

A Formative Assessment Example: Word Association Test

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Received: February 13, 2020

Accepted: March 19, 2020

Online Published: July 29, 2020

doi:10.5539/ies.v13n8p103

URL: <https://doi.org/10.5539/ies.v13n8p103>

Abstract

This research was carried out to determine the effectiveness and functionality of the word association test (WAT), which is a formative assessment tool that is frequently emphasized on today's modern education systems. The study group consisted of 60 students in a public school in Kocaeli in the school year 2018-2019. Participants were identified using convenience sampling technique. The data of the study were obtained by using pre-test and post-test quasi-experimental design with no control group. The data were categorized by subjecting to content analysis. The findings were tabulated using the cut-off technique and analyzed using the Wilcoxon signed-rank test. When the results of the study were examined, it was concluded that conceptual change and development occurred in participants' minds and there was a significant difference in the results of the Wilcoxon test performed before and after the implementation. It was observed that the students wrote 1669 words before the implementation, and the number increased to 2193 after it. This shows that the students associate the key concept of "migration" with more words after the implementation and thus there is a wider connotation related to migration in their minds. In addition, the results of this research reveal that the WAT is suitable for formative assessment and can be used in educational studies.

Keywords: word association test, formative assessment, constructivist approach, cognitive map, elementary school

1. Introduction

As a result of the review of the relationship between teaching and assessment concepts for the last 20 years, it has been shown that "assessment" guides students' learning skills (Biggs & Watkins, 1996).

Today's education systems aim to provide students with a higher quality education and to educate individuals who continuously improve themselves academically, forcing societies to canalize to more contemporary education approaches. This has played an important role in the adoption of a constructive approach by many developed countries such as the United States, Australia, Finland and New Zealand (Aşkar et al., 2005). The constructivist approach in Turkey, which was adopted in 2005, is a modern approach that supports the match of each student with a learning material appropriate to his/her level of learning and encourages students to learn by experiencing knowledge (Fosnot & Perry, 1996; Lainema & Makkonen, 2003). The constructivist approach has brought many innovations to our education system. One of these innovations is formative assessment and evaluation although it is not fully adopted yet.

Formative assessment, which has many different names in literature like "informal evaluation" (Hamayan, 1995), "authentic assessment" (DiMartino, Castaneda, Brownstein, & Miles, 2007; Rennert-Ariev, 2005), "performance assessment" (Hamayan, 1995; DiMartino et al., 2007), "assessment for learning" (Box, 2019) and "alternative assessment" (İzci, Göktaş, & Şad, 2014), is a kind of assessment that changes the focus of traditional assessment and evaluation instruments. It has been demonstrated by many studies that traditional assessments do not contribute to students' learning, reduce the strength of the school curriculum and increase students' dropout rates (Darling-Hammond, Rustique-Forrester, & Pecheone, 2005; Gipps, 1999; Herman, 1997; Wiggins, 1990). These results increased the importance of formative assessment.

Evaluations that are made not to give grades to students, but to support their learning and to increase the adequacy of teaching are called formative assessment (Keeley, Eberle, & Farrin, 2005). Formative assessment studies are

process oriented and support active participation of students (Gelbal & Kelecioğlu, 2007; Mintah, 1993). While traditional assessment and evaluation techniques allow to evaluate students at a lower level (Demirel & Şahinel, 2006; Ünal, 2006), alternative assessment and evaluation techniques enable students to demonstrate their high-level cognitive skills (Hodges, Lamb, Brown, & Foy, 2005). The effective use of formative assessment techniques not only contributes to students' success but also supports lifelong learning (Clarke, 2012). Examples of formative assessment techniques include project, drama, open-ended questions, word association test, structured grid and concept maps (Acar & Anil, 2009; Bagley, 1995; Dietel, Herman, & Knuth, 1991; Kaya & Taşdere, 2016; Mintah, 2003; Struvian, Dochy, Janssens, Schelfhout, & Gielen, 2006; Sambell, McDowell, & Brown, 1997).

The students are confronted with many concepts during the education process and learn them through mental processes. How these concepts form a structure in the mind can only be explained based on students' thoughts on key concepts (Gilbert, Boulter, & Rutherford, 1998). The abstract ones of these concepts prevent the formation of a certain structure in students' minds (Knippels, Waarlo, & Boersma, 2005; Krawczyk, 2007; Quinn, Pegg, & Panizzon, 2009). Accurate understanding and interpretation of each concept encountered in the education process will contribute to the academic life of the students. For a concept to be well understood and stick in the mind, other words related to that concept must be associated (Bahar, 2006). The more students associate a concept with words, the easier it will be to understand the concept (Kaya & Taşdere, 2016). Particularly, constructivist learning approach supports revealing the cognitive structure of students by giving importance to the use of different techniques in determining the conceptual understanding and the relationships between concepts (Vance, Miller, & Hand, 1995). It is difficult to correct the concepts that are misunderstood and cause misconceptions in the mind by using traditional teaching strategies and assessment and evaluation techniques (Posner, Strike, Hewson, & Gertzog, 1982). This requires focusing on formative assessment techniques. Word Association Tests, which are one of the formative assessment techniques, are very effective in revealing the cognitive structures of the students about the concepts they have.

