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Psychological Dynamics of Forming Cognitive Map Arabic Translation in Student

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ABSTRACT

A translation is a cognitive activity, while humans, as cognitive subjects, have different ways of thinking. This condition has implications for the difference in translation results; infrequently, the translation results need to be clarified for the reader. Therefore, investigating the problems of learning Arabic must be done to minimize a generation of incompetent Arabic translators. This study aims to investigate the psychological dynamics in a person that cause differences in the way of thinking in Arabic translation. This research is qualitative research using a multi-case approach. The research subjects comprised 10 Nurul Ummah students as a single-case analysis and 4 LSQ Ar-Rohmah students as a cross-case analysis. The data collection technique used interviews and documentation to assess translated results by expert Arab-Indo translators. Data processing to data visualization implemented NVivo 12 Plus analyzing the suitability of patterns between single and cross-case cases by synchronizing interview transcription results and translated values. Data analysis found several problems that caused differences in participants' thinking in Arabic translation: First, the difference in the weak structural representation of nahwu-shorof due to the difference in the age of knowledge acquisition, the number of activities participated in by participants, and the selection of the priority scale of selected activities; second, differences in inferential planning accuracy due to differences in participant habituation in Arabic translation.

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INTRODUCTION

The thought process in translation is part of human cognitive abilities. Rojo (2015) expressly stated that translation is a cognitive task. The emphasis on cognitive aspects in translation lies in the thought process of capturing the meaning of the source text and restructuring it into the target language (Vyacheslavovna, 2018). These two cognitive activities that attempt to establish the meaning of the source text and simultaneously reformulate it into the target language are called dual cognitive activities (Ren & Wu, 2015).

Multiple cognitive activities in the translation process impose higher cognitive demands on the translator. These demands arise from a translator leading the translation process (Ren & Wu, 2015). In addition, translation is a human communicative action between the original author and the reader. Due to the important role of a translator, Yi (2020) asserted that a translator must provide the best relevance to readers by attempting to produce translations that genuinely reflect the intent of the original text.

The translation results represent one's knowledge and experience. Errors in systematics or ways of thinking in translation can deviate from the original text's author's intention or even complicate the readers' understanding. However, translation results between one person and another must be different. Ren (2015) stated that humans, as cognitive subjects, have different ways of thinking.

Differences in translation results are inevitable, but tolerance can still be given as long as it offers good quality. A poor-quality translation may confuse the target language readers. Therefore, investigating the problems of the Arabic learning process to minimize Arabic translation errors in the next generation and produce competent Arabic translators is necessary. This study aims to examine the psychological dynamics in a person to give rise to differences in the way of thinking in Arabic translation.

Cognitive Map, Cognitive Translation, and Arabic Translation Learning

The construction of knowledge and experience in a person is related to the debate on the role of the brain in mapping and organizing various knowledge and experiences, known as cognitive maps. Cognitive map theory was introduced by Tolman (1948) to term a map in mind formed from building the nervous system into a concept, organizing concepts from one concept to another to predict various possibilities and determine decisions.

Cognitive map theory attracts the attention of further researchers to develop this theory by integrating it into various fields; first, the development of cognitive map theory in physical or geographic scope. Research with this category includes those that examine the function of cognitive maps in navigating geographical space (Ishikawa et al., 2008; Guelton, 2019; Bostelmann et al., 2020), and several others examine cognitive maps by investigating the parts of the brain that

regulate this navigation process (McNaughton et al., 2006; Boccara et al., 2019; Woollett & Maguire, 2012). Second, it relates to the development of cognitive map theory in abstract or conceptual scope. This research relies on Tolman's original cognitive map concept, which can be extended to various conceptual/abstract domains in human life. Some studies include studying cognitive maps in piano tuning (Teki et al., 2012), clinical handover activities (Flemming et al., 2015), organizing various circumstances (Zeithamova et al., 2012; Schiller et al., 2015), and problem-solving and decision-making activities (Eden, 2004; Lee & Kwon, 2014; Park et al., 2020; Bokeria et al., 2021).

Based on the literature review of the cognitive map mentioned above, no research integrates the cognitive map with thinking processes in translation, especially in Arabic. Researchers associate cognitive maps with translation because language skills attach cognitive aspects to human experience, and human experience and cognition must precede translation abilities (Ren, 2015). On the other hand, cognitive maps result from mapping knowledge and life experiences, organizing these experiences systematically (Schiller et al., 2015), and solving relevant problems (Eden, 2004). Thus, the researchers believe that the thinking process mechanism in translation results from the knowledge and the individual's experience. It then conveys the importance of studying the translation process using a cognitive perspective with cognitive map theory.

Furthermore, Arabic is the object of research for translation studies because Indonesia has the largest Muslim population in the world (RISSC, 2021), while the fundamental teachings of Islam are the Qur'an and Arabic hadith. Errors in Arabic translation will cause partial, shallow, and formal knowledge, which may lead to radicalism, mistranslation, and misinterpretation of the Qur'an verses (Munip, 2017; Zuhdi, 2017). Another reason is that Arabic learners in Indonesia assume Arabic is more complicated than other languages (Munip, 2019; Nur, 2018) due to its more complicated grammar and uslub system (Rozak, 2018).

Translation studies have shifted from initially focusing on translation results to focusing on the process using a psychological approach, especially the cognitive aspect. Various studies with cognitive translation have developed starting from the role of cognition in translation (Rojo, 2015; Daems et al., 2017), elaborating the theoretical foundations of cognitive translation studies (Deckert, 2017; Holubenko & Demetskaya, 2020; Vyacheslavovna, 2018; Yi, 2020), analyzing the empirical development of translation research with an experimental perspective and a cognitive perspective (Extremera, 2015; Hurtado Albir, Alves, Englund Dimitrova, & Lacruz, 2015; Krüger, 2016), and developing cognitive approaches in translation learning (Ren, 2015; Ren & Wu, 2015). Thus, this research contributes to developing cognitive map theory and cognitive translation studies, an interdisciplinary study between psychology and translation.

O'Brien (2013) stated that the scope of cognitive translation studies is not only focused on the process of one's cognitive activity when translating but also examines how environmental and social factors influence decision-making in the translation process. Therefore, this study aims to investigate a person's learning process in constructing Arabic knowledge and their experience in Arabic translation to explore the effect on their different ways of thinking in Arabic translation more deeply.

Cognitive Map Components: Structural Representation, Systematic

Structural representation, systematic knowledge organization, and inferential planning establish a cognitive map that navigates a person's thought process (Behrens et al., 2018). Structural representation is an understanding or knowledge stored in the brain's memory that is obtained through marking an object or coding the characteristics, specifications, or entities of an object. Structural representation involves the role of brain memory in remembering sequences of events (Schiller et al., 2015) and encoding the identity and entity of an object (Hsieh et al., 2014). Structural representations are formed from the many experiences of individuals in dealing with a problem or task so that a structured schema/abstraction is formed in the brain that is useful in finding more efficient solutions in the future.

The learning process to strengthen the structural representation of students can be done by providing assignments containing an object's identity at random. In contrast, the relationship between objects appears constant. The more experience and knowledge an individual possesses, the stronger and more generalized the structural representation will be, even though the experience gained is achieved from simple principles.

