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Investigating the Effect of Translation Memory on English into Persian Translation

Abdul Amir Hazbavi

Department of English Language Translation and Teaching,
Islamic Azad University, Bandar Abbas Branch, Iran

Abstract: A Translation Memory (TM) is a database in which a translator stores translations for future re-use. To examine the probable impact of TM tools on English into Persian translation, the present study was conducted. The subjects of the study, who were selected via a language proficiency test (TOEFL), were 90 Iranian undergraduate students of English translation from Bandar Abbas branches of Islamic Azad University and Payeme Noor University, 45 as Control group and 45 as Experimental group. They were selected from among 120 B.A undergraduate students of English translation. To prepare homogenous groups of subjects and avoid bias, only the intermediate students were selected. The subjects first translated a text conventionally. Then during six training sessions, they got familiar with the concept of Translation Memory and learnt how to use the TM. Having passed the training sessions, the subjects took a translation test for which they were asked to translate a text of the same level of difficulty with that of the first text using the TM. Then, the results of the two tests were rated by 3 skilled translation raters according to the same translation checklist. Analyzing the scores of the translation tests using a T-test, the research hypothesis was supported which in turn indicated the positive effect of TM tools on English into Persian translation.

Key words: Machine Translation · Computer Assisted Translation · Translation Memory · Translation Database · MetaTexis

INTRODUCTION

Back Ground: The rising demand for translations over the last few decades has led to the recognition that software tools were urgently needed to help increase translators' productivity and to support them in their efficient and effective delivery of accurate and consistent translations in ever-shorter time periods [1]. In the 1980s Machine Translation held great promises, but it has been steadily losing ground to Computer Assisted Translation (CAT) because the latter responds more realistically to actual needs. Research revived in the late 1980s because the dream of large-scale access to personal computers became a reality. Many computer companies started to work on CAT and it was then that the early word-processing programs were introduced [2].

In practice, computer-assisted translation, computer-aided translation, or CAT is a form of translation wherein a human translator translates texts using computer software designed to support and facilitates the process. This term is a broad and imprecise term covering a range of tools, from the fairly simple to the more complicated. Among CAT tools, Translation Memory (TM) is of a prominent role [3]. TM is defined by the Expert Advisory Group on Language Engineering Standards [4] as "a multilingual text archive containing (segmented, aligned, parsed and classified) multilingual texts, allowing storage and retrieval of aligned multilingual text segments against various search conditions. As stated by Webb, translation memory (also known as sentence memory) consists of a database that stores source and target language pairs of text segments that can be retrieved for use with present texts and texts to be translated in the future [5]. In a simple word, a Translation Memory is a database in which a translator stores translations for future re-use, either in the same text or other texts. Basically, the program records bilingual pairs: a source-language segment (usually a sentence) combined with a target-language segment. If an identical or similar source-language segment comes up later,

Corresponding Author: Abdul Amir Hazbavi, Department of English Language Translation & Teaching, Islamic Azad University, Bandar Abbas Branch, Iran, 7918773451, Islamic Azad University of Bandar Abbas, Bandar Abbas, Iran. Tel: +60-133735329.

the translation memory program will find the previously-translated segment and automatically suggests it for the new translation [6].

Surveys indicate that work providers-the agencies and translation companies for which freelance translators work- continue to embrace TM enthusiastically [7]. The reason might be the great advantages of adopting TM into the translation, namely the productivity and quality assurance of TM, which at least in certain fields, are well established [8]. Moreover, translators are coming under increasing pressure from work providers to adopt TM with a view of driving down costs as well as enhancing quality which are considered to be benefits of TM [9].

The trend, as confirmed by surveys conducted in the past few years is for TM to be used in more jobs, for more languages and by more clients [10]. Since the adoption of TM is increasing, the academic studies on TM are increasing consequently and in fact TM is turning into an interesting subfield of translation studies. So far, many academic studies have discussed different aspects of TM. While some studies have investigated a certain brand of TM systems like the study on TransType and its impact on the productivity of users [11], others have discussed general issues related to TM systems, namely studies on the impact of TM systems on translation profession [12], approaches of finding matches in a TM system [13] and evaluation of TM systems [14].

