CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

This chapter is concerned with describing the methods that aim at empirically answering the research questions preset in the introductory chapter. The study follows a deductive approach in a sense that the research begins with a question or a theory that narrows the focus of the research and allows the translation strategy to be analysed systematically (Seliger and Shohamy, 1989). Accordingly, the research is descriptive whose main concern is a deep description of TSs and TPs used by student translators when translating culture-based texts from English into Arabic. TSs and TPs are part of strategic competence and instrumental competence which are of the most important elements of translation competence. To be specific, the study is devoted to explore the students’ deficiencies in strategic competence\(^9\), instrumental competence\(^{10}\) and cultural competence, which will be investigated through students’ translation of the texts (i.e. translation task), Translog software, (namely task time, keylogging, length of segmentation) and questionnaires. In using such research tools, the strategies employed by the students to comprehend, produce edit and evaluate the text are expected to be revealed.

The concern of Chapter Three is to provide a detailed account of data elicitation techniques, sampling, and procedures followed in implementing this study, which are detailed in the following sections.

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\(^9\) It controls the translation process. Its function is to plan the process and carry out the translation project (selecting the most appropriate method); evaluate the process and the partial results obtained in relation to the final purpose; activate the different sub-competences and compensate for any shortcomings; identify translation problems and apply procedures to solve them (PACTE, 2003)

\(^{10}\) Use of online tools such as online dictionaries, search engines to solve comprehension and production problems.
3.1. Operational Definitions of Variables

Variables are those different factors, which play a role in a study. In order for findings to be clear, the investigator must be able to say that the results are due to the particular factor studied and not to anything else that may have been presented at the time the research was conducted (Seliger and Shohamy, 1989). This study dealt basically with the detailed description of the independent variable and dependent variable and studied the relationship between them. In descriptive study, the independent variable is called predictor or exploratory variable to distinguish it from experimental study (Field, 2013). The study devoted itself to deep description of the independent variables, (i.e. translation strategies) and dependent variable, (i.e. translation procedures) in order to reveal how the students translate in different phases of translation process and product. Besides, the study attempted to find whether there is a correlation between such variables.

3.1.1. The Dependent Variable

A dependent variable is defined as a variable, which changes or is influenced according to changes in one or more independent variables. It is the effect or the result of the independent variable (Richards et al., 1985). It is the means by which any changes are measured. In this study, the dependent variable was operationalised as the translation product, namely TPs (linguistic shift in changing ST text into TT such as 'transference', 'transference+ explicitation', 'transference+ explanation', 'neutral explanation', 'omission' and 'cultural substitution'. These variables were measured through the informants' translations of the (27) cultural loaded words embedded in the five culture-based texts. The dependent variables were expected to be associated with translation operations in the translation process, namely TSs (i.e. independent variable).
Here, it is crucial to define accurately the dependent variables, which are represented by TPs to show their boundaries so they can be measured accurately.

a) Transference: Students transliterate or translate literally SL words or expressions.

b) Transference+ explicitation: Students add words to make SL words or expressions explicit for TL reader, keeping the cultural meaning of SL words or expressions.

c) Transference+ explanation: Students define SL words or expressions for TL reader, keeping the cultural meaning of SL words or expressions.

d) Neutral explanation (i.e. deculturalization): Students define SL words or expressions for TL readers, deleting the SL cultural meaning of the SL words or expressions.

e) Omission: Students delete part of meaning of SL words or expressions

f) Cultural substitution: Students replace SL words or expressions with TL words or expressions (i.e. cultural equivalence). Note that such classification is based on Olk (2013) categorisation of cultural reference translation procedure.

