SNAP TO READ

INVESTIGATING THE COGNITIVE PROCESSES IN POST-EDITING ACTIVITY USING THINKING ALOUD PROTOCOLS

Gharizi Matiini
Institut Teknologi Indonesia
gharizi.matiini@iti.ac.id

First received: May 25, 2022 Final proof received: June 5, 2023

Abstract:
The study aims to investigate the cognitive processes and meta-cognitive strategies used by the post-editor when doing the post-editing activity. It examines the way the post editor reads, thinks, speculates, and makes decision to the machine translation results and correcting the problems founds from the translated text. Thinking Aloud Protocols (TAPs) is used as the approach of the study to record the meta-cognitive strategies applied by the post editor. Several instruments such as video recording tools, machine-translated text, and timer are operated during the data collection. From the study, it is shown that reasoning and problem solving become the most running strategy from the post-editor. It occurs since the post-editor mostly looks for the problems and tries to find a way of correcting mistakes from the translation. The result also shows that the post-editor tries to comprehend the problems and decides the accurate decision when song the post-editing. The cognitive process and meta-cognitive strategies are quite different between the translator and the post-editor.

Keywords:
Post-editing, Thinking aloud protocol, Cognitive processes, Meta-cognitive process.

INTRODUCTION

In the translation process, the post-editing activity may be one of

the strategies to make a more accurate target text. When the translation itself is defined as a process, as Eftekhary (2012) points out that a translation is a process where a translator should transfer sense and meaning from the source language into the target language. Since post-editing is part of translation activity, it also contains the process of transferring meaning and sense to get an accurate target language. House (2000) states that the term 'process' deals with a set of processes, a complex series of problem-solving, and decision making. Therefore, when someone translating and post-editing a text, it may take some time to get the acceptable target text. The set of translating processes, linguistically, is called a cognitive process. Hutchins (2000) defines cognitive process as a process that requires decision making, inference, reasoning, learning, and many others in memory. Krings (2001) detects that post-editing activity can be measured on three-level: technical, temporal, and cognitive. When doing the post-editing, the cognitive process is activated to be the more physical process to get a satisfied translated text. In discovering the cognitive process when post-editing, a post-editor commonly provides text-processing strategies which are called metalinguistic or metacognitive strategies. The metacognitive strategies make specific problem-solving characteristics affected from and during the correcting and revising the translation texts (Gerloff, 1986).

Many scholars have categorized the metacognitive strategies of the cognitive processes, particularly in translation activity. In identifying the metalinguistic strategies and cognitive process, there is no other way to examine it except using Thinking along with protocols. Thinking aloud protocols (TAP), according to Kussmaul (1995) is a kind experiment in which the post-editors are asked to utter everything that went on in their minds when doing the post-editing. Those utterances are recorded and then analyzed to find the cognitive effort behind the metacognitive efforts. The present study tries to discover the

cognitive efforts and processes revealed by a post-editor when doing the post-editing activity. Using the thinking aloud protocols, it is expected that the study finds a new knowledge of post-editing phenomena from the perspective of metacognitive strategies and cognitive processes.

There are numerous previous studies in thinking aloud protocols investigating cognitive processes in translation activity. However, only a limited number of TAP studies focus on post-editing activity to find the cognitive effort of a post-editor. The present study examines the cognitive processes that occur during the post-editing activity. Before concluding the cognitive process, the study looks up to the metacognitive strategies input by the post-editor. From finding the metacognitive efforts, we shall see the cognitive processes experienced by the post-editor. In the findings, the researcher also elaborates some discussions comparing the present study with the previous studies since various scholars conducted similar types of TAP research on post-editing activities.

Before going further to the Review of literature, the researcher needs to clarify some constraints that limit the study. First, since there is only one participant in the study, the result cannot be an absolute decision to the new knowledge, because it is well believed that every post-editor has different metacognitive strategies in post-editing, and thus it changes the cognitive result in every different participant. Second, there are a lot of theoretical approaches regarding the cognitive process, particularly in translation activities. In the present study, the researcher only uses some of the theories and modifies them according to the needs of postediting activities. Therefore, we may not see some categories of the cognitive process due to the distinct process between translation and post-editing.

