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Monolingual and Bilingual Online Dictionary Tools for Academic Reading

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Abstract

For students of English for Academic Purposes (EAP), reading articles in their field of study in English is particularly challenging. One of their main difficulties is understanding unfamiliar words. The purpose of this study was to compare the effect of online monolingual and bilingual dictionary tools on reading comprehension in English and check student preference for one or the other tool. The study was conducted in an advanced English class for tertiary students of government. Two online dictionary tools were used: Reverso, a bilingual tool, and Rewordify, a monolingual tool. These tools allow for more immediacy and speed than previous dictionary tools. The instructor taught students how to use the tools, and after a few practice sessions, two reading comprehension quizzes were administered. The texts for the quizzes were approximately the same length and reading level, and the questions were objective and parallel. Students used Reverso for one of the quizzes and Rewordify for the other and answered a short attitude questionnaire after each quiz. Results show that students got higher grades using the bilingual dictionary tool and felt it was more helpful. Based on the results, we believe language teachers should consider making students aware of the new tools available.

Nowadays, academic reading is mainly online (e.g., Dennis, 2011), and most academic publications are in English (Curry & Lillis, 2018; van Weijen, 2012). Dealing with these publications requires good reading comprehension skills. One of the challenges in reading in a second/foreign language is knowing the meaning of enough words to understand the ideas in the text. In the past, when reading from a printed text, the only help second language readers could get was from monolingual or bilingual printed dictionaries. Reading with such dictionaries could be tedious if readers needed to look up words frequently, since stopping to look up words in the dictionary and deciding which of the meanings suited the context of the text moved their attention away from the content of the text to the meaning of the words. Upon returning to the text, readers would not always be able to continue reading from where they stopped. They would have to go back and reread at least from the beginning of the sentence to remind themselves of the content where they left off. So, rather than reading linearly, readers would read, stop to look up a word, and then return to an earlier point in the text. This process no doubt disrupts comprehension.

To facilitate the process of accessing meanings of words, some English as a Foreign Language (EFL) materials developers glossed the difficult words in texts. As defined by Nation (2001), a gloss is a "brief definition or synonym, either in L1 (bilingual) or L2 (monolingual), which is provided with the text" (p. 174). The glosses shortened the time-away-from-text by providing the meanings of the words in context, either in the margin or at the bottom of the page. Not only did readers not have to thumb through a dictionary, but in addition, they did not have to decide which of the dictionary definitions was suitable for their context. Nation (2001) claims that "Glossing provides minimal interruption of the reading process, especially if the glosses appear near the words being glossed" (p. 175). According to Gettys, Imhof & Kautz (2001), an L1 gloss "represents a psychologically sound support system consistent with the actual needs of the learner when reading in a foreign language" (p. 93). Some online glossing has also included pictorial aids (Lomicka, 1998; Shalmani & Razmjoo, 2015).

Yet, for readers for whom the glosses did not supply the meanings of all the unknown words, reading could still be a tedious and unrewarding activity. As Hu & Nation (2000), Laufer & Ravenhorst (2010), and Schmitt, Jiang & Grabe (2011) claim, to understand an academic text, a reader needs to know the meanings of 98% of the words, that is, knowledge of almost every word in an academic text is essential for text comprehension.

The availability of online dictionaries can simplify the lookup process, for both those reading from a printed text and those reading on screen. Using an online dictionary, readers can copy/paste a word into the search box and immediately access its meaning. They no longer need to thumb through pages to find a single word and can usually return to the text and continue straight away from where they left off. Today, most reading is done on screen, but even with online dictionaries/translators, the reading process is still not completely seamless, since readers have to leave the text to copy/paste the word into the dictionary and then return to the text.

Nowadays there are online tools that take us a step further by immediately providing word meanings in context either by clicking any word in the text or running the cursor over the word. This makes the lookup process even faster than with online dictionaries. Readers do not have

to leave the text for more than the time it takes to glance quickly at the meaning of the word. Using these tools, readers can instantly access the meaning of any word in the text and are not dependent on a printed or online dictionary or on the word choices of the developer who created the glosses.