3.1.2. The Independent Variable

It is the predictor variable since it will predict what will happen to a second single variable to which it is related in some way (Seliger & Shohamy, 1989) and (Filed, 2013). In other words, variations in the independent variable predict corresponding changes in the dependent variable (the predicted). In this study, the independent variable is TS (i.e. mental strategies to solve the comprehension and production problems), which are expected to predict the changes in translation product. To be specific, the independent or predictor variables were operationalized as
TSs (mental strategies to solve comprehension and production problem such as problem identification, search memory, context, guess, dictionary use, search engines, re-read and revise). These strategies were supposed to have an association with what happen to the texts such as explicitation, explanation, omission or cultural equivalence. In other words, these factors were expected to have an association with the students' product of translation.

### 3.2. Research Questions and Methods

However, the aims of the study have been mentioned in the introductory chapter, there is a need to re-mention them here to manipulate and examine them practically. This study aimed mainly at investigating the TSs (i.e. mental strategies) and TPs (i.e. linguistic procedures) used by student translators in translating culture-based texts from English into Arabic, which will explore the strategies used by the students to comprehend, edit, and evaluate the text and procedures employed by the students when rendering a ST into a TT. Accordingly, the students’ difficulties in translation process and product would be explored. The importance of investigating TSs and TPs lay in accounting for extra-linguistic competence (namely cultural competence), strategic competence and instrumental competence, which are crucial components of translation competence. Finally, the study attempted to examine whether there was a correlation between TSs (i.e. mental strategies) and TPs (i.e. linguistic shifts) in order to reveal the areas in which the translation process associates with the translation product.

To address the research questions, Translog was used to record translation process via task time (i.e. skimming time, drafting time and post-editing time), keylogging, mouse clicks and pauses. Besides, the students' responses to the questionnaires, in which they explicitly stated the strategy they used in translating a
certain cultural word, specified the general strategies explored by Translog. To be specific, the task time revealed three operations: skimming, drafting and post-editing. The keylogging revealed the online revision (students translated and edited at the same time), typing and looking for online assistance via online dictionaries and search engines. The questionnaire was divided into eight categories (problem identification, search memory, guess, use context, monolingual dictionary, bilingual dictionary, search engines, re-read and revise).

The metric of translation product is linguistic procedures (i.e. transference, explicitation, explanation, neutral explanation, omission and cultural substitution), which are used to render ST into TT. These procedures were measured through the students' translations of the 27 cultural words embedded in the five culture-based texts.

3.2.1. Sampling

This section sheds light on the subjects of the study and the way of their selection. It is an important stage since it is a determining factor in attaining the objectives of the study and making the needed generalisations. When it comes to the search for informants for an experiment, two important issues should be taken into account: the representativeness of the sample and the size of it. These two factors can either contribute to getting a fairly correct generalisable estimates or converting the experiment into a case study.

Most empirical studies on translation have been based on rather small samples. Jensen (2001) offers an overview of the empirical translation studies with a few informants ranging from 2 (Séguinot 1996), 3 (Tirkkonen-Condit 1989), 12 (Gerloff 1986) to 18 (Kiraly 1986). An exception was Lörscher's (1991) analysis of 52 orally produced translations. Krings (1986) studied translations of two texts by eight

As for this study, it covered five texts of various topics of culture, which were translated by forty students, which is sufficient to draw conclusions on postgraduate students' use of TSs and TPs in the Department of Translation, Najran University.

3.2.2. The Participants

As with any project that involves the use of survey as its main research instrument, it becomes evident that the generalisations of the results of the study would depend on its sample size. The subjects of the study were MA students of translation in the last year of graduation in the College of Arts, Najran University. Being master students, second year, it was expected that the programme has equipped them with the necessary skills and knowledge to join the translation profession. Note that, all the students targeted by the study have TOEFL since it is required for joining master programme. 40 female students were taken randomly from the second year of master's programme, Department of English, College of Arts. The Education system in Saudi Arabia is based on segregation of males and females. Besides, there were no male students enrolled in postgraduate programme in the year the study was conducted.

3.2.3. The Selection Process

The selection of the subjects was random in order to avoid any bias and ensure the generalisation of the study's findings. It is a modified form of simple random sampling. "It involves selecting subjects from a population list in a systematic rather than a random fashion" (Cohen and Manion 2000, p. 100). The starting point for the selection is chosen at random. Then, the decision was made by making a simple
statistic—the total number of the wider population being represented divided by the sample size required.

