4. Triangulation and Software Evaluation

This chapter comprises three sections; the first section deals with the concept of triangulation as an approach in quantitative and qualitative research and how it is helpful. The next section will examine the way the methods for triangulation have been used in translation studies while discussing the kind of information and insights that they provide into the translation process. However, in this chapter, I will be focusing on the methods that rely on technology. The methods used for eliciting the “Other” data will be discussed in the next chapter. The third section deals with the software evaluation aimed at combining software and technology while looking at the features and functions that they provide. The main aim is to examine which type of software will be able to capture what kind of data and how efficiently and effectively it can be done.

4.1. Triangulation and Research

4.1.1. Introduction
The concept of triangulation in social sciences is very much similar to the survey techniques used in navigation and geographical survey that use trigonometry to locate a certain point based on calculations with reference to two other distinct points. The use of Triangulation or mixed method approach in social science research dates back to Campbell and Fiskel (1959) with the introduction of the idea of “Multiple- operationalism” the concept of Triangulation was further developed by Webb et.al. (1966) and subsequently developed by Denzin (1970).

Triangulation is an approach adopted in research pertaining to social sciences and behavioral sciences where prediction of phenomena is a difficult task as the fields are not exactly similar to natural science and there are great amount of variations owing to factors such an individual’s behaviour, social and cultural backgrounds unlike natural sciences where the results of a research often may add up to a
logical conclusion that most often may not vary when the study is replicated elsewhere.

Webb, in his paper in 1966, advocates the use of mixed methods to observe the social phenomena, however, in an unobtrusive manner where the subjects of study are not conscious that they are being studied in order to observe the subjects behaviour in a natural environment.

The prime objective of any research in social sciences is to investigate and to find answers to a research question in a given social context. Dependence on a single method may lead to intuitive generalization of a certain phenomenon. The reason being, every method has its own limitations as no single method is complete in itself. Matters get further complicated in social research as in most cases there is no established scale to measure a phenomenon and present the measurement numerically.

Therefore, the limitations and the shortcomings of a certain method can be overcome by the other methods included for investigating the same phenomenon by adopting a mixed method approach i.e. a triangulative approach and effectively compensate for the shortcomings and limitations posed by a given method.

By combining multiple observers, theories, methods, and empirical materials, researchers can hope to overcome the weakness or intrinsic biases and the problems that come from single-method, single-observer, single-theory studies and remove biases from the research. Often the purpose of triangulation in specific contexts is to obtain confirmation of findings through convergence of different perspectives. The point at which the perspectives converge is seen to represent reality.

Jakob (2001) as quoted by Rahman and Yeasmin (2012:1)
This in turn may be useful in strengthening the basis of arguments made by the researcher that is to say that if the findings based on multiple methods show a convergence, the validity and the reliability of the results of the study are reinforced and the theories emanating from such researches are felt to have a stronger grounding as compared to researches that adopt a single method approach. Further, triangulation also may help overcoming the issue of bias in a study.

Yeasmin and Rehman (2012) cite three types of biases:

(1) measurement bias that is caused by the way in which data are collected
(2) sampling bias that is caused by the exclusion of part of the population under study
(3) procedural bias associated with the study that occurs when participants are put under some kind of pressure to provide information.

Therefore, Triangulation may prove to be effective in enhancing the credibility of researches as observed by scholars.

The concept of triangulation, however, is only an approach and does not particularly specify the methods that are to be used in study. The mix and blend of the methods would purely depend on the research question and the nature of research.
4.2. Types of Triangulation

Denzin further developed the concept of Triangulation by classifying and defining Triangulation into following four types:

1. Data triangulation, which entails gathering data through several sampling strategies, so that slices of data at different times and social situations, as well as on a variety of people, are gathered.
2. Investigator triangulation, which refers to the use of more than one researcher in the field to gather and interpret data.
3. Theoretical triangulation, which refers to the use of more than one theoretical position in interpreting data.
4. Methodological triangulation, which refers to the use of more than one method for gathering data.

He further brings in a distinction of *within the process* Triangulation where variations of the same method are used and *between the method* Triangulations where a combination of various methods are used to study a particular phenomena.