The systematic organization of knowledge guides the mind in integrating various structural representations and providing boundaries for the identity of objects and concrete actions to be combined (Behrens et al., 2018). The scheme of the systematic organization of knowledge in the human brain is revealed by Grewe et al. (2017), who mentioned that the relationship between objects could be known through coding in synaptic weights. A person can easily imagine a scenario or structural abstraction representing object X, then form new synaptic connections with cells that make up object Y and are reconnected with cells that create the representation of object Z, and so on, until a complex knowledge organization is formed.

Inferential planning is a cognitive activity in predicting the possibility that will occur and determining the selected behavior based on the analysis by organizing existing knowledge. Establishing inferential planning in individuals involves the role of the brain in the hippocampus. Buckner and Carrol (2007) in their research stated that cells in the hippocampus become active during retrieval of the identity coding and characteristics of an object (reconstructive memory), as well as when

individuals develop and imagine new problem-solving plans (constructive imagination) with elaboration on the previously obtained structural abstraction. Epstein et al. (2017) also said that cognitive maps involve the brain considering future planning using past representations. Hassabis (2007), in his research, emphasized these two types of thinking activities by stating that without the role of the hippocampus, the two phases cannot be executed by individuals in building and imagining future problem-solving. However, Behrens et al. (2018) stated that inference and generalization are more appropriate for cognitive maps than only planning.

Based on the theoretical study above, the three components that establish the cognitive map are used as the basis for preparing research questions. How is the process of constructing knowledge and experience in a person so they can form a structural representation of Arabic translation in the brain? What is the process of constructing translation knowledge for someone to organize relevant knowledge in Arabic translation? How does the difference in the construction process of translation knowledge make people obtain different thinking patterns in Arabic translation and translation results?

METHODS

This qualitative research used a multi-case approach because each participant has a unique case different from others regarding problems in constructing Arabic translation knowledge. The participants in this study were 14 people; 13 were students at Islamic boarding schools. They were active as students at several universities in Yogyakarta, and one other participant was a non-student student (not studying at a university). The participants were selected based on two criteria: students at Islamic boarding schools whose learning concentration leads to intensive Arabic translation activities (at least 2-3 times a week). Participants are students in the upper class at Islamic boarding schools who apply classically or students who have lived in the cottage for more than four years. The reason for establishing this characteristic is to ensure that the students have mastered the Arabic translation.

The study's primary data source was the participants' expression related to the experience of the Arabic translation learning process they experienced. In contrast, the secondary data source was participant translation scores with assessment criteria of A (perfect), B (Good), C (enough), D (Bad), and E (very bad). The interview instrument was arranged based on the three components that make up the cognitive map. Concerning the imperious Arabic text distributed to participants, the researcher applied two criteria: Arabic texts that do not contain high-level literary elements not to make it challenging to translate participants. The text was taken from a study book that has not been translated (has not been translated by experts/academics and has not been published). It is, therefore, expected to explore the authentication of participant translation results. In the

end, the researchers took a sample of the Arabic text from the book of Nailul Marom, a book of Islamic studies containing a collection of the hadith of the Prophet. They equipped it with a more detailed explanation of the meaning of the hadith. The Arabic text chosen was the Prophet's hadith about an a'raby urinating in a mosque, along with a description of the implicit meaning taken from the hadith.

Data collection techniques used interviews and documentation of translated results. In collecting data, researchers applied procedures including asking for participant approval as stated in and validation of Arabic translation experts. Informed consent contains a statement of participant consent regarding the willingness to conduct interviews, audio recordings, and the willingness to translate the Arabic text provided. Expert validation of Arabic translation was used to assess the feasibility of translating Arabic text to participants and assess participant translation results. The expert translator in this study is Ahmad Wahyudi. He is an alumnus of Al-Imam Muhammad Ibn Saud Islamic University and has had a career in Arabic translation for over three years.

The data analysis procedure in this study used pattern-matching techniques and explanatory making. This study used the multi-case design of Yin (2013) so that the analysis strategy was applied both in single-case analysis (Nurul Ummah participants) and cross-case analysis (LSQ Ar-Rohmah participants). Starting with importing interview transcript data and participant translation values into NVivo 12 Plus, then providing code and cases on interview transcript data and attribute values on participant translation value data. The next step was visualizing relevant data based on explicit and implicit participant expressions. In addition to visualizations, crosstab-query result tables were used in certain themes to support explanations of previous data visualizations (if needed). The final step was to compile the systematics of presenting data. The systematics of the presentation was based on a multi-case design, presenting the results of single case analysis on Nurul Ummah students along with their conclusions, presenting the results of cross-case analysis on LSQ Ar-Rohmah students along with their conclusions, and finally drawing conclusions of the research. Figure 1 illustrates the visualization of the following research design chart.