3.3. The Choice of the Method

The methods of the study highly considered the research questions so that they can be best answered. Using translation task, Translog software and questionnaire aimed at answering the questions of the research. To show the degree of match between the research questions and the research tools, the following section sheds light on how the questions of the research are expected to be answered through the research tools.

The first question was concerned with the 2nd year master students’ use of TSs and TPs in translating culture-based texts from English into Arabic. It was answered through the instrument of Translog software, translation task and questionnaire. As for Translog software, it revealed the students’ use of TSs such as using keylogging, namely text production, text elimination, miscellaneous keystrokes, task time (skimming time, drafting time and post-editing time), translation units (length of segmentation), mouse clicks (connected with using online dictionaries). The questionnaire explicitly demonstrated the strategies used by the students as stated by them in different stages of translation, starting with problem identification and ending with evaluation of translation solution. Regarding translation task, it explored the linguistics procedures used by the students when translating the texts such as transference, explicitation, explanation, etc.

3.4. Methods and Procedures

The search for the methods to carry out the investigation was targeted toward the most appropriate methods that best fulfill the research objective. The major research objective is to analyse TSs and TPs used by the subjects when translating
culture-based texts from English into Arabic. To investigate the TSs used by the students during the translation of culture-based texts, the study used Translog software. The use of such method was based on translators’ dependence on a computer when translating and accordingly these are expected to best show how the students react with the texts they translate on a computer. As for TPs, the translation task showed the linguistics procedures used by students to solve translation problems. Finally, Pearson correlation was applied measure the correlation between TSs and TPs. Exploring the correlation between TSs and TPs is expected to reveal the areas of associations between them either positively or negatively. The explanation of such instruments is the concern of the following sections. Note that measuring the correlation between TSs and TPs is not central to this study.

3.4.1. Translog Software

Translog software has been developed by Arnt Lykke Jakobsen, Center for Research and Innovation in Translation and Translation Technology at Copenhagen Business School in Denmark. It is used to measure the translation process and product. Regarding the translation process, the software records keylogging such as text production keystrokes, text elimination, mouse activities. It shows students' segmentation of the text they are translating (translation unit). The software shows translation time in three phases of translation – reading via start time\(^ {11} \), drafting (actual translation) via translation duration and post-editing via stop time\(^ {12} \). As for translation product, the software has two windows: one for a ST and the other for showing the students' translation (TT) so that the student's translation can be observed. Through examining the students' translations, TPs can be explored (linguistic solution).

\(^{11}\) Skimming time
\(^{12}\) Post-editing
Translog data (i.e. production keystrokes, mouse clicks, deletions and cursor navigation) provide information about rhythm, speed of translation, text production, editing, etc. By recording pauses, it is possible to study “how subjects distribute their time over different linguistic units” (Wengelin 2006, p. 111). Translation on computer replaces translation on paper and so researchers should consider such issues in the use of research tools. In this regard, Translog was used in this study to ensure high ecological validity in the sense that it can be used in studying the task performance under its normal conditions (Dimitrova, 2005).

Translog has the potentials to trace the entire translation process and product in a sense that it records the translator's operations in different stages of translation, all the way from preliminary reading to end revision (i.e. post-editing) of the TT. In Jakobsen's words ‘Instead of seeing only the final product, we can observe all the underlying, preliminary layers of text and decision-making that contributed to the making of the final version’ (1999, p.12). It was decided on this research design because it assures the following issues:

1. Objectivity: Other researchers can use the same design and measuring instruments to investigate and learn more about individuals’ process of translation competence acquisition.