DOI: dx.doi.org/10.21274/ls.2023.15.1.21-34

LITERATURE REVIEW

Post Editing activity

The post-editing activity has experienced various definitions during the time. It starts from Reifler (1952) who introduces post-editing as something to complete the final step of the machine translator development. Post-editing has changed its definition when online machine translators raise the era of digital technology. Mesa-Lao (2103) supplies the function of post-editing as to manipulating, leveling, and technical correction to the translation. Though there are various studies in post-editing, it is a bit rare to find information about the cognitive efforts and process of the post-editing activity. Krings (2001) the father of cognitive process in post-editing activity discovers the three types of efforts in post-editing, the technical efforts, the cognitive efforts, and the temporal efforts. A technical effort is related to mechanical operations, the cognitive effort indicates the metal processes carried out during the task. The temporal effort is the time running in post-editing.

Metacognitive Strategy in Post Editing

Numerous researchers have successfully examined the post-editing and the metacognitive strategies in which the cognitive processes are detected. The present study applies Eftekhary's (2012) metacognitive category in the TAP of the literal text translation that are look-up, using Imagery, paraphrasing, evaluating and Monitoring, co-text Recourse, problem solving, self-Recourse, resourcing and Referencing, contextual Recourse, analyzing and Reasoning, inductive Inferencing, compensation Strategies, guessing Games and switching to L1.

From his study, Eftekhary (2012) detected that the looking-up strategy gets the highest frequency of metacognitive category in the translation activity. Meanwhile, switching to L1 has the fewest

number of frequencies in the metacognitive strategy. Since Eftekhary (2012) makes the categories in the field of translation, the present study surely adapts and modifies those categories which fit the field of post-editing. Some categories such as reasoning, problem-solving, looking-up, and so on, are kept in the present study. However, a few other categories such as switching to L1, guessing games, and using imagery are dismissed from the study since it is impossible to find such categories in post-editing activity. The present study also adds some other categories when it is suitable to be added to the analysis.

Thinking aloud protocols to seek the cognitive process of post-editors

To measure the metacognitive strategies and the cognitive process of post-editing activity, there are several approaches in verbalization the post-editing progress, they are Think-aloud protocols, keyboard logging, screen recorder, and eye-tracking. However, since almost all of the approaches need visual tools and statistical analysis, the present study only applies the think-aloud protocols (TAP) to collect verbalization data. Think-aloud protocols, according to Kussmaul (1995), are one of the research methods in which applying the introspective verbal report. Here the subjects of the study are asked to utter everything that goes on in their mind when translating. The utterances are recorded and analyzed based on the metacognitive and cognitive strategies (Jakobsen, 2003). The TAP approach was firstly introduced in the 1980s when Krings (2001) proposes the cognitive process in translation (Suryani, et al. 2018). The cognitive process itself is a mental process related to decision making, inference reasoning, and learning in memory (Hutchins, 2000).

Plenty of researches relating the post-editing and the cognitive processes and efforts. Krings (2001) has successfully investigated the post-editing activity using Thinking Aloud Protocols. Krings (2001) focuses the study on investigating the effort needed by traditional translation and by post-editing. In the previous studies, Eftekhary

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(2012) also relates the result in metacognitive strategies found in the study to the taxonomy of cognitive process from Krings (1986). The categories of cognitive progress according to Krings (1986) are comprehension (Inferencing and using reference works), equivalent retrieval (from the interlingual and intralingual relationship), equivalent monitoring, decision making, and reduction. There are many other classifications of cognitive processes. One of the recent taxonomies of cognitive process is from Seguinot (1996) who proposes four types of as is called 'professional translation strategies', that are: interpersonal strategies (brainstorming, correction, phatic function), search strategies (dictionaries, world knowledge, words), inferencing strategies (rereading Source text and target text, consult), monitoring strategies (rea rereading Source text and target text, consult, and compare units).