Word association tests (WATs) are the most common alternative evaluation and assessment techniques used to analyze the cognitive structure of the students, to determine whether the relationships between the concepts stored in the mind during education and training are sufficient and to determine students' perceptions of the concepts (Cachapuz & Maskill, 1987; Johnstone & Moynihan, 1985; Özatlı & Bahar, 2010). The technique involves writing a concept about the key concept for any subject, without limiting students' minds, and in a limited time independently (Bahar, Johnstone, & Sutcliffe, 1999; Sato & James, 1999). Bahar and Özatlı (2003) stated that students should write the answers related to the key concept as a list and this may prevent the risk of chain response. The risk of chain response is the risk of writing the concept suggested by the first concept if the student does not return to the key concept after writing a concept for each key concept (Polat, 2013). To eliminate this risk, students should be encouraged to write one by one as a list. The order in which the students write their own sentences in the word association test is a measure of the semantic affinity of the stimulating (key) words (Deese, 1965). After writing key concepts, students may be asked to form a sentence about the given concept. These sentences are used to analyze students' cognitive structure (Gunston, 1980). During the process, students were given various time periods to write the words. These periods are 30 seconds (Bahar, Johnstone, & Sutcliffe, 1999; Kempa & Nicholls, 1983; Steinberg, Bieliauskas, Smith, & Ivnik, 2005), 45 seconds (Dinç, Sezer, Üztemur, & İnel, 2018), 1 minute (Ercan, Tasdere, & Ercan, 2010), 1.5 minutes (Kaya & Tasdere, 2016) and 3 minutes (Aladağ & Yılmaz, 2014). There are also studies in which a 20-second period is allowed for the students (Keskin & Örgün, 2015).

It is possible to see many studies carried out by using WAT in national and international literature. In these studies, misconceptions of the participants related to various concepts were determined, their cognitive structures were revealed, and their current knowledge and perceptions were determined. Among the researches, there were studies in which the participants were teacher candidates (Altıntaş, Kabaran, & Kabaran, 2018; Balbağ, 2018; Bozyigit & Kaya, 2017; Ceylan & Şöhretli, 2017; Deveci, Köse, & Bayır, 2014; Doğan, Güngör, & Güngör, 2018; Durukan & Altay, 2014; Yener et al., 2017; Ekici & Kurt, 2014; Kaya & Akış, 2015; Kızılay, 2018; Kurt & Ekici, 2013; Önal, 2017; Yücel & Özkan, 2014), secondary school students (Bahar & Özatlı, 2003; Kurtaslan, Aydın, & Özer, 2018; Özatlı & Bahar, 2010; Polat, 2013; Tavukçuoğlu & Özcan, 2018), junior high school students (Aydemir, 2014; Dinç et al., 2018; Ercan et al., 2010; İnel, Akar, & Üztemur, 2016; Karaca, 2018; Polat, 2013) and primary school students (Aladağ & Yılmaz, 2014; Eren, 2012; Kaya & Taşdere, 2016). In addition to these, studies conducted with hotel staff (Keskin & Örgün, 2015), both secondary and junior high school students (Kostova & Radoynovska, 2010), teachers and students (Kostova & Radoynovsk, 2008), foreign language classes (Nissen & Henriksen, 2006) and associate degree program students (Altınay-Özdemir, 2018) are included in the literature. This research

was carried out to determine the relevance of the use of WAT, which is frequently used test in various studies in the literature, to formative assessment in the evaluation of the teaching of “Migration” concept.

2. Method

2.1 Research Model

Quantitative research designs were used in this study which was conducted in order to determine how the word association test allows formative assessment. In order to determine to what extent the effect of the process on students can be measured by using WAT, pre-test and post-test were designed as a quasi-experimental design with no control group. With this design, the significance of the change between the pre-test and post-test scores of a single group can be determined (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2010).

2.2 Participants

The sample of research consisted of 60 fourth-grade students of a public school in the migration region of Kocaeli in the academic year 2018-2019. Since the suitability of WAT to formative assessment will be discussed in the evaluation of migration issue, it is important to conduct the study in a migration region. The sample designed using convenience sampling technique, was preferred since the immigrant children in the migration region had to be selected in order to serve the purpose of the study and since the school in which the study was carried out was the school where one of the researchers worked.