In the past, a number of studies related to the use of glosses or dictionaries in L1 and L2 and their effect on reading comprehension; however, they employed a variety of methodologies and did not show a statistically significant difference between the use of L1 and L2 glosses/dictionaries. Bensoussan, Sim, & Weiss (1984) checked the effect of the use of L1 and L2 paper dictionaries on the comprehension of a printed text. Use of the dictionaries by the participants was permitted while doing the test, which consisted of a set of multiple-choice questions. The researchers found no difference in comprehension between L1 and L2 dictionary use. Jacobs, Dufon, and Hong (1994) checked text comprehension when participants used a page of glosses in L1 or a page with the same words glossed in L2. Participants read the text on paper, handed it in with the gloss sheet, and then wrote as much as they were able to recall of the content of the text. There was no difference in the recall scores between the groups using L1 and L2 glosses. However, comprehension and recall are not necessarily the same. Joyce (2018) pointed out that students might understand more than what they recall.

Bell & LeBlanc (2000) described a study they did comparing text comprehension with L1 and L2 glosses. The text was presented on a computer screen as were the glosses, and a comprehension test was administered immediately following the reading. The text and the glosses were not available when taking the test, and no significant difference in comprehension was found. Gettys et al. (2001) compared the reading comprehension scores of participants who read with L1 glosses in context and those who read with basic dictionary entries in L1. The reading was performed on computers, and the glosses were accessed there. Using a recall technique to measure comprehension, the researchers did not find a statistically significant difference between the two groups. Cheng & Good (2009) compared the effect of three different gloss conditions on reading comprehension and found no difference in scores between the three groups – L1 gloss with sample sentence in L2, L1 gloss in text, L1 gloss in the margins.

On the other hand, Ko (2005) also investigated the effect of L1 and L2 gloss conditions on reading comprehension, and her results showed that the L2 gloss condition significantly improved students' reading comprehension. Abraham (2018), in a meta-analysis, found a medium effect size of computer-mediated glosses on reading comprehension (m = .73) as compared to a no-gloss condition. According to Taylor (2006), students who were provided with L1 glosses on computers comprehended significantly more text than students who used traditional, paper-based L1 glossing. In addition, Shalmani & Razmjoo (2015) found that students who read with L1 glosses + pictures performed better on comprehension questions than those who read only with L1 glosses.

With respect to student preference for one of the two types of vocabulary tools, the jury is also still out. Ko (2005) reported that her students preferred L2 dictionary tools, while in the Collins (2016) and Bensoussan et al. (1984) studies, students preferred using L1 tools. In our courses,

the great majority of students use *Google Translate* or *Morfix* (an English-Hebrew, Hebrew-English dictionary) and rarely turn to L2 online dictionaries.

In short, the results of previous research do not provide clear answers to the effect of L1 or L2 dictionary/gloss use on reading comprehension and the question of student preference for L1 or L2 dictionary tools. Therefore, thinking that the use of new dictionary tools that give word meanings immediately might give us a clearer answer, we decided to compare the effects of the use of monolingual and bilingual online dictionary tools on reading comprehension.

Rationale

For many years, high school students in Israel were required to use monolingual dictionaries. Nowadays, the use of bilingual dictionaries is allowed throughout high school and university. The policy in the country is to allow EFL students the use of dictionaries for all reading comprehension assignments and tests, simulating real-life reading situations. At our tertiary institutions in Israel, reading is mainly done online, and most students use *Google Translate* or *Morfix* (Kol, Schcolnik, & Spector-Cohen, 2018). Since they are not allowed to use their computers for exams, students use either handheld electronic dictionaries or paper dictionaries. However, since we are interested in the adoption of tools for life rather than for the final exam, in this study we focused on the use of *Reverso,* an online tool that gives L1 translations, and *Rewordify*, an online tool that gives word meanings in simple English. Our interest in these new tools derives from their immediacy and ease of use and their potential usefulness.

In a vocabulary check at the beginning of the course, we found that students did much better on an English-Hebrew vocabulary test than on an English-English test. For the English-English test, we used the *Lextutor* multiple-choice test (Nation, 1990), and for the English-Hebrew we used a bilingual version of the test. Students also found the bilingual version easier.

Based on the results of the vocabulary tests, we decided to check the effects of using *Reverso* and *Rewordify* on student comprehension of online texts. In both cases, students had free choice of which words in the text to look up, and both tools gave the meanings of the words in context. Moreover, students could refer to the text and the dictionary tool when answering the reading comprehension questions. The research questions were:

1. Which online dictionary tool, monolingual or bilingual, has a greater effect on EAP student reading comprehension?

2. What kind of dictionary tool do students prefer?

Method

Population

The population consisted of 36 EAP (English for Academic Purposes) students (12 male and 24 female) of Government and Diplomacy at B2 level at the Interdisciplinary Center in

Herzliya, Israel, ages ranging from 22 to 27. The subjects were not identified by name, only by number.