Statement of Problem: TM systems have become indispensable tools for professional translators working with various types of documentation [15]. To meet the increasing needs of the translation market and to improve the productivity of the translators, many Translation Memory programs have been developed during the past 15 years.

Strangely, Iranian translators still do not use the translation tools that are and have been available for several years. They still keep track of terminology on paper, many of them use simple, unstructured word processors and very few use any specialized translation tool at all. The reason may be that they have little information about the technology and translation tools available today. The primary purpose of this study was to introduce Translation Memory tools to Iranian translators through determining whether it has positive effect on English into Persian translation and whether it will cause quality improvement or not. It is envisaged that this study will make an innovative contribution to the Translation Services by inspiring insights to translators in order to aid them for their adoption of translation tools.

Research Questions and Hypothesis: On the basis of the information presented so far, it is assumed that using Translation Memory may have some influence on English into Persian translation.

Research Question: In accordance to the presented assumption, the following question is raised:

Does Translation Memory have any effect on English into Persian translation?

Null hypothesis: using Translation Memory has no effect on English into Persian translation.

Methodology

Participants: The subjects of the study, who were selected via language proficiency test (TOEFL), were 90 Iranian undergraduate students of English translation at Islamic Azad University, Bandar Abbas Branch and Payame Noor University, Bandar Abbas Branch. They were divided into two groups, 45 as Control group and 45 as Experimental group. To prepare homogenous groups of subjects and avoid bias, only the students who had intermediate performance at the proficiency test were selected. It should be noted that the age and gender of the participants was not controlled.

Instruments: Materials used in this study were a language proficiency test (TOEFL PbT), a pretest and a posttest with equal level of readability as well as a Translation Memory software named “MetaTexis” with a previously developed corpus which was used to conduct the experimental group posttest. It should be mentioned that MetaTexis is not a stand-alone-program rather it runs in Microsoft Word which means that all MetaTexis functions can be accessed through MS Word. The great advantage of the integration in MS Word was that the subject did not have to learn a completely new program. In fact they only had to learn some new functions while all functions of MS Word were available too. The version of MetaTexis used in this research was Pro 2.8. The corpus of the study contained 100 English into Persian segments which were the most frequent terms regarding computer science and was developed using Hezareh Dictionary which is considered to be the most authentic English into Persian Dictionary available. Besides, a translation checklist with numerical rating scale was used to rate all translations according to the same criteria.

Design: The present study is a pre-experimental design. The group under the study had never got training in any Computer Assisted Translation tool prior to the study. This group was divided into experimental and control

group in which the experimental group received treatment that consisted of six sessions of training of how to use a Translation Memory.

Procedure: To start the research, the subjects were first selected via a language proficiency test. To make sure that the language proficiency test is a standard one, a Paper-based Test of English as a Foreign Language (TOEFL PbT) was provided. Those applicants, who had intermediate performance at the language proficiency test, were selected as the subjects of the study and were divided into two groups, 45 as experimental group and 45 as control group. The main section of the study began by conducting a pretest consisted of translating a text with controlled level of readability. The texts used in this study as pretest and posttest, were scientific texts related to computer science. To make sure that the second text used as posttest is not easier than the pretest and the difference observed is due to the impact of applying Translation Memory software to translation, the researcher had to make sure that our two tests - pretest and posttest- were of the same level of readability. In this study, MS Word was used to calculate the readability level of the pretest and posttests. The program calculated the following statistics for the two tests:

Having prepared the texts, the subjects in both groups were asked to translate the text in the conventional way as for pretest. Then, the subjects of the experimental group attended a six-session treatment aimed at introducing them with the concept of Translation Memory and teaching them how to work with Translation Memory software. Having finished the treatment, the subjects of both groups were provided with a text to translate, but this time the subjects of the experimental group were asked to translate the text with the help of the Translation Memory software.

Data Analysis: The results of the pretests and posttest were rated by 3 skilled translation raters according to the same translation checklist. Using SPSS version 16, the following analyses were made on subjects' scores resulted from above mentioned tests:

- Descriptive Statistics were run on the total scores of both groups

As shown in Table 2, the average of control group posttest (15.0673) has very slightly exceeded the average of control group pretest (14.9813). This increase is scientifically insignificant.