2.3 Measurement Tools

WAT was used as data collection tool in the research. WAT is a measurement tool in which participants are asked to write the first word that comes to their minds about key concepts in a short period of time (Atasoy, 2004). Word association tests can be used to evaluate process and formatting and to identify pre-learning (Güneş & Gözüm, 2013). It is also a very functional technique in terms of its preparation, application and use in all classes and large groups (Bahar, Nartgün, Durmuş, & Bıçak, 2010). Within the research, 10 key concepts related to migration were determined in line with the opinions of 3 field experts. Each of these key concepts was prepared on a page and presented to the participants. In order to eliminate the risk of chain response, key concepts were written in a list (Bahar & Özatlı, 2003). The key concepts are: Border, Farewell, Loneliness, Passenger, Immigrant, Foreign Land, Moving, Longing, Migration and Journey. These key concepts are common concepts that emerge in line with the opinions of the field experts on the children’s picture books to be used in the research. Necessary explanations about WAT and process were given to the participants. The time periods for writing the key concept in the literature may vary according to the group in which the WAT is applied. Since the group of participants in this study was 4th grade primary school students, it was decided to give the participants a 3-minute period (Aladağ & Yılmaz, 2014). A page of the measuring tool is shown below as an example.

Key Concept	Answer Word
Journey
Journey
Journey
Journey
Journey
Journey
Journey
Journey
Journey
Journey
Related Sentence

2.4 Procedure of the Research

This research was conducted using quantitative research designs to determine to what extent the Word Association Test allows formative assessment. The research was carried out with the participation of 60 4th grade students, who were identified with convenience sampling method. In line with the sample selection, a school in the migration region was preferred. In this context, it was aimed to determine to what extent the word association test serves formative assessment in revealing the cognitive structures and vocabulary of the students.



In the first step of the research, concepts that will explain the subject of migration were determined in line with expert opinions. In the light of these words, 15 illustrated children's books which can be used in practice and are accessible are determined. The names of these books and authors are as follows; "Stepping Stones, Nizar Ali Badr", "Why Am I Here?, Constance Orbeck-Nilssen", "Op de Vlucht, Prim Van Hest", "The Journey, Francesca Sanna", "The boy in the Boat, Sevede Tuba", "Welcome, Barroux", "Me and My Fear, Francesca Sanna", "Amin Loses His Way, Aleix Cabrera", "I walk with Vanessa, Kerascoet", "The Journey Home, Fran-Preston Gannon", "I Have the Right to be a Child, Alain Serres", "The box, Merve Çirişoğlu Çotur", "The Three Questions, Jon J. Muth", "Mother Bruce, T. Higgins", "Marwan's Journey, Patricia De Arias", "The other lions, Gökçe Gökçeer". Four of these books were selected by taking into consideration the characteristics of the student group, the peritextual characteristics of the books, the ways in which they deal with migration and the expert opinions.

These books are found appropriate to use: "Journey" written by Francesca Sanna and translated into Turkish by Zeynep Sevede, "Me and My Fear" the continuation of the same book and also written by Francesca Sanna and translated by Zeynep Sevede into Turkish, "The Boy in the Boat" written by Maya Mizuno and Vonne Hemels, about a Syrian child who had to leave his country, "Mother Bruce" written by T. Higgins and translated into Turkish by Nurten Hatirnaz about migration of the goose.

Before the implementation of the WAT, information was given about the research and the word association test. After being sure that all participants learned how to complete the WAT forms, the students were asked to complete WAT forms in 3 minutes for each concept. In this context, prior knowledge of children, cognitive structures related to the concept of migration and vocabulary related to the identified keywords have been determined and the implementation phase has been started. During the implementation phase, children's picture books were read to the groups of 20 students in an interactive way. Reading of each book lasted for 1 lesson and reading process was carried out in 12 lesson hours. After reading the books, WAT forms were reapplied in order to quickly identify the changes in students and give feedback in accordance with formative assessment.

The data obtained after the implementation was analyzed and compared with the situation observed before the implementation and the research was finalized.

2.5 Data Analysis

The data of the research were analyzed using content analysis and categorized by forming certain titles. Content analysis is a scientific approach that involves categorizing various data types by adopting an objective perspective and presenting in an understandable way for the reader (Yıldırım & Şimşek, 2006). The use of content analysis may vary depending on the researcher's problem and how he/she approaches the problem (Weber, 1990). The words written by the participants were analyzed by 3 researchers and then converted into quantitative data. The reliability formula proposed by Miles and Huberman (1994) was used to determine the consensus among the researchers. In the resulting calculation, the reliability value of the study was determined as 88%. In line with this formula, the consensus among coders should be at least 80% (Miles & Huberman, 1994; Patton, 2002). In order to reveal the cognitive structures of the students about migration, repetitive words were identified, and mind maps were created. In this stage, the cut-off point technique, which was put forward by Bahar et al. (1999) was used. Some of the data were analyzed with the help of SPSS program (IBM Corp., 2016) in order to determine how much each participant's data distribution changed after the implementation. In this context, Wilcoxon signed-rank test was used for the non-normally distributed dependent groups.