2. Repeatability: The experiment was made public so it can be repeated by other researchers.

3. Generalizability: The results can be made universally applicable.

4. Validity: The goal of the experiment is reflected in the results (Orozco, 2000, pp. 203-213).
3.4.1.1. Keystroke Logging (Keylogging)

Through observation of keylogging, it is possible to get a clear and comprehensive image of translation process and product. To be specific, recording text production, elimination keystrokes, mouse click, length of segmentation (translation unit) and pauses explored the strategies employed by the students. Translog software provided a visual report of translation process, starting with skimming time and ending with post-editing time. It presented two types of reports: textual level and lexical level. As for the textual level, Translog provided a report of user events (i.e. total user events, text production, text elimination, mouse events, cursor navigation, mouse events and miscellaneous events) and task time( i.e. translation duration, total user event per minute, text production per minute). Figure (3) below shows a report of the keylogging at textual level.

Figure (3) Keylogging Data at Textual level

As for Total user events, they include A-Z characters and operations employed by translator to render the ST into TT, namely text production, text elimination, cursor navigation, mouse events and miscellaneous events.
Recording text production keystrokes revealed the number of keystrokes used by the students to produce alphabetical characters and punctuation marks, which showed whether the students added in the text or omitted. Text elimination showed the online revision (the students translate and edit at the same time). The mouse clicks showed primarily the students' search for online assistance (Translog Manual, 2012). As for task time, it showed the time consumed on translating the whole text. It also showed the production keystrokes and total user keystrokes the students clicked in a minute, which reflected the degree of the speed of translation process.

At lexical level, Translog provided a linear view of translating the whole text, recording all the activities employed by the students to translate every word via pauses, mouse clicks, translation unit, navigation keystrokes and time spent on every word and expression. Besides, it demonstrated important issues such as 'Start' (skimming time), which showed the time spent on reading before students' start of translating and 'Stop' (post-editing), which showed the time spent on post-editing. See Figure (4) below.

Figure (4) Linear View of Keylogging Data at Lexical Level

The lexical level report demonstrated where the students paused, edited, clicked the mouse and navigated the cursor. It also demonstrated the fluency or
disfluency of translation process in translating certain expressions or words. Note that Translog provided data for every student while translating a certain text. The researcher collected such data of all informants and organised them to compare between them properly, which was a daunting task in terms of time consumption, level of software knowledge, skills of dealing with such software and degree of accuracy required to collect such data (See Fig.2 & 3).

Regarding typing skills, the informant had good typing skills. They had diploma in Computer Applications. Besides, the students studied computer as requirement in each level of bachelor programme. Moreover, the experiment was conducted in the Language Laboratory of the Department of Translation. Such issues were considered to ensure that the students do not have difficulty in typing skills and so there is no other variables that affect the students' performance while translating.

3.4.2. Questionnaire

Use of multiple instruments ensure the validity of the results since each instrument supplements the other. The combination of instruments has great potentials as it can bring out the best of both approaches while neutralizing the shortcomings and biases inherent in each paradigm (Dornyei, et al. 2009). In fact, integrated use of multiple data collection methods has created a fertile ground for the increased use of professionally designed questionnaires as psychometrically sound measuring instruments (ibid).

The questionnaire was basically used to supplement the results of keylogging data. It aimed to explore the TSs as explicitly stated by the students when translating the 27 cultural expressions included in the five texts. It was designed according to Krings (1986), Lorsher (1991), Gerloff (1988) research findings on TSs. The students ticked the TSs they used in translating every word or expression (See Appendix 2).
The questionnaires had eight categories: problem identification, search memory, guess, context, monolingual dictionary, bilingual dictionary and search engines, re-reading and revision (See Appendix 2). In doing so, a list of the TSs employed by the students were revealed, which supplemented the results of Translog software, namely task time and keylogging data. Besides, a correlation between TSs revealed by the questionnaires was correlated with the TPs revealed by the translation task, which detected whether there was a direct association between the translation process and product.

3.4.3. Translation Task

The design of the translation task took into account the objectives of the study either in the selection of the texts, their length and degree of readability of the texts, which is the concern of the following section.