4.3. Triangulation in Qualitative and Quantitative Researches

4.3.1. Quantitative Research

Quantitative researches use experimental methods and quantitative measures that enable researchers to test the generalizations made by other scholars and also focus on gauging the various variables of a study while analyzing their interrelationships (Denzin and Lincoln, 1998). Quantitative research helps the researcher to acquaint himself with the problem as well as to an extent allows him to formulate a hypothesis for testing.
The typical characteristics features of Quantitative researches are:

1. the emphasis is on facts and causes of behaviour (Bogdan & Biklen, 1998, as quoted by Golafshani, 2003:597)
2. the data is numerically represented so that it can be quantified and summarized (Golafshani, 2003:597,598)
3. the numeric data is necessarily analyzed using mathematical methods (Golafshani, 2003:598)
4. the final result is expressed in statistical terminologies (Charles, 1995, as quoted by Golafshani, 2003:598).

### 4.3.2. Qualitative Research

Qualitative research unlike constructional positivistic approach of quantitative research adopts a naturalistic approach that attempts to study and understand in a real world setting while allowing the phenomenon to occur naturally without influencing or manipulating the inherent nature of the phenomenon in any way. Any research that does not involve statistical or quantification methods may be included into the category of Qualitative Research.

Qualitative analysis results in a different type of knowledge that is more philosophical in nature as compared to quantitative researches where the knowledge represented is statistical or scientific in nature. Methods like interviews and observations are main methods of study in naturalist paradigm whereas these supplement the study in quantitative researches.

However, both qualitative and quantitative researchers need to test and demonstrate the credibility of the study. While the credibility in quantitative research depends on instruments that are used to arrive at a conclusion, credibility in case of qualitative research depends on the researcher himself.
4.3.3. Benefit of Triangulation in Qualitative and Quantitative Researches

Although triangulation has strongly been advocated by researchers like Web (1966), Campbell (1966), Denzin (1978) and more recently by Patton who supports the use of triangulation by saying “triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including the use of both quantitative and qualitative approaches” (Patton 2001:247) while making a similar argument as the earlier researchers with reference to qualitative and quantitative researches. However, the use of combined methods has been challenged by some researchers like Barbour (1998). While she agrees that mixing the qualitative and quantitative methods emanating from the naturalistic and constructional positivist paradigms respectively can be mixed, she argues against mixing methods within same paradigm, for example, mixing methods within qualitative research may be problematic as each method may be operating with its own assumptions in terms of theoretical framework adopted by the researcher.

4.3.4. Mixing Qualitative and Quantitative Methods

Mixing paradigms in the same study has its own challenges. Hunt (1991 quoted by Bazeley, 2004) argues against mixing qualitative and quantitative methods in the same study observing that the two paradigms differ epistemologically and ontologically. However, Morse (1991 quoted by Bazeley, 2004) suggests two possible ways to combine the quantitative methods for the purpose of triangulation:

(1) Qualitative methods may be employed as supplementary preliminary study to a quantitative investigation where a researcher attempts to understand the phenomenon or isolate factors related to a phenomenon and then he subjects them to quantitative investigation in order to validate his findings.
(2) The qualitative investigation that follows a quantitative study Qualitative methods where the numbers produced by quantitative methods are studied using qualitative methods in order to understand their meaning with reference to the phenomenon and give a precise and testable expression to qualitative ideas.

He observes that it is important to understand that methods employed in both qualitative and quantitative paradigms have their respective strengths and weaknesses. He recommends that both within-method and between-method type of triangulations needs to be used in order to use the advantages of both paradigms while minimizing the drawbacks of each.

4.3.5. Outcomes expected from a Triangulative Research
According to Mathison (1988) there are three possible outcomes that can be expected from the researches adopting a triangulation strategy:

(1) Convergence - The findings from a study that has collected data from different sources or methods show a convergence

(2) Inconsistency - There are inconsistencies between the data obtained but contradiction is not observed

(3) Contradiction - A contradiction is observed

In cases of quantitative researches, triangulation is useful not only in terms of enhancing the credibility of the findings of a study through cross verification of data obtained from different sources and methods but also plays an additional role. Testing the validity of the instruments used to measure in terms of whether the means of measurement are accurate and whether they are actually measuring what they are intended to measure.
Whereas in cases of qualitative research the advantage that triangulation strategy provides in addition validation for the establishing credibility of findings of a research triangulation also provides a more comprehensive picture of the factors being studied and makes some unique variances visible which otherwise would not have been observable in cases of studies adopting single methods approach Jick (1979). In this context, Jick further observes that triangulation can:

[…] also capture a more complete, holistic, and contextual portrayal of the unit(s) under study. That is, beyond the analysis of overlapping variance, the use of multiple measures may also uncover some unique variance which otherwise may have been neglected by single methods. It is here that qualitative methods, in particular, can play an especially prominent role by eliciting data and suggesting conclusions to which other methods would be blind. Elements of the context are illuminated. In this sense, triangulation may be used not only to examine the same phenomenon from multiple perspectives.

