2
Students' Reported Use and Representations of Google Translate

Use of GT	Strengths of GT	Limits of GT
As a bilingual dictionary for a quick look for words while reading, listening, writing, and even interacting	Fast, easy To help to learn	Accuracy issues and limits
To quickly check genders or verbs' conjugation in French	Easy	Accuracy issues, limits
To translate full sentences/paragraphs	Some features	Reliability issues
To self-correct once's sentences in French	Possibility of back-and-forth translations	Can hinder learning
To help with pronunciation	Possibility to hear spoken words	

The variety of uses and representations of GT is coherent with the results of other studies on undergraduate students, such as the large survey performed by Clifford et al. in 2013 and other published works (Hellmich & Vinal, 2021; Jolley & Maimone, 2015; Niño, 2009; O'Neill, 2019). Like the students in our survey, the students from the 2013 survey were

using automated translation for a variety of academic purposes: "reading assignments, at-home grammar assignments, homework and writing tasks, formal compositions" (Clifford et al., 2013, p. 45), using back-and-forth movements between the native language and the target language. But students were also using online dictionaries, as shown in the following table extracted from the survey.

Table 3
Students' Reported Uses and Representations of Online Dictionaries

Use of online dictionaries	Strengths of online dictionaries	Limits of online dictionaries
Help in choosing the right word given the context	Simple	More time-consuming Creates doubt by giving too much information Can lead to errors
Gives extra information, explanation	Helps in learning	Complex interface Sometimes incomplete
Help in building sentences	Forces to practice sentence building, helps in learning	Limited help to build full sentences

It was interesting to observe that students followed multiple and sometimes competing goals while using MT, leading them to make compromises such as achieving a certain task, like writing an assignment, while also working quickly, being efficient, achieving a good grade, and learning the language.

Most Students had Already Built Complex Representations of MT

We were surprised by the fact that most students had already built complex representations of the advantages and limits of MT, relating a plurality of goals and situational factors together, even before our class. Some expressed concerns that the first objectives, time saving, self-correction, etc.) can interfere with their learning goal, "So if you're not careful with how you use it, Google Translate can really confuse you and worsen your understanding of French." Another student was even more radical, "I don't think that Google Translate would help me to learn French."

Let us look in detail at an example of a highly elaborated representation of MT, where we can see that the student can balance efficiency in translation with learning goals, which helps her regulate her use of MT:

> [GT] is a lot quicker to use, you can just copy and paste whole phrases, but I think that has a cost on what you understand in the future or what you remember from it (…) it is so quick, I see the translation once then I forget about it (…) I tend to better remember Wordreference [*sic*] by reading through the different definitions and so.

We could observe the same complex balance of objectives for other students, some of them even trying to completely avoid GT in an academic context: "Not relying on machine translation tech in French has helped me get comfortable with forming sentences myself."

Most Students had Built Complex Epistemic Beliefs on MT

Moreover, while manipulating MT to accomplish tasks, students were also, at the same time, testing these tools to assess their accuracy and build representations on the level of trust they deserve. As for GT, students said "it's usually right," but they also acknowledged that is still makes mistakes in translation. We can see here the trace of what is called "epistemic beliefs" in psychology (Hofer & Pintrich, 1997, p.89):

> Individuals' beliefs about knowledge and knowing are called *epistemic beliefs*. (…) They function as a lens through which a person interprets materials and learning demands, and influence learning and instruction processes. (…) A variety of studies report their impacts on motivation, achievement, text comprehension, learning strategies, teaching conceptions, and additional constructs. (Berding et al., 2017)

The students were therefore not only using the MT tools, but also putting them to the test to build and update their epistemic beliefs, including frequency estimations of their accuracy and metalinguistic representations pertaining to the errors, such as: "Sometimes the translations are inaccurate (though this is rare)," "I think Google Translate often mistranslates things," "I feel like machine translation translates things too directly for it to be useful like that, in French things just aren't phrased/said the same way as they are in English," "It always uses the masculine form."

By testing the machine against their own knowledge, dictionaries or other sources, students were indeed able to identify areas where GT is less accurate in its translation into French, or, for some, into Spanish, their native language. These examples included subject ("*tu*", you informal, or "*vous*", you formal or designating a group), tense choice (especially past tenses, which differ a lot between Romance languages and English), slang, dialect, context (pronouns), cultural/linguistic accuracy of vocabulary, complex sentences and structures, and the fact that it chooses the most common translation only.