Table 3 presents different descriptive statistics of experimental group pretest and posttest. It shows remarkable increase between the average of pretest (15.6600) and the average of posttest (18.1600). This increase is statistically interpreted in later tables.

To make sure that the scores of all four tests have inter-rater reliability, the following set of correlations were run among scores of all the four tests

A correlation was run between Rater 1 and Rater 2 on the experimental group posttest scores

As shown on Table 4, the Correlation is significant at the 0.01 level (2-tailed); the r-value is 0.971, $p \leq 0.01$ which means the scores of Rater 1 correlate significantly with the scores of Rater 2. Another point is that the p-value which represents the probability of observing an r-value of this size just by chance is 0.000.

A correlation was run between Rater 1 and Rater 3 on the control group pretest scores

Table 5 shows the Correlation between rater 1 and rater 3. The correlation is significant at the 0.01 level (2-tailed); the r-value is 0.959, $p \leq 0.01$ which means the scores of Rater 1 correlate significantly with the scores of Rater 3.

A correlation was run between Rater 2 and Rater 3 on the control group posttest scores

The numbers in Table 6 indicate that the Correlation between rater 2 and rater 3 is significant at the 0.01 level (2-tailed); the r-value is 0.957, $p \leq 0.01$ that means the scores of Rater 1 correlate significantly with the scores of Rater 3.

To assess the intra-rater reliability of our raters, they were asked to rate 15 translations that were selected randomly out of the total of 45 prior to the main rating. The following set of correlations were run among the first and the second scorings of each rater:

A correlation was run between the first and the second scores of rater 1 on experimental group pretest

Table 7 indicates that the Correlation between the first and the second scores of raters 1 is significant at the 0.01 level (2-tailed); the r-value for rater 1 is 0.978.

A correlation was run between the first and the second scores of rater 2 on experimental group pretest.

Table 8 shows that the Correlation between the first and the second scores of rater 2 is significant at the 0.01 level (2-tailed); the r-value for rater 2 is 0.972 and $p \leq 0.01$.

A correlation was run between the first and the second scores of rater 3 on experimental group pretest

Table 1: Pretest and Posttest Readability

Pretest	Posttest:
Words: 637	Words: 637
Characters: 3260	Characters: 3171
Paragraphs: 25	Paragraphs: 22
Characters per Word: 4.9	Characters per Word: 4.7
Passive sentences 20 percent	Passive sentences 21 percent
Flesch Reading Ease 46.2	Flesch Reading Ease 44.6

Table 2: Descriptive Statistics of control Group

		Control Group Pretest Average	Control Group Posttest Average
N	Valid	45	45
	Missing	0	0
	Mean	14.9813	15.0673
	Median	15.1600	15.0000
	Mode	14.16[a]	15.00[a]
	Std. Deviation	1.58299	1.28914
	Variance	2.506	1.662
	Skewness	-.314	-.156
	Std. Error of Skewness	.354	.354
	Range	6.00	4.83
	Minimum	11.66	12.50
	Maximum	17.66	17.33
	Sum	674.16	678.03

a. Multiple modes exist. The smallest value is shown

Table 3: Descriptive Statistics of Experimental Group

		Experimental Group Pretest Average	Experimental Group Posttest Average
N	Valid	45	45
	Missing	0	0
	Mean	15.2771	17.9367
	Median	15.6600	18.1600
	Mode	14.33[a]	18.83
	Std. Deviation	1.96109	1.12146
	Variance	3.846	1.258
	Skewness	-.399	-.922
	Std. Error of Skewness	.354	.354
	Range	7.00	5.00
	Minimum	11.33	14.66
	Maximum	18.33	19.66
	Sum	687.47	807.15

a. Multiple modes exist. The smallest value is shown

Table 4: Rater 1and Rater 2 Correlation

		Rater 1	Rater 2
Rater1	Pearson Correlation	1	.971**
	Sig. (2-tailed)		.000
	N	45	45
Rater2	Pearson Correlation	.971**	1
	Sig. (2-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Rater 1and Rater 3 Correlation