From the two above taxonomies, we shall see that they are different in terminology, but it looks the same in their representation. Moreover, in his recent study, Krings (2001) also comments that using the TAP approach is not the best way to investigate the cognitive process of a post-editor. TAP approach significantly slows down the work of post-editor and thus it presumably changes the result of cognitive efforts. Therefore, the present study tries to adapt and modify all the previous taxonomies of the cognitive process to get accurate information of the cognitive process.

METHOD

In the present study, the researcher only invites one participant to join the study to make the data. It occurs since it would take a bit longer time to only transcribe the recording and collect the data. The participant is a librarian in a university. He is quite familiar with translation and post-editing activities since has needed to make a repository system regarding the research publication of his campus,

and he has translated and post-edited many papers to fit the criteria of repository requirements. The instruments used in the study are two different translated texts. The first text is English source text which has been translated to Bahasa Indonesia with the Google translate tool and has 11 lines. The second text is the Bahasa Indonesia text translated to English using the Google translate tool and has 9 lines. during the verbalization process, the participant must record himself to a video recording which also includes his works and his face talking to the camera.

The data are collected from several stages. Beforehand, the participant is given a brief explanation about how the data collection process works, and how he has to post-edit the text along with recording himself. The participant also gets to read and practice days before the recording time to make him ready. The participant knows the rules and time limit for the recording so that it needs only one time to record the verbalization. The researcher gets two different video recordings with the different source text. Each video has an estimated 30 minutes of verbalization. The videos are then transcribed, manually, by the researcher using a spreadsheet. The spreadsheet is used to make the time-lapses of every post-editing strategy brought by the participant. From getting the time-lapse transcription, it would be much easier to analyze the data.

From the transcription captured from the video, the researcher then tries to analyze the data. It starts with deciding what kind of post-editing strategies are exercised by the researcher. This process is called metacognitive strategies in post-editing. Next, the metacognitive strategies which have been detected from the transcription are categorized by the cognitive process taxonomy from Krings (1986) and Seguinot (1996). Please note that since those taxonomies are considered old, the researcher plans to combine them into one table analysis and diagram. it occurs because the taxonomies look different

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from each other, the taxonomies have the same meaning and message. Therefore, it eventually enriches the discussion and conclusion of the study.

FINDINGS AND DISCUSSION

The metacognitive strategies applied by the researcher

There are quite a few metacognitive strategies used by the researcher. For the general result, the participant has his way to post-edit the text. Firstly, he re-translates the source text using the Translator tool in the Google document to get a comparative target text so that he has two target texts there. Second, he compares the two translated texts, the Google Translate (GT) translation, and the Google Document (GD) translation. When he finds a different word or phrase, then he goes to online dictionaries such as blabla.com and kbbi.com. To get an accurate grammar of English, he visits grammarly.com, and when he wants to change some words or paraphrase them, he gets help from quilbot.com. It is quite surprising action since he has various and new resources to help him post-editing instead of using the familiar online dictionaries or websites. However, due to having a lot of resources, the participant does not seem to depend on his logical thinking, and he only trusts the resources provided to him. As it is seen from the table of metacognitive strategies below.

Table 1. The metacognitive strategies applied by the participant

No.	Strategies applied	Frequencies
1.	Preparing the document	7
2.	Resourcing & referencing	17
3.	Reasoning & analysing	23
4.	Looking up	18

5.	Contextual recourse	9
6.	Problem solving	23
7.	Paraphrasing	15
8.	Inferencing	16
9.	Monitoring and evaluating	9
10.	Self-questioning	3
11.	Introducing the agenda	3

We can see from the table that problem-solving strategy takes the lead with 23 times of frequency, along with reasoning and analyzing. It occurs after the participant tries to compare the two machine translation results (GT and GD translation) and decides quickly when he does not find any differences between the two translations. Reasoning gets another highest frequency because In the beginning and at the end of the post-editing the participant explains the reason why he decides to use such resources to help him post-editing the text.