3. Results

The results of this study aimed to measure how much the word association test allows formative assessment was obtained through content analysis applied to WAT forms. In this direction, the vocabulary and cognitive structures of the participants were tried to be determined. In order to compare the participants' post-implementation and pre-implementation vocabulary, they were analyzed in SPSS program using Wilcoxon signed-rank test. The findings obtained after these procedures were tabulated.

Table 1. Pre-test word numbers according to key concepts of word association test

	Total number of words	Number of related words	Number of unrelated words
Migration	149	98	51
Journey	163	109	54
Loneliness	160	102	58
Passenger	208	139	69
Border	135	85	50
Farewell	183	103	80
Immigrant	161	106	55
Foreign Land	161	84	77
Moving	169	121	48
Longing	180	106	74
Total	1669	1053	616

Table 1 shows the number of words obtained from the WAT forms of the participants. When Table 1 is examined, it is seen that various numbers of words are written for each key concept. Minimum words are written for the key concept of “Migration” key concept (149) and the maximum words are written for the key concept of “Passenger” (208) and all the key concepts have 1669 words. Approximately 63% of the words associated with the key concepts by the participants were identified as related to the key concept and 36% of them were identified as unrelated to the key concepts.

Table 2. Post-test word numbers according to key concepts of word association test

	Total number of words	Number of related words	Number of unrelated words
Migration	203	35	68
Journey	209	132	77
Loneliness	218	148	70
Passenger	251	162	89
Border	247	154	93
Farewell	187	118	69
Immigrant	239	155	84
Foreign Land	221	142	79
Moving	218	166	52
Longing	200	151	49
Total	2193	1473	720

Table 2 shows the number of post-test words formed by analyzing the WAT forms of the participants. According to the table, Passenger (251) is the key concept in which participants write the most words as in the pre-test results. When all the key concepts are examined, it is seen that the number of words written for each key concept increases. The post-test data consisted of 2193 words (1473 related, 720 unrelated).

Table 3. Wilcoxon test results of the participants' pre-test and post-test scores

Post-Test/Pre-Test	n	Rank Average	Total Rank	Z	p
Negative Rank	3	18.69	243.00		
Positive Rank	2	30.88	1297.00	-4.417	.000
Equal	2				

*p<.05.

Table 3 shows the comparison analysis of the total words written by the participants in the pre-test and post-test with the Wilcoxon test. According to the table, it is seen that total number of words written by 13 participants decreased after the implementation, 2 participants wrote equal number of words before and after the implementation and total number of words written by 42 participants increased. A significant difference was found

between the total number of words written by the participants on the pre-test and post-test forms ($p < .05$).

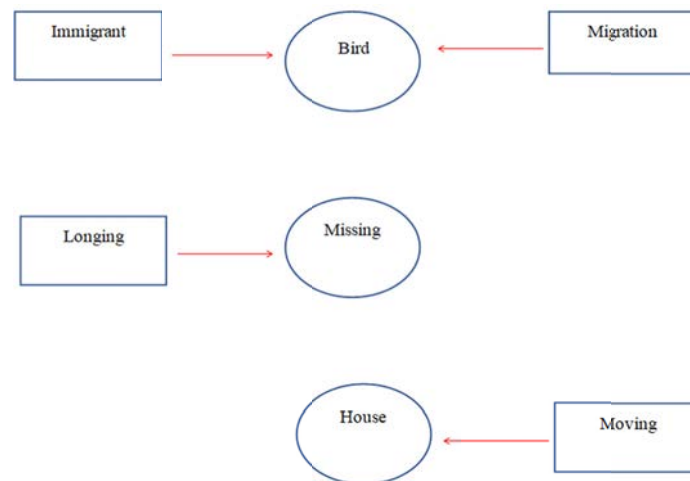


Figure 1. Pre-test, cut-off point between 21+ words

When 21+ words cut-off point is examined, it is noteworthy that any of the key concepts are not associated with another. The key concepts of immigrant and migration are associated with the word “bird”. The key concept of longing is associated with the word “missing” and the key concept of moving is associated with the word “house”.