Jick (1979:603)

While triangulation enjoys advantages such as enhancing the reliability of the study, it too has its own draw backs and limitations. For example, results may not be replicated in case of the social sciences research using triangulation unlike the results of the researches in natural sciences where they can be replicated using the same methods and instruments. However, the results may not contradict the earlier findings.

4.4. Triangulation and Translation Process Research

Over the last decade, the research in the field of translation study has seen a significant shift in its approach. The studies earlier were mostly limited to a
qualitative study of source text and target text in an attempt to evaluate translation as a product. Whereas, the researchers over the last decade, have focused their efforts on gaining better and a more comprehensive understanding of the process as well. (Fabio Alves, 2011).

The process of translation includes every event that occurs right from the beginning of the task till the completion of the target text. According to Weinrich (1976):

> The translation process is defined as everything that happens from the moment the translator starts working on the source text until he finishes the target text. It is all encompassing, from every pencil movement and keystroke, to dictionary use, the use of the internet and the entire thought process that is involved in solving a problem or making a correction – in short everything a translator must do to transform the source text to the target text.

(Weinrich 1976:16 as quoted by Hensen, 2003:26)

It is largely agreed by researchers that translation process is a complex process to study as the process is not only governed by linguistic factors but also by extra-linguistic ones such as socio-cultural factors. Further, the task of translation in a way could be viewed as mediation between two linguistic and socio-cultural systems that is executed by a translator based on a complex system of mental processes such as decision making and establishing equivalence between the two systems. In this context Ali Darwish (1989:2) observes:

Translation is a complex dichotomous and cumulative process that involves a host of activities drawing upon other disciplines related to language, writing, linguistics
and culture. This multi-disciplinary process suggests that three major activities run concomitantly:

- Transfer of data from the source language to the target language
- Synchro-analysis of text and translation and research of subject-matter
- Continuous self-development and learning

Maria Tymoczko further comments on the relationship between language and culture involved in the task of translation. She says:

It became clear early on that translation could not just be defined in terms of language or text type, but that it was essential to consider culture as well. Such approaches cannot be fully separated from either linguistic or literary approaches to translation, for language is central to constituting any human culture and literature in turn is rooted in both language and culture.

(Maria Tymoczko, 2005:1084)

In addition to the linguistic and extra-linguistic complexities involved with the process research, the fact that translation task involves complex mental processes that are not visually observable, further complicates the process research. Process researchers have therefore have relied on methods such as Think Aloud Protocols, keystroke logging, activity logging, video and audio recording of the subjects, retrospective interviews, questionnaires etc. for eliciting data for their experiments. However, since no single method can give complete information pertaining to process as no method is perfect and each of them has its own limitations.
For example, Think Aloud Protocols has the following limitations:

- Verbalizing thoughts is not a natural process therefore not everything is verbalized. Researches show that it is only the problematic instances that are mostly verbalized.
- The subject might have hesitations over verbalizing or revealing certain facts that might be a cause of embarrassment to him or may raise questions over his competence.
- Every individual might verbalize differently owing to his competence as translator.

In this context Sonja Tirkkonen-Condit (2005) notes:

> One of the main findings from the research based on think aloud data, and from process research at large, is that it is dangerous to make sweeping generalizations about translation processes. There is wide individual variation in the processes of novices as well as those of skilled professionals.

Sonja Tirkkonen-Condit (2005: 406)

Scholars recommend using combination of multiple methods for triangulation in qualitative and quantitative studies pertaining to Translation Process Research. This is done for compensating for the shortcomings of other methods. For example, Think Aloud Protocols are commonly used in process research. Think Aloud Protocols are used with an assumption that only problems are verbalized by the subjects. In order to compensate for this limitation, keystroke logging using software like Translog has been used. However, keystroke logging too as a investigation method does not come without limitations, for example, keystroke
logging does not provide information on the resources that were referred to while translating (Dow and Perrin, 2009).