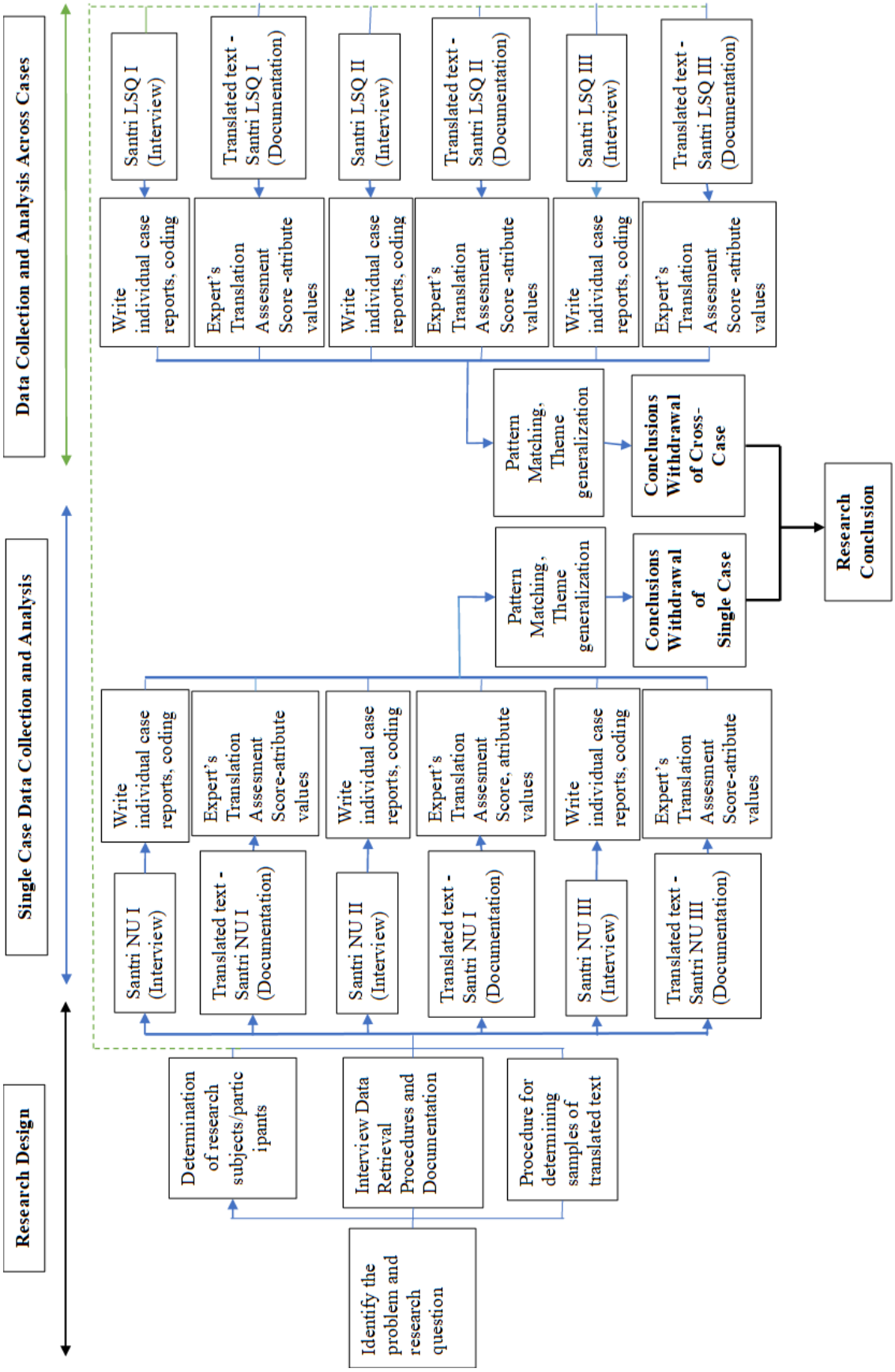

Figure 1. Multi-case research design

Validity in this study used data triangulation of coherence of interview data, and different participant translation value documents present variations of participant expression data that vary and utilize explanation to create rich and concise descriptions still based on the theoretical proposition of cognitive map. The questioning approach is used to dig deeper into the data and the analysis results (Cresswell, 2016). The reliability of this study is to check the data and the results of data analysis repeatedly and with full accuracy. Preventing an increase in results' reliability began with checking the transcription results of each case in participants. It repeated checks on nodes made in the coding process at the first and second-cycle coding stages.

RESULTS AND DISCUSSION

The pattern between single-case analysis and cross-case analysis yielded several findings, such as that age differences in acquiring early knowledge of *nahwu* and *shorof* affected the difference in the strength or weakness of structural representations of *nahwu* and *shorof*. Besides initial knowledge, differences in the number of activities participated in by each participant and the selection of priority scales of activities affect differences in solid or weak structural representation and the ability to organize knowledge in translation. The determining factor for the difference in the way of thinking in translation is the presence or absence of one's habituation. This habituation factor affects inferential planning schemes and impacts the difference in one's translation results with others.

The Beginning of *Nahwu* and *Shorof* Knowledge Acquisition

The translation process involves some knowledge that a person must possess. Even more so when one is about to translate Arabic, analyzing the Arabic text at least involves the knowledge of *nahwu* and *shorof*. The analysis of interviews with Nurul Ummah participants showed that they had studied *nahwu* and *shorof*. *Nahwu* is used to analyze *tarkib*, while *shorof* is used to analyze the meaning of each corresponding word. However, there are differences in the level of education the first time they learn both knowledge. These differences are associated with the participants' translation results and produce visualizations in Figure 2.

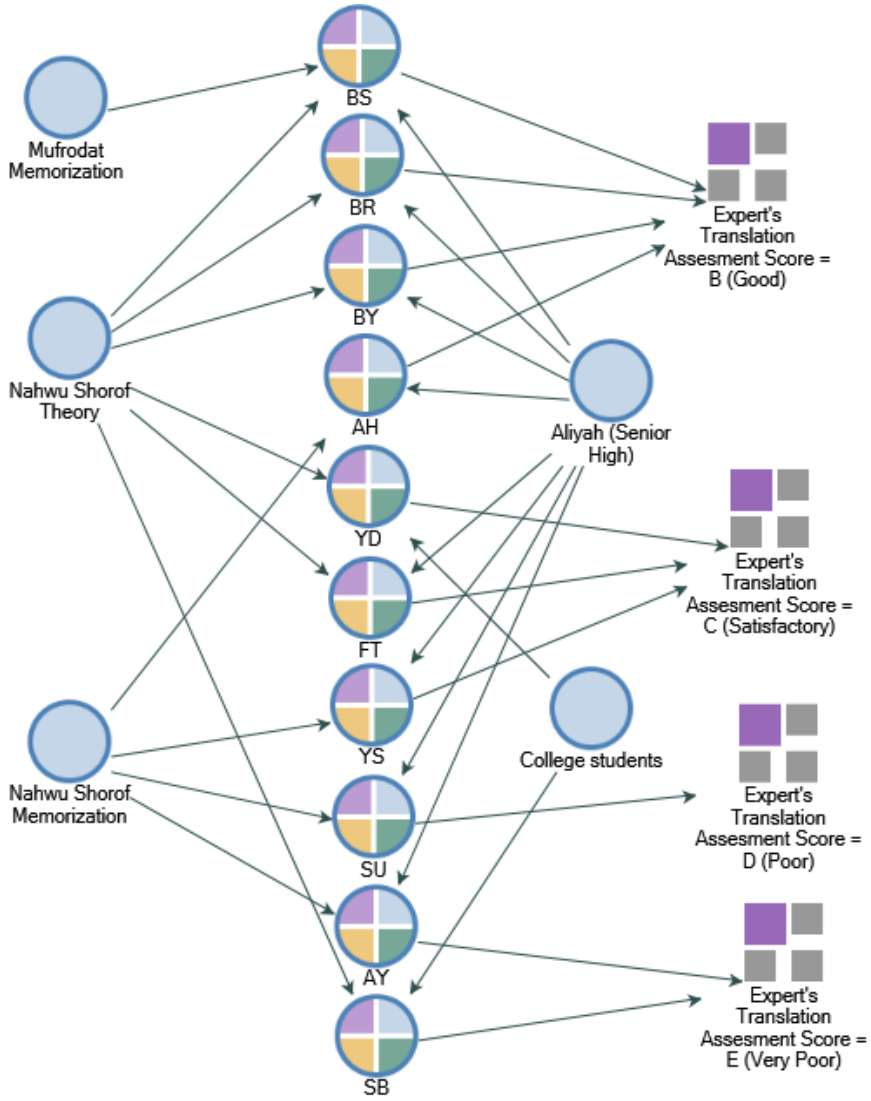

Figure 2. The beginning of the acquisition of *nahwu* and *shorof* knowledge and its implications for the acquisition of the translation value of Nurul Ummah students

Figure 2 shows the pattern-matching analysis where all Nurul Ummah participants know *nahwu* and *shorof*. However, when viewed from the initial aspect, they studied *nahwu* and *shorof* -which represent educational levels- and are connected with the translation results of participants. The results obtained differences in their translations' value and formed a pattern. In the first pattern, participants who began to learn *nahwu* and *shorof* grammatical at the high school /*aliyah* level received varied translation scores. BS, BR, BY, and AH participants got B grades, FT and YS participants got C's, SU participants got D's, and AY participants got E grades. In the second pattern, participants who studied *nahwu* and *shorof* grammatical at the college level got C grades from YD participants and E grades from SB participants.