		Rater1	Rater3
Rater1	Pearson Correlation	1	.959**
	Sig. (2-tailed)		.000
	N	45	45
Rater3	Pearson Correlation	.959**	1
	Sig. (2-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6: Rater 2and Rater 3 Correlation

		Rater2	Rater3
Rater2	Pearson Correlation	1	.957**
	Sig. (2-tailed)		.000
	N	45	45
Rater3	Pearson Correlation	.957**	1
	Sig. (2-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7: The correlation between First and Second Scores of Rater 1

		First Scoring	Second Scoring
First Scoring	Pearson Correlation	1	.978**
	Sig. (2-tailed)		.000
	N	15	15
Second Scoring	Pearson Correlation	.978**	1
	Sig. (2-tailed)	.000	
	N	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8: The correlation between First and Second Scores of Rater 2

		First Scoring	Second Scoring
First Scoring	Pearson Correlation	1	.972**
	Sig. (2-tailed)		.000
	N	15	15
Second Scoring	Pearson Correlation	.972**	1
	Sig. (2-tailed)	.000	
	N	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Table 9: The correlation between First and Second Scores of Rater 3

		First Scoring	Second Scoring
First Scoring	Pearson Correlation	1	.980**
	Sig. (2-tailed)		.000
	N	15	15
Second Scoring	Pearson Correlation	.980**	1
	Sig. (2-tailed)	.000	
	N	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Table 10: Paired Samples Test of Control Group

	Paired Differences							
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	Df	Sig. (2-tailed)
Pair 1 Control Group Pretest Average Control Group Posttest Average	-.08600	1.65387	.24655	-.58288	.41088	-.349	44	.729

Table 11: Paired Samples Test of Experimental Group

	Paired Differences							
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	Df	Sig. (2-tailed)
Pair 1 Experimental Group Pretest Average Experimental Group Posttest Average	-2.65956	1.15241	.17179	-3.00578	-2.31333	-15.481	44	.000

The numbers in Table 9 show that the Correlation between the first and the second scores of rater 3 is significant at the 0.01 level (2-tailed); the r-value for rater 3 is 0.980 and $p \leq 0.01$.

The numbers presented in the last three tables indicate that the first scores of all three raters correlate significantly with their second scores therefore; the level of intra-rater reliability is acceptable.

To see if there is any significant difference between the performance of our Control group subjects in pretest and posttest, a Paired Sample T-test was run among the averages of pretest and posttest.

The above table shows that the posttest average of Control group (M=15.0673) did not significantly exceeded pretest average of Control group (M=14.9813) while t (44)=-0.349 and Sig. (2-tailed)=0.729 which is not $\leq .05$. This means that the difference observed among control group averages of pretest and posttest is not a significant reliable difference.

A Paired Sample T-test was run between the averages of pretest and posttest of the Experimental group to see if there is any significant difference among the averages of this group

Table number 11 shows that the posttest average of Experimental group (M=17.9367) significantly exceeded pretest average of Experimental group (M= 15.2771) while t (44) = -15.481 and Sig. (2-tailed) = 0.000 which is ≤ 0.05. This means that the difference observed among pretest and posttest averages of experimental group is a significant difference.

Conclusion and Implications: In social sciences when the significance is below 0.05 (e.g. 0.000) the null hypothesis should be rejected and the alternative hypothesis will be accepted. As shown in section 5 of the data analysis (Table 11), the paired samples statistics of experimental group say that the t-test with 44 degrees of freedom was significant which in turn means that the null hypothesis can be rejected. This also means that the difference observed among Experimental group averages of pretest and posttest is a significant reliable difference. Ultimately, this indicates that Translation Memory tool had positive effect on English into Persian translation.

Implications and Suggestions for Future Studies: In the present research, beside the productivity improvement, it was scientifically approved that Translation Memory has positive effect on English into Persian translation and can result in translation quality improvement. The Iranian translation agencies as well as freelancers, who work on English into Persian translation, can take the advantages of integrating this technology into their own work in order to improve their productivity and to produce high quality translations in a shorter period of time. The use of Translation Memory tools can also turn them into an up-to-date translator equipped with the newest technologies on the market that in addition to earning more income has its own benefits too.

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