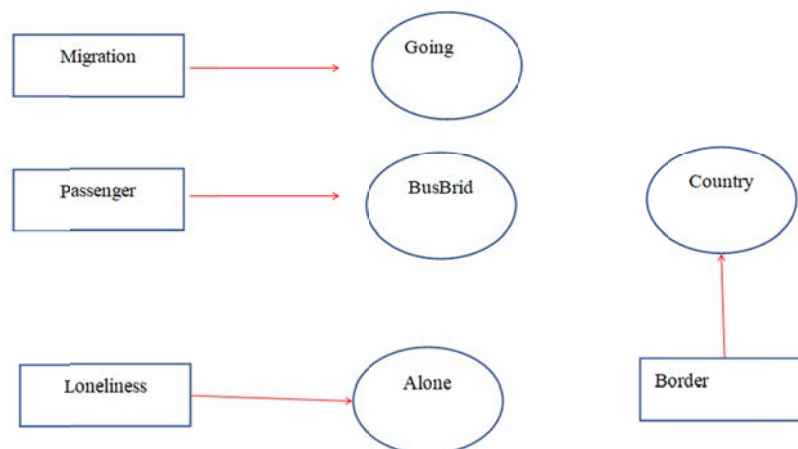


Figure 2. Pre-test cut-off point between 16-20 words

It is seen that 4 key concepts are associated with 4 different words at the cut-off point consisting of 16-20 words. The key concept of migration is associated with the word “going”, the key concept of passenger is associated with the word “bus”, the key concept of border is associated with the word “country”, the key concept of loneliness is associated with the word “alone”. No key is associated with another.

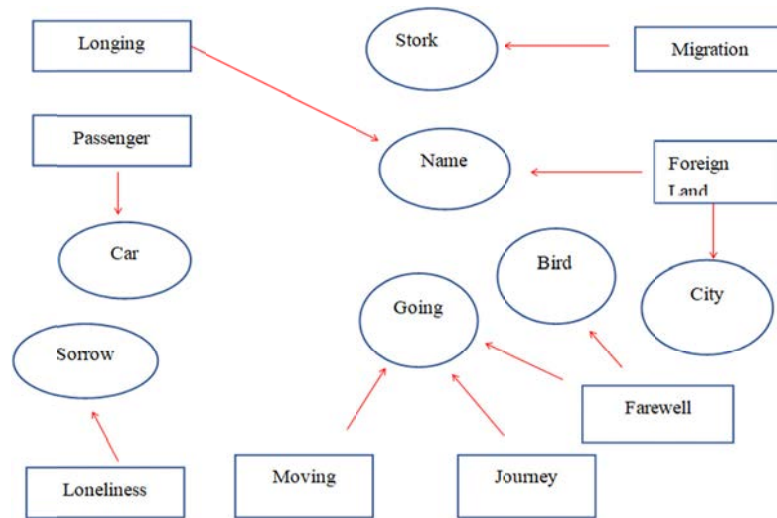


Figure 3. Pre-test cut-off point between 10-15 words

When the cut-off points between 10-15 are examined, it is seen that 8 different key concepts are associated with 7 different words. Although different key concepts are associated with the same word, no key concept is associated with another key concept. In addition, the word ‘going’ is associated with 3 different key concepts (Moving, Journey, Farewell).