As elaborated in the literature review, the researcher takes Eftekhary's (2012) metacognitive strategies in labeling the action of the participant, the researcher eventually modifies and deleted several strategies to fit the mental process of post-editing activity. There, for example, the researcher does not put all kinds of inferencing and only puts it as one inferencing strategy. Several strategies are deleted since they do not happen in post-editing such as Self-Recourse, guessing games, and switching to L1. The way the participant handles the text also influences the number of strategies from Eftekhary's (2012). Instead, the researcher put some additional strategies to label every verbalization action from the participant. Strategies such as paraphrasing, self-questioning, preparing the document, and introducing the agenda are put to be part of the strategies since there are no suitable strategies available from Eftekhary's (2012). Though the

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additional strategies do not have plenty of frequency, those strategies are expected to change the cognitive process resulting in the next subchapter

The cognitive process

The present study explains the cognitive processes that occur from the data looking at the two taxonomies from Krings (1986) and sequinot (1996) of cognitive processes, as the table illustrates below.

Table 2. The cognitive processes according to the metacognitive strategies

No.	**Cognitive process**	**Metacognitive strategies**
1.	Problem identification	Preparing the document Introducing the agenda
2.	The use of reference sources	Resourcing and referencing
3.	The semantic analysis of source-language text items	Looking-up Contextual recourse
4.	Hesitation Phenomena in the search for potential equivalents	Self-questioning
5.	Evaluation strategies	Monitoring and evaluation
6.	Comprehension	Inferencing Reasoning and analysis
7.	Modification and Decision making of the target text	Problem solving Paraphrasing

From the two taxonomies, the researcher only finds some of them suitable for the metacognitive strategies. Several processes from both scholars Krings (1986) and Seguinot (1996) are deleted and few of them are combined since they have the same messages. As is predicted before, the cognitive processes of planning, monitoring, and evaluating are mentioned in the table. The planning process appears

in Problem identification and the use of references. The monitoring process exists in the hesitation phenomena, the semantic analysis, and the comprehension. Last, the evaluation process takes place in modification, decision making, and evaluation strategies. Please note that the additional strategies, preparing the document and introducing the agenda, are both put in the problem identification considering those strategies are part of the participant's plans to start the post-editing activity.

Discussion

We have seen a series of metacognitive strategies executed by the participant that some of which are similar to Eftekhary's (2012) strategies of metacognition in translation activity though, in the study, the data are taken from post-editing activities. However, the researcher cannot adopt all the strategies since the post-editing is a bit different activity than the translation. The main purpose of post-editing, according to Mesa-Lao (2013) is to manipulate, level, and correct the translated text so that the post-editors commonly have different ways to post-edit, including the participant of the study.

While, the metacognitive strategies of the participant are much in contrast to Eftekhary's (2012). However, when it comes to the cognitive process, the strategies from the participant are considered plausible to be put in Krings's (1986) and Seguinot's (1996) taxonomies. It proves that the thinking aloud protocols can bring out the cognitive process of the post-editor even though there are contrastive strategies among the post-editors. Krings(2001) in his study also admits that the TAP approach is not appropriate to be conducted in the post-editing activities since it slows down the post-editing process. In this case, the work of the participant is not slowing down, it only runs constantly without having any dynamic verbal thought. Surprisingly, at the last minutes of post-editing, the participant is a bit quiet to let his brain works without talking anything in the paraphrasing stage.

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CONCLUSION

To conclude the research, there are 11 metacognitive strategies implemented by the participants. It is a bit few since the participant has a different way to post-edit the text, though it is believed that every post-editor may come to different strategies as well. From those strategies, 7 cognitive processes are coming out in the studies. The planning, the monitoring, and the evaluation process are employed by the participant. However, thinking aloud protocols is confirmed to holp up the post-editing activity of the participant, and therefore metacognitive strategies are relatively fewer than it should be. The further study may apply other types of cognitive process approaches besides the TAP, or other approaches can be combined with the TAP to avoid the biased result. It is also expected to further study to have more participants and more statistical calculation to get a more accurate result.

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