4.4.1. Triangulation Methods in Translation Process Research

1. Think Aloud Protocols provide insights into the thought process of the subject.
2. Keystroke logging provides information on key punching activity so that the researcher can see the text typing activity of the subject.
3. Screen recording is useful for
   - Retrospectively reviewing the process
   - Observing the behavior and expressions of the subject
   - Stimulating the long term memory of the subject during retrospective interviews by replaying the video
4. Eye tracking records what word or part of the screen a person is looking at any given point of time and traces reading paths and activity during pauses in the translation process.
5. Questionnaires

In the context of translation studies, researchers while on the one hand have relied on qualitative methods such questionnaires and retrospectives interviews etc., they have also made use of technology for eliciting data for their respective researches like video, audio and screen recordings. However, although the technologies may have been suitable, the way of capturing the data may make the researches a complex process if the data is presented as corpus containing multiple files. For example, the audio recordings in some cases have been done using Audacity, in the same research screen recording is done using Camtasia Studio 5, and the subjects have been recorded using video camera. This leads to a complex process of cross-referencing where the researcher needs to look at
multiple information sources. In addition to this, the synchronization between all these files also might further make referencing a tedious task.

In order to make cross referencing a simpler job, it may be advisable to make the audio video and screen recordings in a single file where the whole process is visible and the information from all three sources can be presented in a synchronized manner. Evaluating the currently available technologies and the technologies that have been used might provide a way to achieve this goal.

4.5. Software Evaluation

In this section, I will be examining three typical software that have been chosen for evaluation. The first software chosen for evaluation is Morae 2 that has been developed by Techsmith and is primarily aimed at usability testing of software and websites. A preliminary casual study of the literature related to this software indicates that the software includes features that are similar to those used in process research and may also prove to be a superset of all the functions of different software that have been used in process researches till now.

The second software chosen for evaluation is Camtasia Studio 7 which is a screen recording software and earlier version of this software (Camtasia Studio 5) has been quite commonly been used in earlier Process Researches.

The third software, Translog-II, is a keystroke logging software possessing capability to incorporate eye tracking and also provides analytical tools to present the data. This software has quite commonly been used in Translation Process Research.
4.5.1. Techsmith Morae 2

The software Morae is a tool that enables systematic observation of how well the given tasks are accomplished under controlled conditions such as commonly recognized laboratory studies. The software provides flexibility to testers to plan tasks, carry out tests and analyses and finally report the results. The software comprises three components as mentioned below that can operate independently:

- Morae Recorder
- Morae Observer
- Morae Manager

**Morae Recorder**

It plays a vital role in the planning and testing phase as it runs on the terminal of the participating subject while he performs the designated activities. Its website mentions that the software has been specifically designed for usability testing where users can be observed for behavior while interacting with software or while using a website. Therefore, it may be useful in the Process Research in Translation Studies as the subject needs to be observed. The main role of the recorder is to capture the complete session; it provides the required functionality to record the screen in real time. The same feature of the software could be useful for recording the translation activities of the subjects participating in the translation experiments. The software, while recording the session, makes it possible to:

- Record the Screen activity- The main task of translation can be recorded in real time while the translator is translating. Activities like mouse clicks, mouse pointer movement, the keystrokes, the forward and backward movement of the cursor, interaction with dictionaries, online tools
websites and other internet resources breaks that the translator has taken to relax or some other purpose etc.

- Record videos of the subject in a Picture in Picture mode – The video of the subject can be recorded on the screen in a small window so that his expression and other activities other than those related to the task itself can be observed. The video of the subject and the screen where the main activity is being performed are in absolute synchronization making it possible to study how a translator reacted at a particular point of time during translation or the physical object he has used such as electronic dictionary or normal dictionary etc. that may not have been verbalized. The software allows the use of webcam for this purpose.

- Record Audio - Translation studies has relied upon the Think Aloud Protocols for studying as well as triangulating the process of translation. Recording of the Think Aloud Protocol is possible while the translator is performing the tasks. In this case again the audio is synchronized with the Captured video of the main task of translation as well as the picture in picture video of the participating translator.

- Adding notes to the Recordings- The recorder allows the observers to connect to the network and watch the session and subsequently add notes pertaining to their observations to the recordings. Observers on the same network can connect to Recorder to watch a session and add observation notes to the recording for their future reference. In this way the observations in the Short term memory (as defined by Ericsson and Simon) can be attached to the recording for their future reference.
Present questionnaires - the recorder allows the automatic presentation of questionnaires designed for a particular study to the participants in the due course of the experiment. The data output of a sessions from the Recorder is stored in a Morae Recording (rdg) file.