Tools and Procedure

Online dictionary tools. Before the start of the study, we asked the students what dictionaries they use when reading online texts in English. A large majority said they use *Google Translate*, and a number of students said they use *Morfix* (an English-Hebrew, Hebrew-English online dictionary).

For this study, we used two free online dictionary tools: *Reverso Context* and *Rewordify*. In addition to dictionary-like features, both tools offer vocabulary learning options, which were not used in this study.

Reverso Context provides translations of the words in online text in many languages. When users add the *Reverso Context* extension to their browser, an icon appears in the top toolbar. The extension activates the tool on any webpage. When double-clicking a word or expression, a translation pops up (see Figure 1), offering a number of optional in-context translations. The popup appears very quickly and includes an audio option. *Reverso Context* works on a variety of online text formats, including pdf.

Figure 1. *Reverso Context* Translation Popup.

The second tool, *Rewordify*, helps readers of online English text by providing definitions in simple English of the difficult words or phrases. To use the tool, readers first paste text or a URL into a text box on the site. The program then analyzes the text and identifies the words and phrases that may be difficult to understand. When the user hovers over a word with the cursor, if the word has been rewordified, a small box with the definition pops up close to it (see Figure 3). The definitions provided are especially helpful because they match the part of speech, verb tense, and the number of the original word. Clicking a rewordified word offers sound and learning options. If the word has not been rewordified, a highlight appears and clicking it provides a full dictionary definition.

Rewordify offers several display options. Users can choose the reading level, which affects the number of words for which definitions are provided, and whether to display the text as is, or with the easier word replacements. For the study, the students were instructed to choose to display the text as is, with the original words and without highlights, so as not to interrupt the

flow of reading. They were also told to select "Level 1" to give them a large number of rewordified words (see Figure 2).

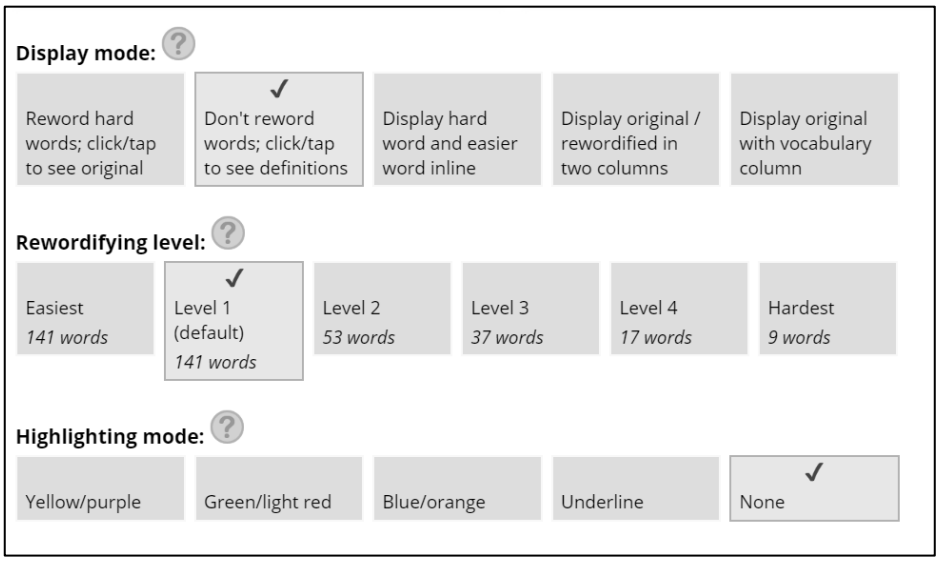

Figure 2. *Rewordify* Settings Selected for the Experiment.