> Students put GT to a test and built lessons from it, as this student said:
>
> For example, you may type in something you want to say to a close friend, and the machine translation gives you the formal version with "*vous*" which in reality would not be what you want in this case. This is just a small example, but I think there are a lot of similar errors you would get if relying on the machine translation completely.

Students were trying to outsmart the algorithms. Some of them were trying to force GT into giving them the right (formal) form of conjugation, by adding "comma, sir" to their sentence in English to force GT into a formal "*vous*" translation. Others were playing with GT to translate songs with their group of friends, "we wouldn't give it much credibility until we find a second source so we can back it up, because (…) I think (…) that you have specific dialects and specific words that can mean completely different things." That second source was usually "another native speaker who can back it up."

Such a phenomenon of translation-related epistemic belief construction is not unknown, yet rarely discussed in the literature. As shown by the Clifford et al. (2013) survey, a majority of college students were also aware of the limitations of MT in 2013: "78% of students indicated that MT was *somewhat accurate*, and […] 91% of users […] reported that they had detected an error when using MT" (2013, p. 47). Even if GT has gained in accuracy since 2013, it is still not 100% accurate and using it seems to provoke the development of epistemic beliefs on its linguistic accuracy and cultural relevance given specific contexts.

Students Responded Well to the Class

The students responded well to the lesson, as shown by their high level of oral participation in the group discussions and the "post-editing" activities that we proposed. We can see that all of them struggled with the same elements of translation (idiomatic expressions), and that only a few of them proposed a relevant solution after using online dictionaries to correct GT.

Doing the exercises in small groups made some students verbalize interesting representations of the advantages and limits of MT in context: such as "and also GT only gives you like one translation of it, like very limited." The activities elicited discussions on the compared benefits and limits of MT tools, which was one of our learning goals: "Yeah and that leads to the discussion which is I've stopped using GT most of the time because it's just so limited, and yeah we've put in "*passer*" [in GT] and it gives you only one definition while there are so many," to which another student responds by saying, "definitely for nouns and conjugation WR will be very specific." It also made students question the way the tools are conceived: "I wonder how they order it on WR, is it also according to frequency?", to which another student responded with, "probably I would think so."

The lessons led to slightly different conclusions in each class. After students performed the post-editing exercises in small groups, teachers asked them to propose their solutions to the whole class and then they gave feedback on them. In one of the classes, the final group discussion was mostly oriented towards a failed collective attempt by students to translate the French idiom "*Que voulez-vous*" before the teacher finally gives a possible correct translation ("What can I say"), to which students responded by a "oh" of understanding and surprise. This allowed the teacher to conclude by reframing the lesson learned that day, in line with the objectives of the class: "You could not get it with GT or Wordreference [*sic*], and in that case you've got to have people, you need to talk to people, all of these tools are still not enough to translate that idiom."

In the other class, the final collective discussion spent more time on the translation of the French word "*sage*", with many suggestions from the students validated ('smart', 'well-behaved'), rejected ('good' or 'wise'), and commented upon by the teacher; it also lead to the discussion of the translation of the French idiom "*fait des bêtises*", wrongly translated by GT. Students expressed and agreed on a lot of representations on MT at this occasion: "There is also more information on WR, like what it is, and for a noun, what the gender is." Another shared representation was about additional information found in WR forums: "[T]here is also some discussion posts on WR, if there is like a specific phrase that's weird, it's not in the dictionary, you can look at the discussion posts where people are talking about it." Another student concluded about the limits of GT, "That's what I hate about GT because it's totally in the dark," before another student tried to formulate a synthetic conclusion to which all other students nodded, "[L]ike for all translators, it all comes down to how smartly you use them, you cannot put it bluntly into GT, it will not get the context, but WR is doing a better job at giving you the right sense of the word because a lot of words are used very differently in French than they are in English." It was then easy for the teacher to insist on the use of online dictionaries (bilingual or French) as compared to GT to achieve a better translation which was one of the objectives of the class. Both teachers used this correction time to draw somewhat different lessons from the exercise, even if both emphasized the need to be overly cautious with GT.

Potential Impact on Students' Representations of MT

Did the class have any impact on students' representations of MT? It is, of course, difficult to say given than only five students responded to the post-survey, compared to the 14 who responded to the pre-survey. The five students who did respond to the post-survey did not indicate any important change in their representations of MT or intended uses, but some indicated that the class made them want to use less of GT and more of online dictionaries, which was one of our objectives in terms of representational change.