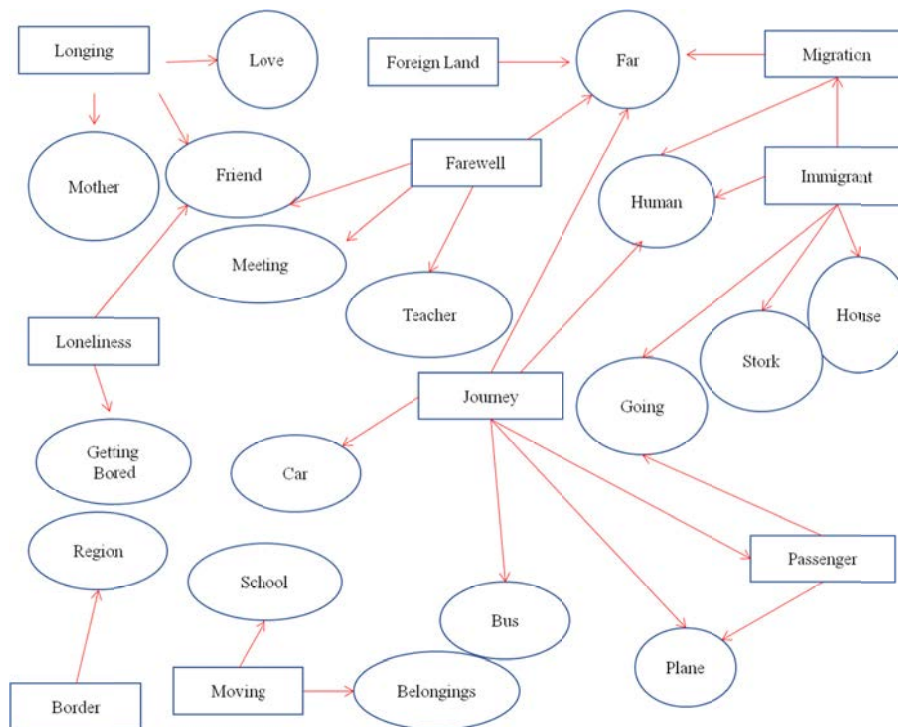


Figure 4. Pre-test cut-off point of 5-9 word

When the cut-off points between 5 and 9 are examined, it is seen that all key concepts are associated with at least one word. It is also important that many key concepts are associated with a word. In addition, the key concept of journey is associated with the key concept of passenger and the key concept of immigrant is associated with the key concept of migration.

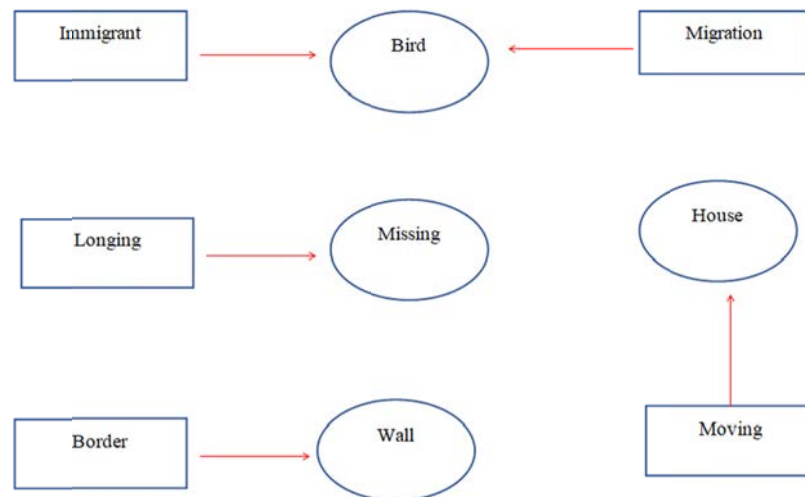


Figure 5. Post-test cut-off point between 21+ words

When the 21+ post-test cut-off point is examined, it is noteworthy that none of the key concepts are associated with another. The key concepts of immigrant and migration are associated with the word “bird”. The key concept of longing is associated with the word “missing”; the key concept of moving is associated with the word “house” and the key concept of border is associated with the word “wall”.

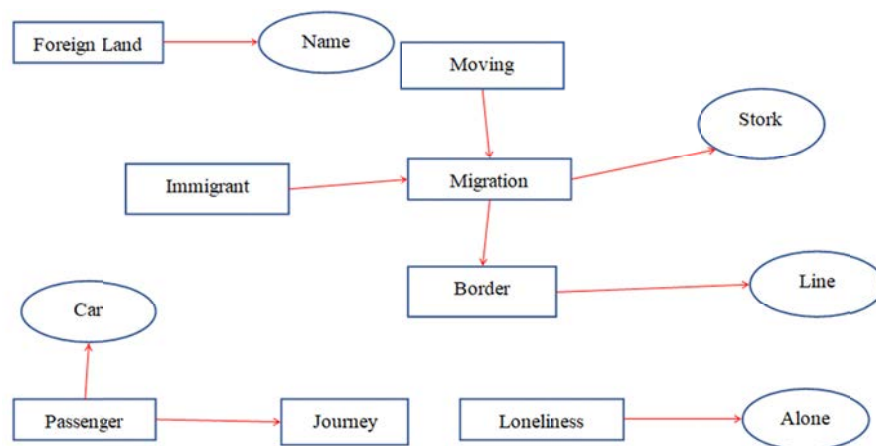


Figure 6. Post-test cut-off point for 16-20 word

It is seen that word associations are made for 8 key concepts at the cut-off point formed between 16-20 words in post-test. The key concepts of immigration and moving have been associated with the key concept of migration. The key concept of passenger is associated with the key concept of journey, in addition to the word “car”. The key concept of loneliness is associated with the word “alone”, the key concept of migration is associated with the word “stork”, while the key concept of foreign land is associated with the word “name”.