The highest translation value in the first pattern is a B grade, while the highest in the second pattern is a C. Although some participants scored C, D, and E, the

cases of participants who scored low were relatively few. Other corroborating evidence can be seen in the case of participants who gained initial knowledge of *nahwu* and *shorof* at the tertiary level, getting a C grade.

Furthermore, the cross-case analysis of LSQ Ar-Rohmah participants' expressions is presented regarding acquiring initial knowledge about *nahwu* and *shorof* and developing Arabic translation skills of the following visualizations.

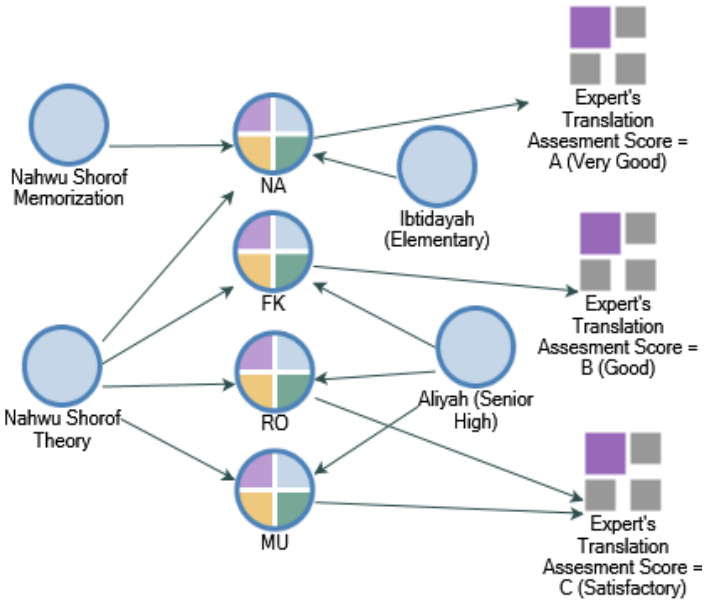

Figure 3. The beginning of the acquisition of *nahwu* and *shorof* knowledge and its implications for acquiring the translation value of LSQ Ar-Rohmah students.

Figure 2 shows that all participants already have *nahwu shorof* knowledge. In the cross-case analysis of LSQ Ar-Rohmah participants, there are two patterns: acquiring initial knowledge of *nahwu* and *shorof* at the *ibtidaiyah* or elementary and high school levels. The first pattern produced an A (excellent) translation grade in NA participants. The second pattern results in a translation value of B in FI participants. In contrast, the other two participants, RO and MU, scored C. Thus, pattern matching analysis in the cross-case analysis shows that early knowledge acquisition at the elementary school level had a better translation value than acquisition at the high school level.

Problems of Developing Translation Skills

Translation ability is not only influenced by a person's age when acquiring initial knowledge of *nahwu* and *shorof*. However, it is related to various problems they face in the subsequent learning process, developing this knowledge into the ability to translate Arabic texts. The analysis of participant expressions indicates two problems: the number of routines or activities and the priority scale of these activities.

1. Activities and Their Influence on the Development of Translation Skills

Most participants, both Nurul Ummah students and LSQ Ar-Rohmah students, are active as students at universities in Yogyakarta. Some other participants had additional activities outside of studying at the cottage and lecture activities at the university. Figure 4 explains the results of the single case analysis of Nurul Ummah participants in Figure 4.

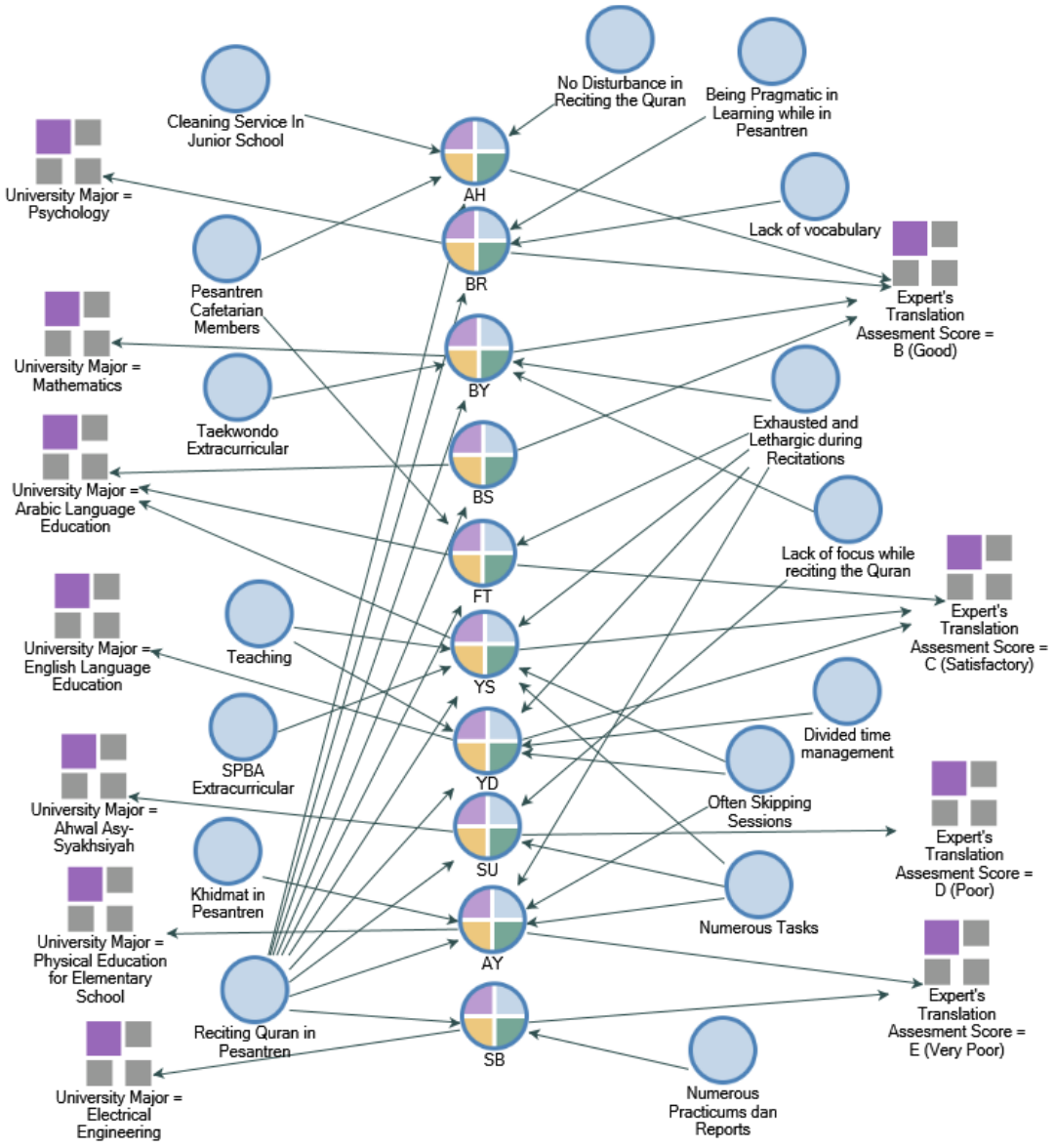

Figure 4. The number of activities and their influence on the transition value of Nurul Ummah students.