To the question "How has the lesson today influenced the way you think about machine translation technology?", two students responded that it had not ("Mostly my opinions remain unchanged"), while the other three students said in had made them question the use of GT ("I think it made us question our use of it", "It's made me even more cautious about putting words in context and using your own French knowledge to check and correct translations you're given").

To the question "Do you think you'll use these technologies differently after the lesson? If so, how?", two students responded no ("I think I will use them in mostly the same way that I used them before. I feel like I have figured out how to use them effectively for my learning process (in a way that does not do the work for me) and I am content to continue on like this"), whereas the three others said that it could have a small impact: "Pointing us to "Le Robert" I think was helpful, I will try to use that in the future when I just want to know the meaning of a word", "I think I'll try to use French dictionaries too, and really focus more on the context of the sentence I'm trying to understand", "I will use more of dictionaries and other sites (like a conjugator for irregular verbs, for example) instead of plugging sentences into a machine translator."

Was there, therefore, a real impact on students' representations of MT? The fact that students' representations were already very elaborated before the class, as we have seen before, limits the potential for spectacular representational change. Yet, our class did make them discover or rethink the existence of other tools, like French dictionaries. It also made them verbalize and share representations of MT and build collective agreements on their possible uses and limits. The impact we can expect from such a class can therefore be described as modest conceptualization effects and a potential reinforcement of their suspicion of GT, to keep students questioning the accuracy of the tools and the limits of their uses for learning.

DISCUSSION AND CONCLUSION

Rethinking Our Lesson Plan

After analysis, we were led to *rethink our lesson plan* (see a modified lesson plan in Appendix 2) in line with our iterative instructional design strategy or Successive Approximation Model (see Allen & Sites, 2012). We crafted a lesson, implemented it, documented and analyzed its potential impacts, and finally revised the lesson plan accordingly.

With a better knowledge of our students' previous use of MT, we now consider that we should 1) skip the first "post-editing" type of exercise, based on single words, which was pretty obvious for most students, to concentrate on the second type of "post-editing" translations based on full sentences, by dedicating more time to it; (2) we could use those exercises to discuss the impact of MT on learning and "point out that mistakes are part of the language acquisition process" (Ducar & Schocket, 2018, p. 792) by showing students what they have learned from a perfect GT translation, which is likely less than they have learned from the use of dictionaries and correcting the mistakes they made without using an online translator; 3) take more time to discuss the lessons learned from

this class in small groups of peers, and do a small role-play to try to talk another student out of relying so much on GT.

Besides a specific class on MT, we could also incorporate more GT "post-editing" exercises in everyday classes, on specific grammar examples, as suggested by Enkin and Mejías-Bikandi (2016): "[F]aulty online translator output can be used to create activities that help raise metalinguistic awareness of second language grammar and of the differences between grammatical constructions in the first and second language, which can help with the language learning process" (p. 138). This requires very well-crafted examples of bad translation "if the teacher controls the input text in such a way that the MT output errors are relevant […], post-editing into the foreign language can provide an excellent form-focused activity that can help the students develop their grammatical and lexical accuracy" (Niño, 2008, p. 42). Correcting GT should therefore not be reserved for a special class on machine translation, as we have done, especially if students seem already to have the representations and experience of MT that would allow them to engage with GT as part of the standard curriculum.

The Role of Learning Institutions

We think it is incumbent on departments to raise awareness among instructors that MT is part of our reality now. Teachers should teach responsible and learning-prone uses of MT as part of their regular curriculum, instead of mere prohibition. They should also "review their beliefs about students' use of supportive technologies" (Ducar & Schocket, 2018, p. 793). Such a discrepancy among teachers' beliefs was already observed by Clifford at al. (2013):

> 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. (p. 47)

Our paper can be viewed as an attempt to continue the discussion on this subject.

Review Writing Assignments

We should also review the way we ask students to write and the way we assess writing in our whole curriculum. We cannot take for granted that students are reading or writing without help in the target language anymore. One option is to do more in-class reading and writing; another option is to ask that they show and reflect on the writing process in their L2 essays, instead of turning in a perfectly crafted composition.

For instance, our French Department has recently started to ask students of French 1 and 2 to underline the words they searched in online dictionaries and to ask us at least 2 questions of translation/French in the composition itself. We are revising our grading criteria in order to include these changes. We aim at moving from perfect writing to work-in-progress writing. We are aware of the fact that if we continue to ask for perfectly written papers and grade only their level of proficiency, we will keep grading GT output instead of students' original creations.