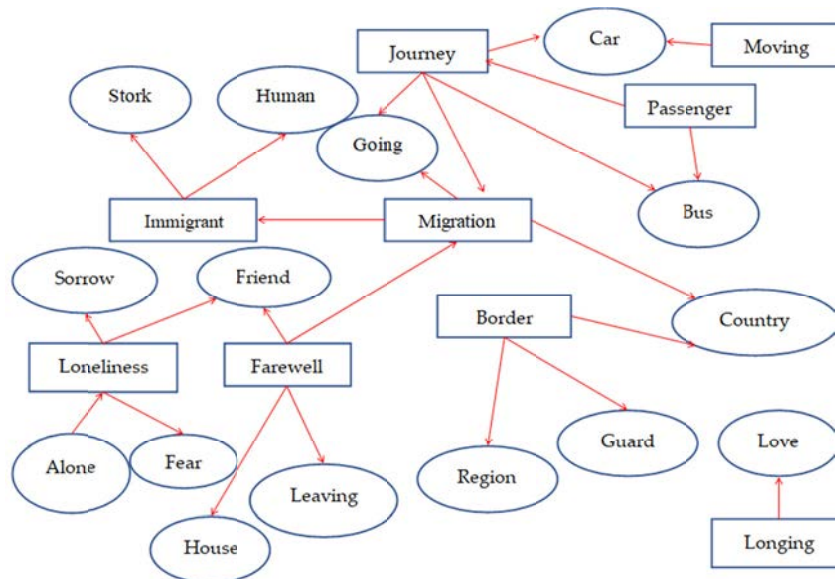


Figure 7. Post-test cut-off point between 10-15 words

When the post-test cut-off points between 10-15 words are examined, it is seen that many key concepts are associated with different key concepts with the key concept of migration at the center. In addition, 9 key concepts were associated with 15 different words.

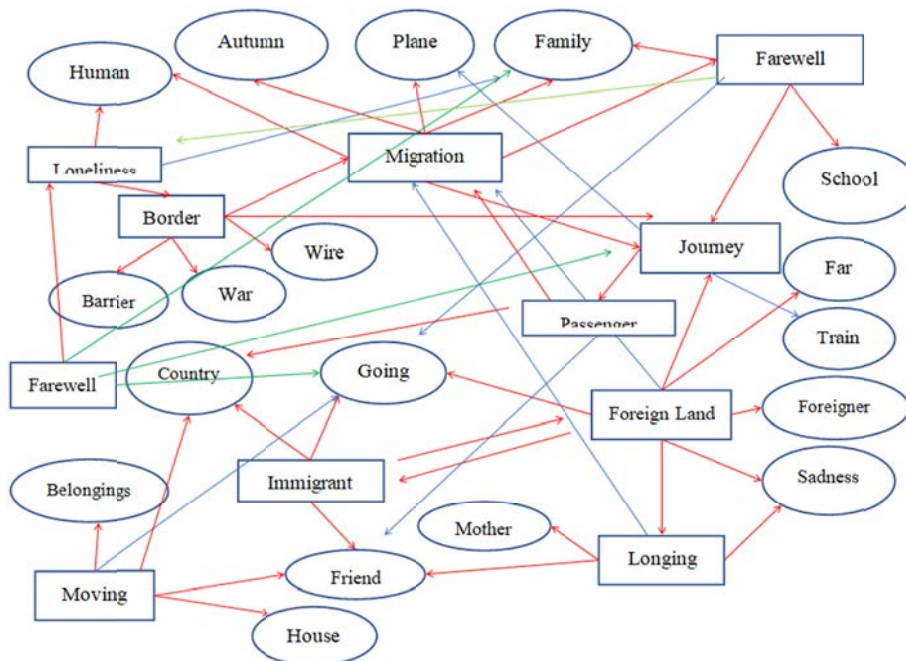


Figure 8. Post-test, cut-off point between 5-9 words

It is seen that all key concepts take place at the post-test cut-off point between 5-9 words. While the key concepts of immigrant and foreign land are associated with each other, the key concept of border is associated with the key concept of immigration and the key concept of farewell is associated with the key concept of loneliness. There is a relationship between the key concepts of loneliness and border. Also, the key concept of foreign land has a relationship with the key concept of journey and the key concept of longing. In addition to them, many key concepts have been considered in connection with different words.

4. Discussion and Conclusion

In this study, the effectiveness of the word association test (WAT), which is one of the formative assessment techniques emphasized by modern education systems, is examined. It was concluded that the conceptual change and development occurred in the participants' minds related to the key concept of migration and there was a significant difference in the analysis of the words they wrote about the given key concept before and after the implementation.

Before reading the children's picture books on the theme of migration, WAT was applied to the participants and the data were collected and analyzed. After reading the children's picture books, the WAT was applied again, and the answers of the children were analyzed, and their cognitive connections were revealed. The results indicate that the participants' thoughts about the migration have changed, their knowledge about the concept of migration has increased and they have become aware of the migration.