3.4.3.1. Texts Selection

The main criterion of selecting the texts to be translated by the students was that they exhibited as many varied cultural translation problems as possible. They were selected on the basis of the translation theorists' classifications of the cultural translation problems that have been presented and developed by the researcher in Chapter Two. The second criterion was that they were authentic texts since they best represent English culture. Authentic texts were chosen from different sources such as electronic British newspapers, namely Guardian, and textbook of Translation such as Ghazala (2008) etc., assuming that they best reflect English culture (See Appendix1). Besides, in the process of looking for authentic texts I considered the classification of cultural translation problems so that the texts become representative of the cultural translation problems. To make sure of the problematicity of translating the culture-based texts that have been selected for the study, I translated them and underlined the
difficult items and sections in each text. Besides, the researcher's translation of the texts was useful in judging whether the classification of cultural translation problems was represented in the texts or not.

The translation task generally consisted of five texts of 27 cultural loaded words that covered different types of cultural problems (i.e. social culture, political culture, technical terms and institutional terms (See Appendix, 1). The texts were short so that the respondents react positively to the translation task by translating all the texts. The cultural translation problems were approximately covered in the texts selected for the study.

As the main purpose of the task was to investigate the TPs (linguistic shift) employed by students when translating culture-based texts from English into Arabic, the selection of the texts was based on the assumption that the texts exhibited many cultural differences between the SL and TL culture in terms of social, political, institutional and technical expressions. The study did not aim to classify culture rather than to explore the process and product strategies employed by the students to translate such types of texts.

3.4.3.2. Text Readability

As the study aimed to explore the TSs and TPs used by the students when translating, it was crucial to measure the level of such texts' readability to ensure that the texts match the level of the students. Lix formula is one of the prominent formula to measure text readability, which was used to measure readability of the five texts used in the study. The first step in the text analysis was to analyse the text readability in order to see whether they match the level of the students and ensure the clarity of the text. Readability tests and readability metrics are a way to measure the reading ease, comprehension, retention, reading speed, and reading persistence of a text.
Among such metrics is Lix formula that measures the students' level on a scale from very easy to very difficult. Table (2) below demonstrates such levels.

Table (2) Lix formula of Text Readability

<table>
<thead>
<tr>
<th>Degree</th>
<th>Significance</th>
<th>level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–24</td>
<td>Very Easy</td>
<td>Elementary</td>
</tr>
<tr>
<td>25–34</td>
<td>Easy</td>
<td>Primary</td>
</tr>
<tr>
<td>35–44</td>
<td>Standard</td>
<td>High school</td>
</tr>
<tr>
<td>45–54</td>
<td>Difficult</td>
<td>College</td>
</tr>
<tr>
<td>55+</td>
<td>very difficult</td>
<td>Above</td>
</tr>
</tbody>
</table>

Lix formula (Schulz, 1981) was applied to the five texts to see the degree of their readability. It was found that the grades of readability of the five texts matched the level of the students (some below the students' level, namely level of college students), which ensured that the texts did not have any complexities in its readability except cultural load, which the study aimed to examine. Note that such text readability formula cannot account for cultural issue since cultural words are more implicit.

The grades of readability scales of text (1), (2), (3), (4) and (5), as determined by the Lix formula, were 54, 34, 53, 73 and 43 respectively, which means that all the text were below the students' level except text (4), (73), matching the level of postgraduate students. In doing so, the texts were clear and simple in terms of structure of sentences, words and syllables for informants. Based on readability the grades, it was expected that the students would not find any difficulty in the process of comprehension due to the structure of sentences. See Table (3).
Table (3) Lix Readability Formula of the Five Texts