Morae Recorder provides a function of mouse movement that was not previously a common feature in usability studies. Mouse movement is the distance covered by mouse pointer in terms of pixels. This allows the definition and establishment of a **pixel per minute** metric which can be part of usability requirements in software development projects. This particular feature may not be much of use for studying translation as it mainly would people engaged in software development projects, however the usability of this feature cannot completely be ruled out.

**Auto Pilot Mode** – The software provides an Autopilot functionality where the tests can be conducted automatically after the tasks are defined along with the time specifications. This eliminates the presence of a moderator while tasks are performed. The tasks are provided automatically in accordance with the progress. This feature may be useful only in laboratory experiments.

**Creating a Study Configuration File**

The first step in planning a usability test using Morae is to create a Morae Configuration File (.mrcfg) in Morae Recorder. When opening Morae Recorder, the user is presented with the option to create a new usability study or use an existing study template. A typical Morae Configuration File includes the following details, among other aspects of a test session:

- Study name and description
- Scenario and tasks
- Task scoring definitions
- Observation codes, known as Markers
- Severity score definitions associated with Markers
- SUS survey and/or custom pre-test, pre-task, post-task and post-test questionnaires
- System and application events to be captured such as mouse clicks, keystrokes and screen text.

The clear advantage of a Morae Configuration File is the ability to have all details of a usability test session in a small file that can be easily shared among team members and the same can be re-used in future tests, hence avoiding lots of paperwork. However, Morae does not store the .mrcfg file in a common “templates” directory but instead each file is stored in the user-defined directory for each study. Therefore, this requires the user to locate where it has been saved on the local machine before opening it in Morae Recorder.

**Morae Recorder Main Window**

The main window of Morae shows the configuration settings that have been defined for a particular study, this enables the researcher to view the settings and the configuration options available and modify any configuration settings as and when required. This also may be useful for the researcher to have quick glance at the configurations used for the earlier experiments or the studies being conducted presently. Referring to these might be helpful for the researcher as it might save considerable amount of time and efforts of going through lengthy test plan documents, hence, a shorter setup time.
Morae Observer

The Morae Observer simulates the conventional observation room laboratories where tests are conducted. It would enable an observer or the researcher to observe the subjects through this virtual room by connecting to the Morae Recorder on desired terminal from a remote location through network just by providing the IP address and the computer name. This way the observer can observe any ongoing session as and when he wishes to and to add notes to the session and save the session on his own computer or any common central server in a .wmv format for future reference or for sharing with other fellow researchers.
Morae Manager
Recordings made in Observer are imported into Manager for analysis. Manager allows the usability testers to carry out different types of data analysis and communicate the results of the usability test.

Manager’s main features are categorised into three sections, namely the Analyze, Graph and Present tabs.

Analyse
The set of functionalities in this part of Morae is the stepping stone in the usability testing process as it allows in-depth analysis to be made at a very fast pace. Analyse has a user friendly interface, where the main focus is on the video
of test session and the corresponding markers. The video of the participant as well of the participant’s computer screen can be viewed at the same time. The Analyse section has a search feature which facilitates retrieval of specific predefined events, as represented by markers, such as mouse clicks, keystrokes, comments, errors among others. Search results can be saved as a preset in the study and also be exported as a .csv file. Task start and end times can be adjusted and all observation notes can be edited. Additional markers (observation notes) can be also added if needed.

Another useful feature is the possibility to change the speed of the video during viewing. The timeline has a zoom feature, hence allowing more visibility and control over markers, especially for lengthy usability test session.

**Graph**

Graphical representations of data generated can be interpreted very quickly and easily as compared to tabular data. The *Graph* feature in Morae is designed to accomplish this task. Data imported automatically from Recorder can be compiled and represented in graphs. Some predefined graphs are already provided by Morae and can be customized to fit any study.
Fig.4.3. The graph tab for graphical representation of usability data

Present
After observation and analysis of participants’ recordings, a highlight video can be presented using this feature. The Present feature allows the researcher to create a storyboard where small segments of video recordings can be imported and presented in any order. Title Clips are used to describe an activity currently occurring on the video. The video can then be exported in wmv, avi and mpeg4 format and also as a PowerPoint presentation.