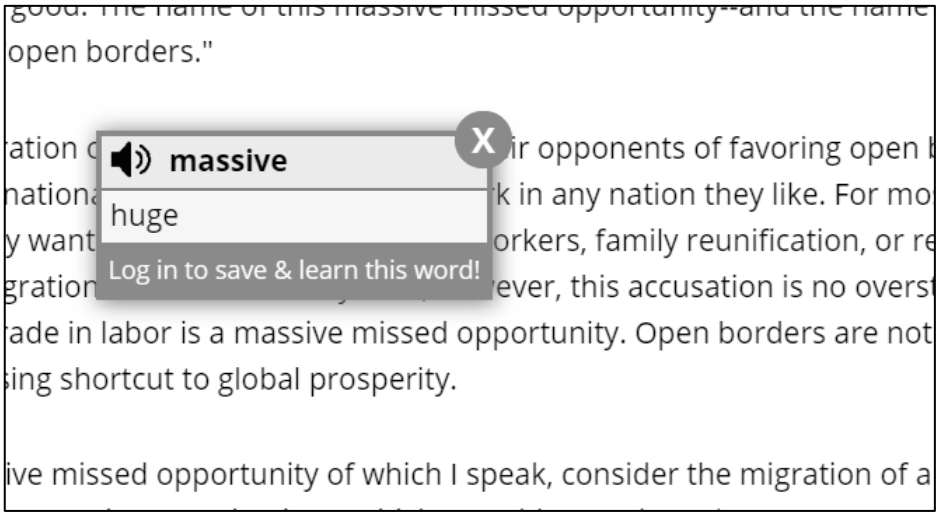

Figure 3. *Rewordify* Popup.

The instructor received informed consent from all participants. She introduced both tools, and after a few practice sessions, the quizzes were administered.

Comprehension quizzes. We administered two reading comprehension quizzes using two unabridged texts (from *Foreign Policy)*, of similar length and reading level (text 1: 1560 words, Flesch Kincaid 13.8; text 2: 1739 words, Flesch Kincaid 14.4). The quizzes were administered in two consecutive weeks, on the same day of the week and at the same time. The quizzes were validated for content and construct validity by three experienced test writers.

Both quizzes consisted of seven objective questions, including multiple-choice and cloze with banks of words (see Appendix A for an example of a cloze question). The first question in both quizzes tapped global comprehension of the text (e.g., "What is the main idea of the article?"). The rest of the questions tapped comprehension of local details. Answering the questions required understanding the difficult words in the text (see Appendix A). To look up the difficult words, students used *Rewordify* in one quiz, and *Reverso* in the other. 45 minutes were allotted for each quiz.

Questionnaires. After each quiz, students were asked two questions, one about the helpfulness of the tool and the second about the approximate number of words they looked up. After the second quiz, there was an additional question comparing the helpfulness of the two tools (see Appendix B).

At the end of the course, we administered an additional questionnaire asking about possible future use of *Rewordify* and *Reverso,* and the reasons for it. The questionnaire included a question about preference for one of the online dictionary tools, including *Morfix* and *Google Translate* (see Appendix B). In order to check whether the students continued using the new tools during the following course, the instructor asked them whether they were using the tools.

Results

Comprehension quizzes

The average grade (percentage) on the reading comprehension quiz using *Rewordify* was 74.1 (SD 11.8), while the average grade on the quiz using *Reverso* was 80.1 (SD 16.4). The difference between the grades on the two quizzes approached significance (t=0.08).

Questionnaires

Helpfulness of each tool right after the quiz. 51% of the students felt *Rewordify* was QUITE HELPFUL or VERY HELPFUL and 53% of the students said the same about *Reverso*, which shows that the students found the two tools equally helpful.

Number of words looked up. For *Rewordify*, 91% of the students said they looked up from 4 to 15 words, and only 6% looked up more than 15 words; For *Reverso,* 68% looked up from 4 to 15 words, and 26% looked up more than 15 words (see Table 1).

Table 1. Percentage of Students That Looked Up Words with Each Tool (N: 36).

No. of Words	***Rewordify***	***Reverso***
Fewer than 4 words	3%	6%
4-15 words	91%	68%
More than 15 words	6%	26%

Comparison question after the second quiz. 56% of the students said *Reverso* was more helpful, 29% felt that *Rewordify* was more helpful, and 15% of the students said that the program made no difference.

Preference at the end of the course. Students were asked which dictionary tool they found most useful to look up single words, 64% of the students chose *Google Translate*. Preference for the other dictionaries was much lower. Putting together *Google Translate, Morfix,* and *Reverso* (all of them bilingual tools) we see that 97% of the students prefer to use bilingual tools (see Table 2).

Table 2. Most Useful Tool (N: 36).

Tool	Percentage
Google Translate	64%
Morfix	24%
Reverso	9%
Rewordify	3%

Continued use after the course. In reply to the informal question checking continued use of the tools at the end of the second semester of the course, 44% of the students said they had used *Reverso*, while only 8% said they had used *Rewordify*.