Rethink Pedagogy to Empower Students

Globally, there is a need for "rethinking pedagogy in the age of GT" (Ducar & Schocket, 2018, p. 791). We believe that this study is a reflection of the times we live in. According to the contemporary philosopher Michel Serres, the rise of new technologies is revolutionizing our world, our balances of powers and our way of learning. He claims that the old-fashioned way of teaching, based on "the presumption of unknowing" ("*une présomption d'incompétence*") of students is long over. "Access to knowledge is now open. In a certain sense, it's everywhere, always and already. There is no more teacher in the amphitheater. Teachers are everywhere…" (Serres, 2012, p. 52).

As shown in this study, students are now more expert and receive more external help in the domain of language learning than before, and as a consequence, they demand to be more active and engaged in their learning than previously. How could we organize such a transfer of power from teachers to students? Could they become, for a few lessons, teachers for their peers? How could we encourage collaborative-teaching and self-teaching practices? Collaborative writing, collaborative-reading and co-correcting, inside or outside the class, is an example. Contract-grading, to concentrate more on the effort of writing than on the final product, is another idea.

Let us not be fooled. New technologies are not going away, and they are becoming more efficient at translating each day. "Translation technologies are here to stay; current language learners who are digital natives…already use them and, therefore, carefully considering their role in didactic environments is a necessity in the 21st century" (Jiménez-Crespo, 2017, p. 190). Can we share the optimism of Michel Serres: "[E]verything remains to be redone… everything remains to be invented" (Serres, 2012, p. 57)?

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REFERENCES

Allen, M., & Sites, R. (2012). *Leaving ADDIE for SAM: An agile model for developing the best learning experiences.* ATD Press.

Berding, F., Rolf-Wittlake, K., & Buschenlange, J. (2017). Impact of different levels of epistemic beliefs on learning processes and outcomes in vocational education and training. *World Journal of Education 7*(3), 103-114.

Bialystok, E. (1981). The role of linguistic knowledge in second language use. *Studies in Second Language Acquisition*, *4*(1), 31-45.

Bland, S. K., Noblitt, J. S., Armington, S., & Gay, G. (1990). The naïve lexical hypothesis: evidence from computer-assisted language learning. *The Modern Language Journal*, *74*(4), 440-450.

Clifford, J., Merschel, L., & Reisinger, D. (2013). Meeting the challenges of machine translation. *The Language Educator*, *8*, 44-47.

Correa, M. (2011). Academic dishonesty in the second language classroom: Instructors' perspectives. *Modern Journal of Language Teaching Methods*, *1*(1), 65-79.

Correa, M. (2014). Leaving the "peer" out of peer-editing: Online translators as a pedagogical tool in the Spanish as a second language classroom. *Latin American Journal of Content and Language Integrated Learning*, *7*(1), 1-20.

Ducar, C., & Schocket, D. H. (2018). Machine translation and the L2 classroom: Pedagogical solutions for making peace with Google translate. *Foreign Language Annals*, *51*(4), 779-795.

Duckworth, E. (1964). Piaget rediscovered. *The Arithmetic Teacher*, *11*(7), 496-499.

Enkin, E., & Mejías-Bikandi, E. (2016). Using online translators in the second language classroom: Ideas for advanced-level Spanish. *Latin American Journal of Content and Language Integrated Learning, 9*(1), 138-158.

Hellmich, E. A., & Vinall, K. (2021). FL instructors beliefs about machine translation: ecological insights to guide research and practice. *International Journal of Computer-Assisted Language Learning & Teaching (IJCALLT), 11*(4), 1-18.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67*(1), 88-140.

Jiménez-Crespo, M. (2017). The role of translation technologies in Spanish language learning. *Journal of Spanish Language Teaching, 4*(2), 181-193.

Jolley, J. R., & Maimone, L. (2015). Free online machine translation: Use and perceptions by Spanish students and instructors. In A. J. Moeller (Ed.), *Learn languages, explore cultures, transform lives* (pp. 181-200). 2015 Central States Conference on the Teaching of Foreign Languages.

Kazemzadeh, A. (2014). The effect of computer-assisted translation on L2 learners' mastery of writing. *International Journal of Research Studies in Language Learning, 3*(3), 29-44.

Kern, R. (2012). Teaching communication in a global age: New goals for language/culture teacher education. In H. W. Allen & H. Maxim (Eds.), *Educating the future FL professoriate for the 21st century* (pp. 1-16). Heinle.