A single case analysis of Nurul Ummah participants showed that some problems that interfered with developing translation skills came from activities in lectures and other activities besides studying. The most meaningful activity is lecture activities. AH, a participant who obtained a B grade, had other activities, such as becoming a cleaning service in a school and

a canteen member. Still, these activities did not interfere with studying at the cottage. Unlike the SB participants who got an E, the routine was to study and go to college. One of the factors is that the college major is not linear. There are many tasks in practicum and making reports. The other participants experienced fatigue and drowsiness when studying because of the many tasks in the lecture and other activities, which demanded a division of time.

The next step is to conduct a cross-case analysis of student participants at LSQ Ar-Rohmah. Figure 5 presents a visualization of the data processing results on the influence of many activities in developing Arabic translation skills.

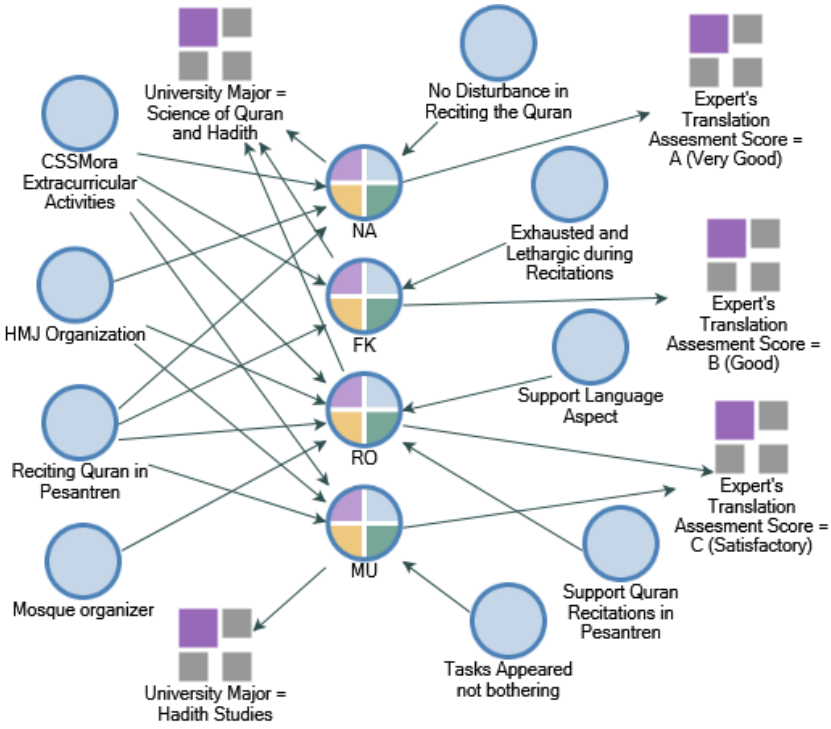

Figure 5. The importance of activities and their influence on the translation value of LSQ Ar-Rohmah students

Figure 4 shows that the activities of LSQ Ar-Rohmah participants were more than those of Nurul Ummah participants. The cross-case analysis shows that actions in lectures and activities other than studying affect translation skill development. Figure 4 illustrates that the more activities participants participate, the lower the translation value. For example, RO and MU participants with a C translation score had more activities than FI participants, unlike NA, who got an A. Although the number of activities in NA participants is the same as in MU participants, NA has more substantial initial knowledge *of nahwu* and *shorof* than MU, as shown in Figure 2.

The pattern matchmaking between the single-case analysis and the cross-case analysis showed that activities joined by the participants influenced their lack of attention or loss of concentration due to fatigue, drowsiness, and

coursework required. They lack time to study independently, repeat previous subject matter, or develop their Arabic knowledge, leading to a lack of translation skills.

2. Priority Scale Selection

This section continues the previous analysis of the participants' activities. There was one of the activities they prioritized. When connected with translation value data, it shows a single case analysis of Nurul Ummah participants.

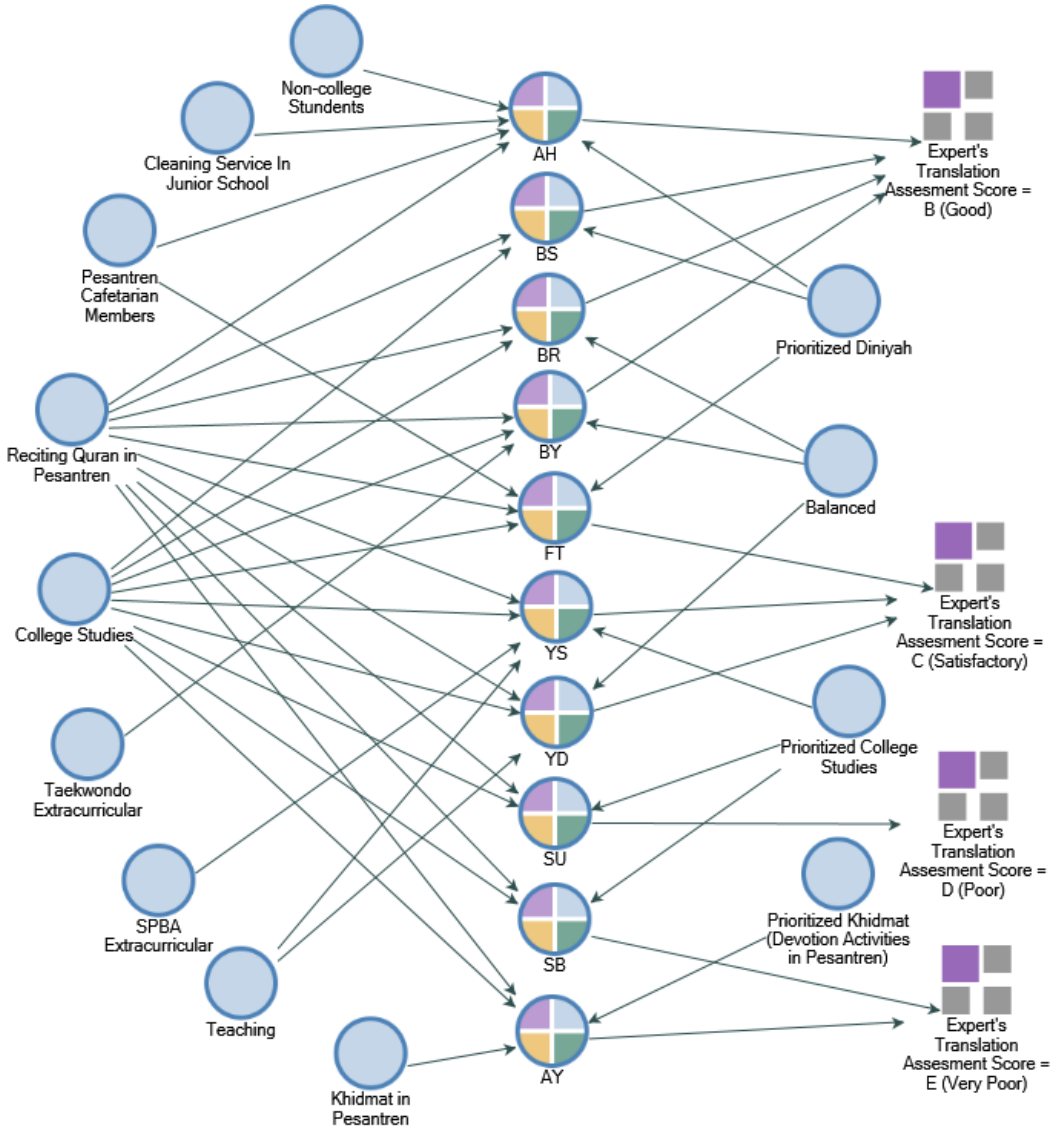

Figure 6. Selection of priority activities and their influence on the translation value of *Nurul Ummah* students