<table>
<thead>
<tr>
<th>Text No.</th>
<th>No. of Words</th>
<th>Character No.</th>
<th>Syllabus No.</th>
<th>Sentence No.</th>
<th>Characters per word</th>
<th>Words per Sentence</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>66</td>
<td>339</td>
<td>109</td>
<td>3</td>
<td>5.1</td>
<td>21.7</td>
<td>51</td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>314</td>
<td>91</td>
<td>2</td>
<td>4.56</td>
<td>30.5</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>66</td>
<td>228</td>
<td>53</td>
<td>2</td>
<td>4.72</td>
<td>19.50</td>
<td>53</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>175</td>
<td>44</td>
<td>1</td>
<td>5.88</td>
<td>25</td>
<td>73</td>
</tr>
<tr>
<td>5</td>
<td>477</td>
<td>679</td>
<td>165</td>
<td>6</td>
<td>4.4</td>
<td>19</td>
<td>43</td>
</tr>
</tbody>
</table>

3.4.3.3. Translation Brief

The informants were given background about the texts they are going to translate in terms type of culture-based text and type of reader they are going to translate to. They were informed that the texts are written for general readers in the street. The texts are parts of news articles and they are directed to general Arabic readership.

3.5. Pilot study

The aim of the pilot study was first and foremost to test the feasibility of conducting the study in terms of representative sample, appropriate methodology and the problems that are expected to occur when conducting the main study and answering the research questions. Five postgraduate students were selected informally to do the translation task, using Translog. After doing the translation task, they were given questionnaires to choose the strategy the used in translating the culture-based texts. It was found that answering the research questions is feasible via the using translation task, Translog and questionnaires. The results of pilot study alerted the researcher to use shorter texts, and give students more time for conducting the translation task. The pilot study was helpful in determining the elements of the questionnaire and ensuring the validity of applying Olk's classification (2013) of TPs.
to students' translations of culture-based texts. Besides, it was helpful in alerting the researcher to the importance of presenting sufficient tutorial to students regarding how to deal with Translog and procedures of the experiment of the study.

3.6. Data Collection Procedures

The main study was designed on the basis of the pilot study, which was very useful in determining the final format and content of the translation task and questionnaire. As for Translog, it recorded the students' behaviours in translation process and product. To be specific, it has two windows, one for the ST and the other for the TT so that a researcher can analyses the students' translations. The translation process was recorded via two windows (Linear view and Statistic window. (See Fig.2 & 3).

As for the translation task, the students were given instructions of how to deal with the windows of Translog in terms of translating and using online dictionaries and search engines in case of encountering comprehension and production problem. The experiment was held in the Language Lab of English Department. The students were motivated by translation teacher by deciding the task as a part of the students' activities. The data were collected by means of five texts that consist of 27 cultural loaded expressions. The subjects were allowed to use online dictionaries and search engines, but reported that in their responses to questionnaire. Besides, the questionnaire was useful in investigating the difficulties as perceived by the students, which supplemented the Translog data in translation process. Besides, the questionnaire results were correlated with translation product (i.e. TPs). The Translog recorded the students' translations and showed that in a window that enabled the researcher to judge the students' translations and identify the procedures that the
students used in translating the 27 cultural loaded words so that such procedures could be classified and placed in certain categories.

Note that the number of cultural words to be assessed was 27 distributed in the five texts (see Appendix 1 and 2). The acceptable translation of every cultural word was given one point and so the maximum score for acceptable translations was 27. The raising question is that what factors followed to assess the acceptable or unacceptable translation. Two factors were followed in the assessment: a) clarity for TL readership and retaining the SL meaning (Mailhac, 1996)

In sum, the data were collected in the whole study through Translog data (task time, keylogging data and length of segmentation), questionnaire to analyses translation strategy (translation process) and translation task to analyse translation procedure (i.e. translation product).