Kern, R., & Malinowksi, D. (2016). Limitations and boundaries in language learning and technology. In F. Farr & L. Murray (Eds.). *Routledge Handbook of Language Learning and Technology* (pp. 197-209). Routledge.

Meyers, C., & Jones, T. (1993). *Promoting active learning. Strategies for the college classroom.* Jossey-Bass.

Niño, A. (2008). Evaluating the use of machine translation post-editing in the foreign language class. *Computer Assisted Language Learning, 21*(1), 29-49.

Niño, A. (2009). Machine translation in foreign language learning: Language learners' and tutors' perceptions of its advantages and disadvantages. *ReCALL, 21*(2), 24-258.

O'Neill, E. M. (2019). Online translator, dictionary, and search engine use among L2 students. *CALL-EJ, 20*(1), 154-177.

Piaget, J. (1974). *La prise de conscience.* Presses Universitaires de France.

Rabardel, P. (1995). *Les hommes et les technologies; approche cognitive des instruments contemporains.* Armand Colin.

Serres, M. (2012). *Petite Poucette.* Pommier.

APPENDIX 1

Pilot-Class Lesson Plan (before the class)

Objectives (1 minute)
Discover and discuss tools for online translation (Google Translate, online dictionaries) to understand the merits and limits of each tool

Discussion (7 minutes) in small groups then in class group
What technologies and websites do you use to help you write and translate in French? Do you use Google Translate, online dictionaries? What are their advantages and limits?

The importance of a good translation (2 minutes)
Authentic and funny images of poor automated translations, followed by a presentation of the websites used in this class (Google Translate, WordReference.com, and www.robert.fr)

First work in small groups + correction in class (20 minutes)
Each small group had to follow the instructions written on a shared class Google Doc, and was asked to take notes of their answers for in-class correction

1) Google Translate vs. online dictionaries (10')
1.1. Using Google Translate, translate the following words (French to English), and then take the English translation provided and translate it back into French. Record what happens.

> « *coup* »
> « *bas* »
> « *temps* »
> « *passer* »

Discussion: what happened? Why?

1.2. Now, using WordReference.com, look at the possible translations for the same words: https://www.wordreference.com/fren/

> « *coup* »
> « *bas* »
> « *temps* »
> « *passer* »

Discussion: what is the difference with Google Translate? Which tool is the best for translation?

Second work in small groups + correction in class (20 minutes)

2) *A vous de jouer !* (5')

2.1. Using Google Translate, look up and note here the exact translations of the following sentences:

> "The party was a flurry of activity!" =
> « *Mon petit garçon est sage, il ne fait pas beaucoup de bêtises !* » =
> « *Que veux-tu, je l'aime !* » =

2.2. Then, using WordReference.com and/or Le Robert, translate the same sentences and keep track of your final solutions in your notebook:

> "The party was a flurry of activity!"
> « *Mon petit garçon est sage, il ne fait pas beaucoup de bêtises !* »
> « *Que veux-tu, je l'aime !* »

Discussion: Which translations are the best to translate and to learn French? Why?

APPENDIX 2

New MT class lesson plan (revised after the pilot class)

Objectives (1 minute)
Discover and discuss tools for online translation (Google Translate, online dictionaries) to understand the merits and limits of each tool

Discussion (7 minutes) in small groups then in class group
What technologies and websites do you use to help you write and translate in French? Do you use Google Translate, online dictionaries? What are their advantages and limits?

The importance of a good translation (2 minutes)
Authentic and funny images of poor automated translations, followed by a presentation of the websites used in this class (Google Translate, WordReference.com, and www.robert.fr)

Exercises (15 minutes)
1. Using Google Translate, look up and note here the exact translations of the following sentences:
> "The party was a flurry of activity!" =
> « *Mon petit garçon est sage, il ne fait pas beaucoup de bêtises !* » =
> « *Que veux-tu, je l'aime!* » =

2. Then, using WordReference.com and/or Le Robert, translate the same sentences and keep track of your final solutions in your notebook:
> "The party was a flurry of activity!"
> « *Mon petit garçon est sage, il ne fait pas beaucoup de bêtises !* »
> « *Que veux-tu, je l'aime !* »

Discussion: Which translations are the best to translate and to learn French? Why?

Whole class Correction/Discussion (15 minutes)
Including a discussion: What French have you learned when using GT? What French have you learned when using online dictionaries? What French have you learned from your peers, and your teacher? Are mistakes useful to learn a new language? Why? How could you learn more from your mistakes, in general?