To sum up, Morae makes testing easy. It decreases the need for sophisticated equipment, reduces setup, editing, analyzing and reporting time and therefore it may be concluded that it may find effective application in experiments focusing
on translation process as process research shares many characteristics with usability test in terms of data to be recorded e.g. verbal reporting, screen recording, logging of data like time, video recordings of the subjects etc. Further, it allows data to be analyzed and reports to be made and presented more quickly and with less effort. It is also an efficient tool to involve participants and managers into usability tests. Overall, Morae2 can be considered to a large extent as a suitable alternative to lab-based testing.

4.5.2. Camtasia studio 7
Camtasia Studio integrates all needed functions to record, edit and produce video for different types of broadcasters. Camtasia Studio is a software developed specially for screen recording and providing a full motion approach over all sorts of presentations. The list of features includes options for webcam recording, video editing and enhancing audio. Immediately after launching the app, a wizard will pop up on the screen displaying all project options available in the software: screen recording, voice recording, PowerPoint recording and media importing.

Camtasia Recorder’s settings allow users to enable sound and webcam recording options and configuring them as required. Audio can be saved in more than one format. There are three audio quality presets available (CD quality, Radio quality and Telephone quality) but you can create your own to use them in other projects.

Selecting the area to be recorded is the easiest task. Camtasia Recorder allows selection of area to be screen recorded. All you have to do is to drag the selection or simply place it on the title bar of the application to be captured.

These allow modifying the size of the selection as well as locking it to application, a useful option in cases when a window needs to be resized without making a new selection. Locking to application allows moving the application screen all around
your desktop without losing Camtasia selection of the area. Once the recording is stopped, videos can be saved in a .camrec file (native Camtasia format) anywhere on the disk.

**Post-Save Options** dialog lets you proceed to editing your video or get directly to producing it into a shareable format.

Options for **annotations** (time and date stamps, computer name, user name, elapsed time), cursor setup, and zoom (**auto zoom speed, autopan speed, zoom level**, enable smooth scaling, centering etc.) are also available. These settings enhance the effectiveness of capturing video.

Editing component of Camtasia Studio is displayed in a big screen containing a Task List, the Clip Bin, recorded video, and a Timeline. All these elements are important for presenting the video in a desired format. For editing the video, the saved camera recording or .camrec file needs to loaded and saved as a Camtasia project (.camproj format).

There are three menus available that allow addition of elements to the video; all or these contain options for importing media files, edit the video and the audio track, add transitions or produce the video according to broadcast method.

**Add menu** allows the user to insert different media elements into the video, like additional movies, title clips for separating the different sections of the movie, voice narration and webcam recordings. All these elements can be edited and are present in Clip Bin section of the applications window.

**Title clips** support adding a background image as well as text input. Text can be modified in terms of font type, size and color as well as style and alignment in the
Media files that can be imported from your computer include images, video and audio. However, Camtasia Studio proves modest in what concerns the formats supported: AVI, MPG, MPEG, WMV, BMP, GIF, JPG, PNG, WAV, MP3 and WMA. But these are the most popular.

In short, although Camtasia studio unlike Morae is not a software meant for researches involving statistical analysis of the data from laboratory experiments because it only possesses features similar to Morae Recorder as it shares some common traits with Morae with regard to screen recording functions.

Camtasia studio has been used in a number of translation researches where screen recording has been carried out and its usability as a means to enhance the reliability and validity of findings in translation researches is established as seen in the review of literature. However, the features of this software have been used in a very limited way, for example, in most of the studies the software has been used for only recording the screen, and the video of the translator acting as a subject for study has been recorded separately. Camtasia studio very much like Morae has all the features related to screen recording inserting callouts on the video etc. However, it lacks the functionalities like eye tracking, graph generation, analytical tools and centralized remote monitoring by the observer through network. Therefore it may be better suited for studies which involve recording of a translator’s task carried out by an individual which later would become a part of the corpus for the reference of researchers in future. In other words Camtasia Studio may not be as suitable as Morae in experiments that are carried out in laboratory conditions.
Translog – II

Translog – II is a Microsoft Windows compatible program that helps in recording and analyzing the reading and writing processes and precisely register and accurately reconstruct the writing process while translating on the computer. Translation has often been regarded predominately as a skill that involves reproduction of a text in a target language. In translation conventionally the emphasis was on the communicative aspect of translation. Whereas, productivity as a parameter is fairly a recent aspect that has come into focus to such an extent that translation is sometimes barely distinguishable from the original text production. To facilitate the research pertaining to productivity and attain maximum accuracy Translog helps the researcher to acquire objective digital data of human translation process. Similar to the previous version of Translog 2000, Translog 2006, also Translog II contains two main components that are interdependent: Translog II user server, which records the experimental translation sessions and generate supervisor project files to replay and analyze the log files.