Figure 6 shows that AH and BS scored B and FT scored C as they prioritized studying. BR and BY, who balanced priority, scored B, and YD scored C. The emphasis of the lecture has affected translation scores for YS, obtaining C, SU

D, and SB, obtaining E. In contrast, priorities on activities outside of lectures and studying have caused AY to obtain E.

In this case, there is a similar pattern between choosing the priority of studying and choosing balance. More participants get a translation score of B. Selecting *diniyah* means that participants focus more on developing Arabic translation skills, while other activities do not get much attention. Similarly, participants who chose to be balanced still took the time to develop their Arabic translation skills even though they did many routines. Unlike the participants who prioritize lectures or other activities, in this case, the development of Arabic translation skills does not receive much attention, so the translation scores they get are C, D, and E.

Furthermore, the analysis of priority selection in LSQ Ar-Rohmah participants is a cross-case analysis. Data analysis of participant expressions and translation values are presented in Figure 7.

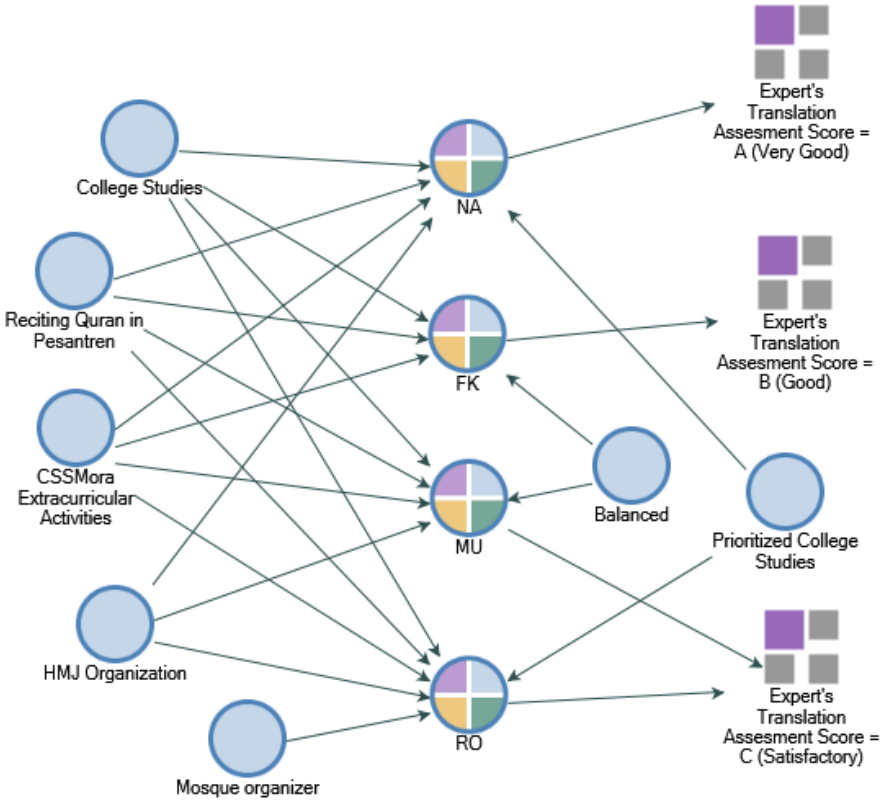

Figure 7. Selection of priority activities and their influence on the translation value of LSQ Ar-Rohmah students

Figure 7 shows two patterns of activity priorities selection: lecture priorities and balanced elections. NA obtains an A, and RO obtains a C. In contrast, the second pattern affects the acquisition of the translation, causing FI to obtain a B and MU to obtain a C. In this cross-case analysis, college-priority participants were superior to participants who chose to be balanced.

There are differences in the lecture priority selection patterns between single-case and cross-case analysis. In a single case analysis, the college priority selection got the highest translation grade of C. In contrast, in the cross-case study, the highest translation grade was an A and the highest grade of all participants. This pattern difference can be broken down by linking the results of the first analysis, the beginning of the acquisition of *nahwu* and *shorof* knowledge. NA, one of the participants, had gained knowledge of *nahwu* and *shorof* in the 4th elementary grade. Thus, NA is not affected by many activities and priority selection.

In addition to NA, there was a similarity in pattern between the analysis of the cases in Nurul Ummah participants and the cross-case analysis of LSQ Ar-Rohmah participants. Therefore, the analysis results in the influence of priority scales of various activities in developing Arabic translation skills.

Habituation in Arabic Translation

Arabic translation skills are related to the acquisition of *nahwu* and *shorof* knowledge and the habituating a person to deal with Arabic texts and translate them into Indonesian. Figure 8 presents a visualization of a single case analysis of Nurul Ummah participants about translation habituation and its effect on translation value.