Final small-groups discussion (5 minutes)
What lessons have we learned today? Are you going to change your uses of Google Translate and Online Dictionaries? How? What other tools could we use, with what limitations?
Role play: Try to convince your partner to not use Goggle Translate so much. Be as convincing as possible and give precise examples.

APPENDIX 3

Table 2bis – Uses and representations of Google Translate among students, based on the surveys (including quotes from students)

Table 2bis
Uses and representations of Google Translate among students

Use of GT	Quotes from students	Strengths of GT	Limits of GT
As a bilingual dictionary for a quick look for words while reading, listening, writing and even interacting	"*I look up simple words I don't know/don't remember*" "*If I'm having a conversation with someone in French and don't know how to say a word, I will look up the word in French*"	Fast, easy: *"Fast, simple, easy!"* To help to learn: *"I can save words to my account and study them later on"*	Accuracy issues and limits: GT "*doesn't know slang or informal French that well*" There is a "*stigma in an academic context*"
To quickly check genders or verbs' conjugation in French	"*I often doubt myself on grammar or whether something is masculine or feminine, so I will type in "the ____" in English in order to see if it is le/la in the translation*"	Easy: *"It is very straightforward in use"*	Accuracy issues, limits: *"Google translate is sometimes wrong about verb tenses"*
To translate full sentences/paragraphs	"*I use google translate to find translations of English phrases/things that are multiple words as other dictionaries don't really have that capacity*"	Some features: *"Can translate whole phrases"*	Reliability issues: *"I think Google Translate often mistranslates things"; "If you type in a sentence, it can sometimes give you the wrong translations or something people don't actually use"*

| To self-correct once's sentences in French | *"I will also use them to self-correct my own work because it can be reliable"* *"I use them to double check sentences I've written in French by translating them to English"* | Possibility of back-and-forth translations: *"and then if I want to confirm or check I'll switch the languages and then switch them back"* | Can hinder learning: *"I think these technologies are helpful for people who aren't super committed to learning a new language but who want to know generally what something means"* *"they also take away from people's willingness and ability to fully learn a new language"* |
| To help with pronunciation | *"I use them for specific phrases I hear in class that I don't understand or to learn how to pronunciate [sic]words correctly"* | Possibility to hear spoken words | |

APPENDIX 4

Table 3bis – Uses and representations of online dictionaries among students, based on the surveys (including quotes from students)

Table 3bis
Uses and representations of online dictionaries among students

Use of online dictionaries	Quotes from students	Strengths of online dictionaries	Limits of online dictionaries
Help in choosing the right word given the context	*"It is fantastic because there's often more than one way in French to say what would be just one word in English, and it helps you know which French word to use in which context (e.g. the other day I looked up "lover," and learned "amant" would be a (usually secret) sexual partner, while "amour" describes a romantic partner, which is the connotation I was looking for"* *"help you with simple words, are exact/precise with what these words mean in context"*	Simple	More time consuming Creates doubt by giving too much information: *"Sometimes I feel overwhelmed with the result page, where you have a long list saying adjective/proposition, etc. and I wonder if I am using the word correctly in my case"* Can lead to errors: *"I guess the disadvantage would be they allow us to use words that we don't actually know and therefore possibly end up using wrong"* Can hinder learning: *"it doesn't promote using your own brain or thinking critically"*
Gives extra information, explanation	*"great for vocabulary help, good for understanding the gender of words"* *"grammatical information"* *"examples of sentences",* *"provides examples of usage"* *"Gives lots of translations for specific words so it can be easy to find the one that is correct"* *"They explain sentence structure very well"* *"They provide many translations, synonyms or connected words"* *"Word Reference has a conjugation function for numerous tenses"* *"It gives a lot of answers and options and explains why they're different depending on meaning"*	Helps in learning: *"It helps you learn new words fairly quickly"*	Complex interface: *"They are not always user-friendly, and can be a bit dense and annoying to navigate"* Sometimes incomplete: *"They can sometimes be missing useful information"* *"Understanding how to use certain words and how they should behave in a sentence can be difficult with limited examples"*

| Help in building sentences | "*It also makes you practice constructing your own sentences, because you can only search one word or sometimes small phrase at a time*"
"*force me to form sentences myself in my target language*" | Forces to practice sentence building, helps in learning | Limited help to build full sentences:
"*Cannot do phrases which means it won't help if you don't know which preposition to use in that context*"
"*They don't help with grammar*" |