In addition, the total number of words that each participant wrote on the key concept of migration before and after reading the children's picture book was calculated. It was seen that the participants wrote 1669 words before the implementation, and 2193 words after the implementation. In the pre-test, 1053 of the words written by the participants about the concept of migration were related and 616 of them were unrelated. In the post-test study, it is seen that 1473 words are related, and 720 words are unrelated. In addition, the cut-off sampling was used to determine changes in the cognitive structures of the participants before and after the implementation using WAT. When the pre-test and post-test cut-off points were examined, it was seen that the words associated with the key concepts increased after the implementation and the key concepts were related to each other. These results show the effectiveness of the WAT in showing how the words written by the participants about a key concept have changed at the end of the implementation and how relevant the words written by the participants to the key concept. These results also reveal the effectiveness of WAT in showing the change in the cognitive structure of the students.

In addition, these data were analyzed in SPSS package program to see if there was a significant difference and then Wilcoxon test was applied. As a result of the results, it was concluded that there was a significant difference between the number of words of written by students before and after the implementation ($p < .05$). According to the results of Wilcoxon test, which calculated the relationship between the total number of words written by the participants before and after the implementation, it was found that there was an increase in the number of words written by 42 participants and decrease in 13 participants and there was no change in 2 participants after the implementation.

Social Studies course does not attract students' interest and does not remain in students' minds because some teachers do not give the necessary importance to the course or teach the course with traditional teaching methods (Freeman & Lestik, 1988). Since the concept of "migration" is known to be a part of the social studies curriculum (MEB, 2019), underestimation of this course may cause students not to perceive this concept sufficiently. It is very difficult for students to learn the concept of migration permanently unless they are subjected to appropriate education (Rüzgar, 2014). Within the research, the lesson has been made more active thanks to the children's picture books and the meaning of the increase in the number of words has become more significant when it is considered that the abstract concept of "migration" is assimilated to the students.

There are several studies that have similar results to those obtained during the implementation of this research. In these studies, WAT has been effective in revealing the cognitive structures of the participants' minds (Deveci et al., 2014; Karaca, 2018; Doğan et al., 2018; Ekici & Kurt, 2014). There are also similar studies stating that WAT helps to reveal participants' misconceptions on a key concept and to conduct studies to eliminate them (Aydemir, 2014; Işıklı et al., 2011; Keskin & Örgün, 2015; Ercan et al., 2010; Kaya & Flow, 2015). It was found that the WAT is very useful in determining prior knowledge and students' misconceptions about the subject during the research implementation and it is suitable for formative assessment. However, WAT aims to reveal the cognitive structures of students about a subject, but it ignores the underlying causes of the words that students associate with key concepts. A word in a student's mind described by researchers as related to key concepts can be included in the category of unrelated word-misconception because the teacher may not be aware of the student's experiences. Karaca (2018) stated in his thesis, which aims to reveal the perceptions of the students towards the professions, although there are no misconceptions about the professions, the words they associate with the profession do not reflect their occupational characteristics. In this research, the words that the students associate with the professions do not reflect the occupational characteristics. At this point, it is thought that the information obtained through WAT forms might not reveal necessary prior knowledge about the students' lives.

Bahar and Özalıtı (2003) stated in their study, aimed to reveal the cognitive structures of the students for the basic

components of people, that when they use WAT; the students' prior knowledge was spread over a wide area and they included words that were not related to the subject, but they mentioned that the students provided more scientific answers in the data obtained after the implementation. In this study, when the cut-off points were examined, it was seen that the number of common words associated increased in the post-test data and the students started to associate key concepts with each other. In formative assessment, it is important to evaluate the progress of the students in a planned manner at regular periods in the process. Before starting to teach a subject process, it is thought that WAT forms can be helpful while designing a process suitable for formative assessment by determining the instructional needs of students by applying WAT. In his study, Polat (2013) applied the WAT forms to the same students 2 weeks after the teaching and 1 year after the teaching and determined that there was a high decrease in the total number of answer words given by the students in the second implementation. He also stated that WAT is a very powerful alternative measurement tool in diagnosing and identifying. In this respect, Polat's (2013) views are similar to the ideas reached as a result of the study.

In the studies carried out by Polat (2013), Bahar and Özatlı (2003), Ercan et al. (2010) and Kaya and Taşdere (2016), a group of participants were subjected to WAT before and after being subjected to an education process and the number of words they wrote for the key word was calculated. In these studies, the number of words increased after the implementation. In this study, the increase in the number of words of participants before and after the implementation was successfully demonstrated. Considering this situation, it is thought that the WAT can be used to implement the feedback element which can be considered as the most important element of formative assessment and to examine the development process of the students.

In conclusion, this study has once again showed that WAT is a formative assessment tool. The WAT can be used as an alternative assessment tool suitable for formative assessment in the teaching process. Moreover, studies can be organized to determine the common ideas of the students on two different topics, experimental studies can be designed by using WAT over a long period and the effect of these evaluations on student achievement can be examined. In-service trainings may be offered to teacher candidates in order to popularize WAT forms and to emphasize their suitability for formative assessment.

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