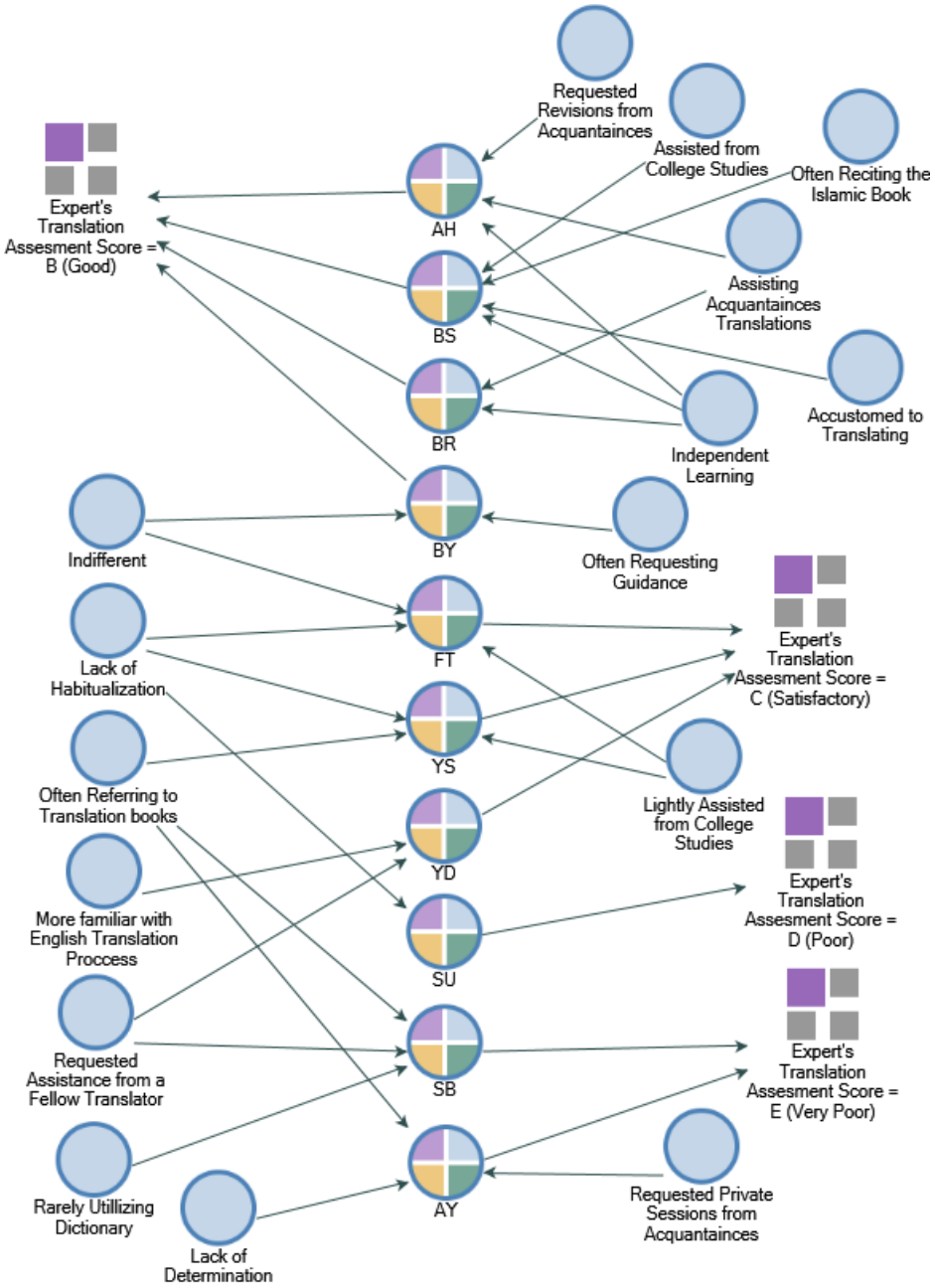

Figure 8. The effect of translation habituation on Arabic translation skills in Nurul Ummah participants

The analysis results of single cases in Nurul Ummah participants had two patterns: habituation and lack of habituation. The first pattern was found in AH, BS, and BR, who obtained B. They were often accustomed to Arabic text translation activities, self-study, and helping their friends and juniors in the cottage. The second pattern was that other participants got grades of C, D, and E. The most causal factor was the lack of habituation in translating Arabic texts, while the other factor arose from seeing frequently translated books and rarely opening dictionaries due to laziness.

The next step is to conduct a cross-case analysis of LSQ Ar-Rohmah participants. Based on the expressions of the LSQ Ar-Rohmah participants, Figure 9 presents a visualization associated with the value of translation by an Arabic translator.

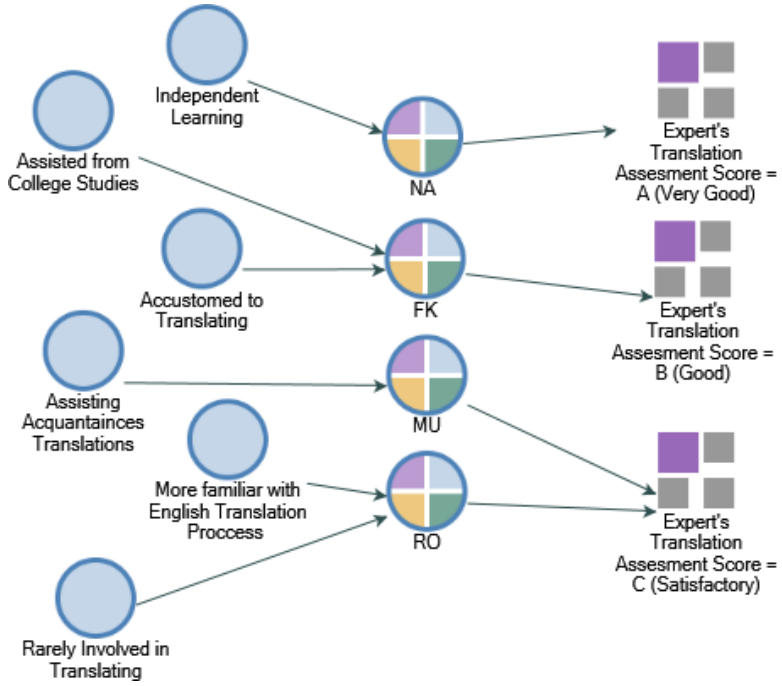

Figure 9. The effect of translation habituation on Arabic translation skills in LSQ Ar-Rohmah participants

The cross-case analysis of LSQ Ar-Rohmah participants showed that A and B grades were obtained by participants who habitually translated Arabic texts independently. Unlike the participants who got a C grade, they were less used to translating Arabic texts.

Thus, there is a similarity in pattern between the results of single-case analysis and cross-case analysis where the presence in the translation of Arabic texts can improve their translation skills. Conversely, the lack of habituation to Arabic text translation will hinder the development of translation skills. Habituation of Arabic text translation will strengthen *nahwu* and s*horof* knowledge so that the accuracy of the Arabic text analysis results is more precise than that of participants who lack habituation. Translation habituation can also improve the ability to organize knowledge to capture the meaning of Arabic texts and choose the proper diction so that the translation results are better than participants who lack habituation.

The Urgency of Strengthening *Nahwu* and *Shorof* Structural Representations Early

Participants' Arabic translation skills in this study are passive ones obtained through language learning. Arabic is the source language because the original translated text is written in Arabic. At the same time, Indonesian is the target language. One can translate Arabic from the grammatical learning process of Arabic as a second language and the source language.

The conclusion of the pattern matching results between the single-case analysis (Figure 1) and cross-case analysis (Figure 2) shows that the earlier a person acquires initial knowledge of *nahwu shorof*, the better the translation value. When studied using cognitive development theory, when the participants first learned Arabic, they had two stages, called the concrete operational stage and the formal operational stage.

In the concrete operational stage, the dominance of children's thinking ability is in coding or marking the identity and entity of an object, giving names, sorting things according to shape, and other thought processes to think about solving problems. The designation of an object or coding on an object's characteristics, specifications, or entities in Behrens's is referred to as a structural representation.

In other words, the concrete operational stage is the right time to reproduce the coding of various terms in *nahwu* and *shorof* and their identities and strengthen the structural representation of *nahwu* and *shorof* through the enrichment of tasks and applications in the reading of the book when these two things continue to be done until they are at the formal operational stage, where a person's cognitive abilities are already at the level of thinking abstractly. Logical reasoning to conclude will lead to better translations.