Translog allows the researcher to do the following:

Record: This software helps in recording module logs (keyboard, mouse and eye tracking inputs) data together with a unique time stamp. In Microsoft word, this module also logs character position, actual document length and copy/paste/move actions. During the process of writing, the basic data is continuously stored for later stages of editing. However, it can be noted that, this continuous data storage does not interfere with regular use of computer nor cause any visual delay as the process runs in the background.
**Pre-Process:** It is necessary to refine the stored data prior to the analysis. Translog-II enables the user to process data from different perspectives, namely:

- **Event Based:** Logging the key board strokes that the user punches while performing the translation, recording the movement of the mouse pointer and eye tracking

- **Time Based:** By the toggling between Windows, such as Microsoft Word, Internet browser etc. and the Translog window (Translog Editor Window) in which the subjects performs the task of the translation.

1. **Analyze:** Analyzing is the key and core of the program and features three process representations, such as general and linear logging file where the linear progression of the translation task is represented in symbols and process replay. Additionally a process graph is produced.

2. **Replay Mode:** Translog Supervisor computes statistical figures based on the keystrokes, etc., however most interesting is certainly the possibility to replay the log files. This feature helps to view the translation process as well as also stimulating the Long Term Memory of the subject during retrospective interviews in order to enhance extent of Information retrieval.

Translog provides data for researches on:

1. Cognitive writing processes
2. Recording writing strategies
3. First and second language writing
4. Spelling research
5. Specialist skill areas such as translation
6. Biometric measures such as eye tracking

Keystroke logging can be used not only in research specifically on writing processes, it can also be useful in the academics for second language acquisition, programming skills as well as typing skills. Since, Translog-II records user activity data, meaning, all the keystrokes are logged and depending on the availability of the eye-tracker, eye movements are tracked. Further, it segregates the key log (using symbolic representations) as follows:

- insertion
- deletion (delete and backspace)
- navigation (cursor movements)
- copy/cut and paste
- return key
- mouse operations.

The key logger runs in the background of the operating system, therefore the recording does not interfere with the writing or translation process being performed by the subject. Translog-II gets the exact time stamp, at which each keystroke operation is made.

If connected to an eye tracking device, Translog-II also records

- gaze-sample points
- computes fixations
- mapping of fixations to the closest character on the screen.

In the process of recording of gaze sample points, its representation in the log file is in such a way that fixation to an extent including mapping is made possible to
fix on the completion of the activity. Further, the recorded or logged gaze movement information and key stroke information can be correlated, as the textual position referred by both of them. The information is stored in an XML format, which allows it to be replayed or analyzed using the Translog-II or with the help of any other external tool.

**Functions of Translog-II**

Translog-II has three main functions:

1. Create a project
2. Run and record a session
3. Replay and analyze a recorded log file.

**Creating a Project File:** The size and the orientation of a source text as well as the target text windows to be displayed on the screen can be changed. It is also possible to regulate the reading and writing permissions. In addition, by supplying the necessary text for the source and target window, its layout, font size, colour, spacing etc can be set. Lastly, the data to be recorded such as keyboard activity and eye tracking can also be configured.

**Running and Recording a Session:** Project file is loaded and depending on the availability, the eye-tracker is calibrated and subsequently user activity data is recorded.

**Replay and Analyzing a Recorded Log File:** The key component analysis is further divided into 1) Statistics 2) User View 3) Linear View 4) Pause Plot.

- **Statistics** helps in figuring out the events such as additions, deletions and navigation etc. with respect to the text.
- **User View** replays the translation session
- **Linear View** plots the textual representation of the user activity data
respectively.

- **Pause plot** provides a 2D view representing as to how the text emerged in relation to time utilised.

Similar to .camrec and .camproj files of Camatasia Studio 7, in Translog II the Supervisor program executes the functions 1 and 3 mentioned above, the user is allowed to record a translation session and save the user activity data in a log file format.