Discussion and Recommendations

With both the bilingual *Reverso* and the monolingual *Rewordify*, students have word meanings at their fingertips. However, which of the two tools helps them do better when reading an English text online? Notwithstanding the small number of participants, from the results of the quizzes, it would seem that the bilingual tool was more helpful, as students got higher grades using *Reverso*. This differs from many results reported in the literature showing no significant difference in reading comprehension when using monolingual or bilingual tools, for example, Bensoussan et al. (1984), where use of L1 or L2 dictionaries had no significant effect on test scores, and Cheng & Good (2009), where there were no gains in reading comprehension when using three different kinds of L1 glosses. However, our results are in line with the results of a study in a Saudi context (Al-Jabri, 2009), in which the use of L1 glosses significantly improved reading comprehension, and those in a Chinese context (Shen, 2013), in which use of a bilingual electronic dictionary significantly improved the reading scores. Shen attributed this to the quick search afforded by electronic dictionaries, which did not disturb the reading process. The difference between our results and those in previous research may be due to the differences in methodology and the affordances of the dictionary tools used. Electronic dictionaries, as those used in the Shen study, and online dictionary tools, as in ours, enable much faster lookup than print dictionaries, as used in the Bensoussan et al 1984 studies.

As mentioned above, in previous studies various dictionary tools were used. Print dictionaries are different from portable electronic dictionaries and online dictionaries as are glosses, whether printed or on-screen. *Reverso* and *Rewordify* have more similarities with glosses than with dictionaries but are different in that they allow for self-choice, that is, users decide which words to look up, unlike glosses, which are prepared beforehand by instructors or materials developers.

The different affordances of the various tools require different skills. For example, print dictionaries require knowing the order of the alphabet, knowing how to use the guide words on each page, and being familiar with abbreviations referring to parts of speech. With online dictionaries, quick alphabetizing or locating a word on a dictionary page is irrelevant (Schcolnik & Feuerstein, 2018). In spite of the differences, however, the purpose of all these tools is to help readers clarify word meanings while reading. To the best of our knowledge, our study is the first that deals with online dictionary tools.

Immediacy and speed seem to be important factors in the use of online dictionary tools. When using *Rewordify*, where the text needs to be pasted into a window, only 6% of the students looked up more than 15 words, whereas when using *Reverso*, where double-clicking a word gives the translation, 26% of the students did. However, with both online dictionary tools, the lookup process is faster and much easier than with printed dictionaries, particularly with a tool like *Reverso*, where no special lookup strategy is called for. One of the difficulties Bensoussan et al. (1984) pointed to is that 1st-year students may not know how to use the (paper) dictionary efficiently and choose the right meaning for the context. Both *Reverso* and *Rewordify,* on the other hand, provide the meanings of the words in context.

In response to the preference question after having used both tools, most of our students preferred *Reverso* (L1 tool), which may be due to the above-mentioned immediacy, to the ease of use of *Reverso*, which doesn't require copy/paste, or to the fact that students prefer a translation to an easier English alternative. This is consistent with the results in the Bensoussan et al. studies (1984), in which 60% of the students chose to use bilingual dictionaries, 20% chose monolingual dictionaries, and the rest did not use a dictionary at all, either because they did not want to waste time, or because they had forgotten to bring their dictionaries to class. We see that the preference for bilingual dictionaries is consistent, in spite of the differences between those studies and ours, namely, the time elapsed (over 30 years), and the fact that their research dealt with print dictionaries, whereas ours used online dictionary tools. It is important to note that the Bensoussan studies were done with a similar population to ours, namely, tertiary EFL students with a similar language background and level (advanced), and the same type of reading comprehension test, in which the text was not taken away from students during the test.

Also, in the end of course preference question, our students showed a clear preference for L1 translations. However, *Google Translate* and *Morfix* were preferred to the new tools. This may be because students were more familiar with *Google Translate* and *Morfix* having used them often in the past. These results are consistent with Collins' findings (2016), which showed most students used internet-based bilingual dictionaries or translation software. But our results differ from Ko's study (2005) on glosses, in which most students preferred L2 to L1 glosses. The Ko study, however, is different from ours in several ways, which may explain the difference in

preference. Firstly, the Ko study looked at printed glosses rather than online dictionary tools. As mentioned above, glosses are selected and prepared beforehand by the instructor or researcher, whereas when using dictionaries (regardless of whether they are print, electronic or online), students can decide which words to look up. Secondly, in the Ko study, the text was taken away after fifteen minutes, and then students answered the questions without access to the text.