Unlike participants who have learned Arabic at the formal operational stage, they can still master the grammatical Arabic and other supporting sciences, the structural representation that he brings in translation is not as strong as that of people who have studied Arabic grammar since childhood/concrete operational stages because it should no longer focus on forming structural representations of *nahwu shorof,* but instead on developing the ability to think logically in analyzing Arabic texts and drawing conclusions by restructuring translated sentences. Epstein et al. (2017) stated that "route planning involves considering the future using representations laid down in the past." The statement indicates that the cognitive map, which in this case is termed "route planning" in the future, requires a strong structural representation of the past, and to strengthen the structural model is to introduce it to students from childhood.

Thus, the earlier one learns *nahwu* and *shorof*, the stronger the structural representation formed and the better the translation. As Bostelman (2020) examined children's ability to use pathway integration to the home and build mental maps that support navigation in their environment, childhood is an excellent time to instill cognitive maps. The test results found that children could

use pathway integration without visual information to create cognitive maps, and children's cognitive mapping capacity can increase with age. Indeed, the cognitive map of Arabic translation in 9-year-olds has yet to be seen. Newcombe's research also conveyed that the cognitive map results formed in children were not visible until they reached 12.

Now, what is the solution for those who start learning Arabic, especially *nahwu* and *shorof*, at the high school level? or even the college level, where they have more activities that have the potential to interfere with Arabic learning? The answer to such a question leads to the following discussion.

The Urgency of Choosing a Priority Scale from Various Routines Carried Out

Pattern matching between single-case analysis (Figure 3) and cross-case analysis (Figure 4) shows that the more activities participants participate in outside of Arabic learning activities, the more impact it has on inhibiting the development of translation skills. It becomes routine when a person has many activities. At least these outside activities cause a person to have little free time to self-study to develop grammatical knowledge of *nahwu* and *shorof* or hone Arabic translation skills.

Most students spend the afternoon on campus, and there are still some assignments from lectures to complete. Thus, the time to recite at night is a little time left to develop translation skills. Fatigue affects drowsiness and causes difficulty concentrating and focusing when learning Arabic. Therefore, they cannot optimize the brain's attention performance during learning.

The lack of attention of a person in learning will affect one of the components that make up the cognitive map, namely structural representation. The effect of these influences forms weak structural pictures due to lack of attention at the time of learning, which impacts the coherence of coding the characteristics of an object. The homogeneity of structural representation will affect the constraints of *tarkib* analysis in Arabic texts in the future, as one can forget or fail to retrieve the memory of structural representations of grammatical knowledge of Arabic memory.

One solution to increase learning attention to strengthen the structural representation of *nahwu* and *shorof* and develop Arabic translation skills is to choose Arabic learning activities as activities that are prioritized over other activities, as explained in the matchmaking analysis of the priority scale selection pattern between single-case research (Figure 5) and cross-case analysis (Figure 6) that studying can improve Arabic translation skills. The selection of recitation as a prioritized activity is a solution to have a strong structural representation of *nahwu* and *shorof*.

The selection of priority scales represents individuals choosing a specific goal. The desire to achieve these goals will encourage one to do things related to achieving the goals set, including strengthening structural representation and

developing translation skills until a full Arabic translation cognitive map is formed. Tolman's purpose and cognition present the link between the intrinsic impulse to achieve goals. In later experiments, Tolman stated that in the critical phase, the activity of individuals not only responds passively to a separate stimulus but also actively selects and compares stimuli. Other studies have also strengthened the drive to achieve goals, including Langfield-Smith (1992) and Moran et al. (2021), which used certain variables to stimulate subjects to establish needs to improve cognitive maps. Boccara et al. (2019) explored the features of objects used as goals by experimental subjects.

Some confirmed that selecting relevant priority scales would strengthen the cognitive map. Therefore, a person who learns *nahwu* and *shorof* at the college level needs to establish learning Arabic as an activity prioritized over other activities, such as lectures, organizations, work, or other activities.

Habituation as a Main Component in the Development of Arabic Translation Cognitive Maps

Based on pattern matching between single-case analysis (Figure 7) and cross-case analysis (Figure 8), habituation in Arabic translation improved cognitive map development. In contrast, the lack of habituation in Arabic translation hindered the growth of the cognitive map.

As known, Arabic translation requires applying the grammatical knowledge of *nahwu* and *shorof*, so the habituation will further strengthen their structural representation. The solid structural word of *Mahou* and short strongly supports efforts to quickly and precisely identify talking in future Arabic translations. Behrens et al. (2018) emphasized that structural representation is obtained from enrichment tasks. In this case, the assignment can be interpreted as the continuity of the Arabic text analysis exercise to strengthen the structural representation of *nahwu* and *shorof.*

Arabic translation also demands systematic organization of knowledge. A person used to translating Arabic will easily organize his diverse expertise. With habituation, inferential planning in translation is also improving regarding reconstructive memory to capture the meaning and constructive imagination to constructive sentence restructuring. Epstein et al. (2017) and Park (2020) would form a structured scheme/abstraction in the brain useful for finding future efficient solutions. This statement indicates the need for habituation to develop a cognitive map and a systematic thinking scheme in the brain.

Habituation is an essential component in developing Arabic translation cognitive maps based on a study by Wollet and Maguire (2012), who found an improvement in the performance of cells in the hippocampus in taxi drivers in London who developed "knowledge" of London layout and could use this knowledge to navigate geographical spaces to choose the fastest route. Teki et al. (2012) also found a greater volume of gray matter in the hippocampus in professional piano players who performed piano pitch tuning based on their

experience. Both studies took samples of someone proficient in their field, meaning that the subjects in the study have gone through habituation in their respective fields.

Thus, habituation is a significant and inseparable component in developing the Arabic translation cognitive map. Translation habituation can close or complement the previous shortcomings. The problems in the initial acquisition of *nahwu* and *shorof* representations could have been greater, and issues in the selection of priority scales from the activities.

CONCLUSION

The difference in the way of thinking in translation is due to the difference in cognitive maps formed in each person. The differences in cognitive maps developed in each person are caused by differences in the strong or weak structural representation of *nahwu* and *shorof* as a result of differences in the acquisition of initial knowledge of *nahwu* and *shorof*, differences in the number of activities that affect the acquisition and development of Arabic translation skills, and differences in the selection of priority scale activities. The difference in inferential planning ability arises from the difference in the intensity of Arabic translation exercises/habituation. This difference in inferential planning can be seen in each person's translation results.

This research has limitations because it only involved ten students and focuses more on the psychological dynamics of someone translating texts from Arabic to Indonesian. So, it is necessary to discuss the number of informant subjects to draw stronger conclusions from the results of this research. This study examined the cognitive maps of Arabic translation at a lexico-grammatical level. At the same time, studying other supporting sciences of Arabic also plays an essential role in translation, especially in analyzing Arabic texts and capturing the meaning of Arabic texts. Thus, future researchers can study the Arabic translation cognitive map and explore other linguistic aspects.

Cognitive map studies have also developed the mechanisms of the nervous system in the nervous brain that underlie the process of spatial navigation and abstract knowledge. Therefore, the researcher will be more interested if he examines the cognitive map of Arabic translation from mechanical aspects to the nervous system and the spatial navigation process in a person when translating Arabic texts.

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