The files used as project files in Translog-II can be used for following types of experiments:

- Experiments pertaining to reading process, however, the window that would appear in this case is the source text window.
- Experiments studying the writing process where the only the Target Text window is displayed.
- Experiments involving translation task, in this case both source text window as well as the target text window is displayed.

Apart from Translog-II, there are similar programs such as ScriptLog,uLog, Eyewrite, etc., specially designed for acquiring data, and have been widely used by the research community (not to be confused with translation research). The comparison table given below lists the available applications and their key functions as compared to Translog-II.
<table>
<thead>
<tr>
<th>Function</th>
<th>Scriptlog</th>
<th>Inputlog</th>
<th>Translog</th>
<th>uLog</th>
<th>TraceIt/Jedit</th>
<th>Eyewrite</th>
<th>Eye&amp;Pen</th>
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</thead>
<tbody>
<tr>
<td><strong>Logging</strong></td>
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<td>All Windows programs or later versions</td>
<td>Translog Editor</td>
<td>All Windows programs</td>
<td>TraceIt Editor</td>
<td>Eyewrite Editor</td>
<td>Tablet</td>
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Fig. 4.4. Keystroke logging software comparison table
4.6. Samples of Translog – II Screen views (source Michael Carl, 2012)

Fig. 4.5. Screenshot showing how the gaze points through eye tracking

The top part of the window shows the gaze points on the source text whereas the bottom part shows the gaze points accumulated in the translation.
Fig. 4.6. Linear view of translation progression

Two Linear views shown in different temporal resolution
Top figure: each dot represents 1 second pause.
Bottom figure: a dot represents 0.1 seconds between successive keyboard activities.
Fig. 4.7. Screen shot of graphical representation of pauses

Fig.4.8. Progression of the translation of one sentence
4.7. Conclusions

After examining the quantitative and qualitative studies on Process Research conducted in the field of Translation Studies in the chapter 2. Review of Literature, triangulation as an approach seems to play vital and integral role in process research in Translation Studies; and upon considering the benefits and insights that incorporation of this approach can provide with regard to the qualitative and quantitative research as discussed in the earlier part of this chapter; prospects of Translation Studies reaping similar benefits look promising if methods of triangulation can be incorporated into corpus methods. Process research till now has captured data by combining different methods. These methods can broadly be categorized into those using technology and others that do not rely on technology. Keeping the methods that are dependent on technology three types of software were evaluated. All three of them differed from each other in terms of features and were representative of types in the following ways:

1. Techsmith Morae is a typical representative example of usability testing software that includes analytical observational tools like activity logging, keystroke logging, eye tracking compatibility, audio and video recording as well as analytical tools that helps analyzing the data.

2. Camtasia Studio 7 is representative of software that allows audio, video and screen recording, but does not provide analytical tools.

3. Translog-II represents the category of keystroke logging software. Although it has analytical tools, it does not allow screen recording and audio recording like a video. Therefore, interpretation and analysis of the data may be comparatively tedious.

A comparison of Camtasia Studio and Translog-II indicated the following:

- Translog-II only records the keystroke activity
- The data captured using Translog-II does not provide a complete picture of the process as it does not record off screen activities such as behaviour or facial expression of the subject etc.
- Screen activities outside the Translog window, for example activities on the internet browser etc., will not be captured
- Translog cannot record audio

Since the keystroke activity is adequately viewable in the screen recordings by Camtasia Studio it was chosen over Translog-II.

While comparing Morae and Camtasia Studio the need for analytical tools was felt to be redundant as the scope of this research is limited to capturing the data and storing it in an electronically retrievable form. In other words, this research is an attempt to suggest a model for corpus that can provide and incorporate the methods used for triangulation by the researchers in process research. Therefore, although Morae has all the required features, Camtasia Studio was chosen over Morae due to the following reasons:

- Cost considerations
- The scope of the experiment was limited to creation of a corpus model that excludes the analytical requirements as there is no concrete objective of investigating a particular phenomenon of translation process.

However, this should not be interpreted as that other software cannot be used or have no relevance to process research. For example, in a real time research scenario all the kinds of data such as keystroke log, eye tracking information (similar to information obtained using Translog-II) activity logging (similar to data obtained using PROXY) and screen recordings (exactly as provided by Camtasia Studio 7) etc. can be obtained using Morae. At the same time the data
collected can be analysed and the findings can also be presented using Morae itself. In short, Morae may prove to be a powerful data collection, analysis and presentation tool for well defined laboratory experiments.