3.6.1. Data Analysis (Translation Process)

The data collected were based on the students' translations recorded by Translog. It recorded the students' behaviours in translation process, namely TSs. The Translog recorded the TSs employed by the students at textual and lexical levels. At textual level, Translog recorded keylogging (total user events, text production, text elimination, mouse clicks, navigation, keystrokes) and task time (skimming time, drafting time and post-editing). At lexical level, the linear view provided detailed report of how the students translated every sentence, expression and word. The students' pauses, deletions, additions were recorded. Besides, mouse clicks and navigation keystrokes were recorded. All such operations were collected per se for every informant and organized by the researcher in order to explore the strategies used by them. Besides, the problematic areas that encountered informants were revealed in their use of TSs.
As for the questionnaire, the students' responses to the questionnaire revealed the strategies used by them according to their perspective. The students' responses to the list of strategies (whether they used this or that strategy) supplemented the data of Translog. Combining results of keylogging and questionnaire helped arriving at accurate analysis of the TSs employed by the students in translation process.

3.6.2. Data Analysis (Translation Product)

The product data, (namely TPs) were collected through the students’ translation of the five texts (27 cultural loaded words). Analysing translation product was based on the analysis of TPs (i.e. linguistic shifts) employed by the students when translating such cultural words or expressions. Olk's (2013) classification of cultural reference TPs was applied to analyse the students' translations of the 27 cultural loaded words. Such classification was empirical and matched the data of the study. Based on such analysis, the students' problems in the process of production was revealed. Besides, the students' acceptable translations were assessed according to Mailhac's (1996) parameters of TP selection.

3.6. 3. Correlation between Translation Process and Product

There is a need here to state that measuring correlation between TSs and TPs is not central to the study. It was an attempt to enrich the translation strategy and procedure analysis with the areas of associations between them. It was assumed that appropriate use of TSs has associations with the right selection of TPs. Therefore, Pearson correlation was applied see whether there was a correlation between a certain translation strategy and a certain translation procedure. Applying Pearson correlation aimed to see the areas of relations between translation process and product, which could help recognise the association between a certain adequate TS and TP.
3.7. Inter-Rater Reliability Test

Inter-rater reliability refers to the extent to which two or more individuals agree on their measurement of an item. Therefore, the more unanimous the agreement reached the more reliable the system of assessment will be, and thus the more valid are the results (Seliger & Shohamy, 1989). It is defined as the degree to which an instrument yields the same results for the same individual at the same time with more than one judge (inter-rater) (ibid).

Two raters were acquainted with the task of assessment and given a copy of a rater guide containing a description of each category, a sample of subjects’ translations, one version of a model of translation for each text to be assessed and classification of TPs and TSs. The raters would only specify the main category and its immediate sub-categories and compared them with the existent categorisation. Disagreement on locating main and sub-categories was noticed in the first session. Then, it was overcome by discussing the aspects of disagreement between the raters and the researcher. Then, the process of adjusting the categorising system took place after the process of discussion and modification of the aspects of disagreement.

3.8. Intra-Reliability Test

Intra-Reliability Test aimed to detect the degree to which an analysis yields consistent data (ibid). In this case, the researchers will get access to the original sources and repeat the analysis and interpretations in order to get accurate and consistent data. In the present study, the researcher repeated assessing and categorising TSs and TPs after a short period so that the consistency of categorising system is maintained.
According to inter and intra-reliability tests, the categorisation system was after some amendments proved to be reliable for the actual analysis of the raw data of the subjects' translations.

3.9. Statistical Methods

The researcher used Statistical Package for Social Science (SPSS) to perform statistical operations that the study required to attain its objectives. To analyse the keylogging, task time and length of segmentation data (i.e. translation unit), the researcher used Descriptive Statistics, namely the mean, and standard deviation in order to analyse the students' use of TSs. Multiple responses analysis was applied to reveal the percentages of the students' use of TSs as perceived by them to explore the most frequently strategy that informants opted for. The multiple responses analysis was also used to measure the percentage of students' use of TPs in order to reveal the most recurrent procedures used in every text and its relationship with acceptable translation. See Fig. (5) below.

Figure (5) Multiple Response Analysis of Translation Strategy
Besides, the descriptive statistics namely the mean was used with students' scores, which revealed the students' performance in translation process and product. It was also useful in interpreting the students' performance in relation to the translation process and product.

Finally, Pearson correlation was applied to measure the correlation between the students' use of the TSs and the TPs.