The limitations of our study are the small number of participants and the fact that the study was done with advanced EAP students only, which may have had an effect on the significance of the results. Had the study been conducted with lower-level students as well, they would have no doubt performed significantly better with the bilingual tool. Future research may explore this issue with a larger sample size or with various levels in order to obtain generalizable results.

Most academic texts in both EAP courses and content courses are online, and online dictionary tools, due to their availability and ease of use, can facilitate comprehension. We believe language teachers should consider making students aware of the new dictionary tools and teach them how to best utilize them when reading online texts in English. Based on the preferences shown in past research and in ours, it seems the choice of which tool to use, monolingual or bilingual, should be left to the students. New technologies and new digital tools are constantly being developed, and we feel it is important for instructors to be aware of these developments and to consider their possible usefulness for their students.

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Appendix A

Examples of quiz questions that require understanding the vocabulary. Note that we bolded the words students needed to understand in order to answer the questions.

Example from the text on Iran.

"To be sure, Iranian support to the Taliban—both real and potential—shouldn't be **overstated**. Shiite Iran isn't about to make the Sunni Taliban its newest regional **proxy**, on the model of Hezbollah. The current **surge** of Taliban attacks in Shiite regions of Ghazni province will also **prompt** Iran to be **cautious** in its efforts to arm the Taliban. Ultimately, the **deleterious** consequences of a **destabilizing** Afghanistan – particularly refugee flows and a robust drug trade – give Tehran good reason to keep partnering with Kabul to **promote** stability."

Why isn't Iranian support for the Taliban total? *Choose the best answer.* Because:

1. That would destabilize Afghanistan.
2. That would promote Afghan stability.
3. That would reduce the drug trade.
4. That would solve the refugee problem.

Example from the text on Saudi Arabia.

The **premise** of Mohammed bin Salman's reform effort has been that, prior to 1979—when Ayatollah Ruhollah Khomeini established an Islamic **theocracy** in Iran and Juhayman al-Otaybi **seized** the Grand Mosque in Mecca—Saudi Arabia was a moderate kingdom that respected the **diversity** and civil rights of its subjects. In March, CBS anchor Norah O'Donnell asked the crown prince whether the last 40 years represents the "real Saudi Arabia," and he replied, "I would ask your viewers to use their smartphones to find out. And they can google Saudi Arabia in the '70s and '60s, and they will see the real Saudi Arabia easily in the pictures." In an interview this spring with the Atlantic's Jeffrey Goldberg, Mohammed bin Salman similarly **portrayed** the Saudi Arabia of the 1960s and '70s as comparatively liberal—always citing 1979 as the turning point. "Before 1979 there were **societal guardianship** customs, but no guardianship laws in Saudi Arabia. … In the 1960s, women didn't travel with male guardians," he said.

The problem is that this story is a **myth**—indeed, it's the very myth that Saudi rulers in the decades prior to 1979 **peddled** to the United States in exchange for their material and diplomatic support in the region.

What is the myth? *Choose the best answer.*

1. Ayatollah Khomeini established an Islamic theocracy in Iran.
2. 1979 was a turning point in the reforms of Saudi Arabia.

3. Saudi Arabia of the 60s and 70s was liberal.
4. Saudi Arabia before 1979 was not liberal.

Example of cloze question

(Par. beginning with "Washington's hard line"). *Fill in the blanks with the correct words.*

US sanctions on Iran will probably _____ (benefit/hurt/not affect) the Afghan economy because of the _____ (reduced/increased/steady) income from the Afghans working in Iran.

Appendix B – Questionnaires

Questionnaire after quiz using *Reverso* (Hebrew translation)

1. Was *Reverso* helpful? *Circle ONE.*

not at all / somewhat helpful / helpful / quite helpful / very helpful

2. Approximately how many words did you look up? _____

Questionnaire after quiz using *Rewordify* (simpler English synonym)

1. Was *Rewordify* helpful? *Circle ONE.*

not at all / somewhat helpful / helpful / quite helpful / very helpful

2. Approximately how many words did you look up? _____

Comparison question after the 2nd quiz (after having used both tools)

3. Which of the two tools did you find more helpful? *Check ONE.*

[ ] *Rewordify*

[ ] *Reverso*

[ ] The two tools were equally helpful.

Question at the end of the course

Which of the following tools do you find MOST USEFUL to look up single words? *Choose **ONE**.*

[ ] *Google Translate*

[ ] *Morfix*

[ ] *Rewordify*

[ ] *Reverso*

[ ] Other _____