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A Bibliometric Analysis of Articles on Text Simplification: Sample of Scopus Database

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ABSTRACT

Literacy is a term generally used for adults and young people. Basically, it is an acquisition that includes the process of reading, writing and understanding symbols in any language. While this concept, whose definition and scope has expanded over time, refers to people who can only say their names in the past, today it refers to individuals who can perform more functional skills. What is expected from today's literacy, which is also referred to as functional literacy, is not just saying the name, but also understanding what you read and harmonizing these information with the environment. It is critical to create texts that are easier to interpret, especially for poor readers and individuals learning foreign languages, in today's world where reading comprehension and correct use of information have become extremely important. In this context, the text simplification method, which is one of the text modification methods, comes to the fore. In accordance with these information, this current study aims to presents the bibliometric analysis of articles on text simplification, which are published in journals indexed in Scopus database in the field of social sciences. The data set of the study consists of 194 articles on text simplification published in journals scanned in the field of social sciences and scopus database. These 194 articles were examined in terms of different variables. The research is generally a descriptive study and document analysis method was used as a method. In the data analysis stage of the research, VOSviewer visualization software version 1.6.16 was used. According to the results obtained from the study, the most articles on text simplification were written in 2020 (f: 21), most cited article is "Interpretation as Abduction" (f: 363) written by J.R Hobbs, M.E Stickel, D.E. Appelt and P. Martin. Findings obtained from the research were shared in the form of tables, graphs and figures. The most common keywords that preffered by authors is "Simplification" (f: 18). The most cited institution is "Artifical Intelligence Center" (f: 363). The most cited journal is "Artifical Intelligence" (f: 363). The most published country is United States of America (f: 30). The most cited country is United States of America (f: 863). All findings obtained from the research were shared as tables and figures in the findings section.

Key words: Text Simplification, Bibliometric Analysis, Scopus Database, Article

INTRODUCTION

Reading is the process of understanding written symbols, and writing is the process of translating what the individual understands into letters, figures and graphics. These enable the individuals to read the society and the world they live in, and to read the events that they experience and see critically. Literacy not only contributes to the socialization of individuals, but also opens a new horizon for them, modernizes them, helps them question what is happening in their environment and the world and play an active role in their environment (Güneş, 2019, p. 225). As in mother tongue teaching, developing four basic language skills is seen as the ultimate goal in foreign language teaching. It is extremely important for learners to acquire the reading comprehension, which is the main purpose of reading skill, which is one of these four basic language skills. Reading skill in foreign language teaching is not only the process of reading written letters, but also the process of understanding the written text and making sense by synthesizing it with personal knowledge and experience. Yılmaz (2008) stated that the reading comprehension skill acquired in the first phase of education will affect the learning that will take place throughout the life of the individual positively or negatively. In addition, Bloom (1995) stated that there was a relationship between the reading comprehension skills of students and their academic achievement.

One of the most important materials that help to improve reading skills is texts. In order for students to understand what they read and to maintain their interest and motivation for reading, the linguistic characteristics and language level of the text they read should be appropriate for their levels. In addition, the text they read must meet their interests and

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needs. In this context, the selection of the texts to be read becomes important. Language teachers can sometimes use existing texts for their students in their classes. Sometimes, they choose to write a fictional text themselves, as well as pass an original text through modification stages and adapt it to the their students' level.

The term text modification corresponds to the relationship between the source text and the target text that emerged as a result of a series of linguistic changes made on this text (Durmuş, 2013, p. 392). Durmuş also states that text modification can be done for different purposes and different target groups. One of these target audiences is those who learn a language as a foreign language. Other target groups are individuals with learning difficulties, speakers of different dialects in the same language family, and speakers of the same language who have difficulties in reading historical texts for different reasons other than the alphabet (Durmuş, 2013, p. 394-395).

According to Nation (2001), text modification is generally done in four different ways: simplification, elaboration, easification, and interview. While simplification, elaboration and easification are the methods that based on the text, the interview is a method mostly includes in-class practices and is based on observations and face to face interviews between the researcher and the participants.

Text Simplification

The most widely used text replacement method is text simplification. Text modification is the process of making an original text more understandable by using many methods, techniques and going through different stages. Shardlow (2014) defines text simplification as a process to reduce the complexity of the original text, as well as increase both its readability and understandability. All simplification studies aim to improve the reading comprehension of individuals who learn a language as a second language and to reduce the mental burden of these individuals (Crosley & Yang, 2014, p. 93). Oh (2001) explains the basic logic of simplification, which is one of the most widely used text replacement methods, with the following statements; The scope of a typical simplification; a simpler pronunciation (at the word or sentence level), simpler syntax, simpler words (avoiding words with low frequency of use and texts of smaller volume), removing sentence elements or reducing morphological conjugations, and choosing the correct word order can be determined.

According to Allen (2009), text simplification is done in two different ways, structural and intuitive. Nunan (1999) states that while simplifying in constructivist approach, the words and language structures that the student should know according to the language level should be listed beforehand, and the simplification process should be done according to these lists. Another approach used in text simplification is the intuitive approach. The most widely used of these two approaches is the intuitive approach (Crossley et al., 2012). Crossley et al. (2012) state that in the intuitive approach, the people who make the simplification process intuitively decide which words and language structures they need to know according to the level of simplification by thinking of themselves as a language teacher or a student who is at the level of simplification. Bölükbaş (2015) states that an objective point of view is not dominant in simplification processes in which the intuitive method is preferred, so adapted/modified works by different individuals or institutions may differ in terms of word and structure (Bölükbaş, 2015, p. 927).

According to Sandom (2013), Nation (1993) and Chang (2008), text simplification can be done in three ways; Syntactic simplification, lexical simplification and content simplification. The points to be considered in the simplification process can be summarized as follows;

- The essence of the original text, which has gone through the simplification stages, should be preserved.
- Simplification should be done by experts.
- In the original text, which was simplified, the structures known and unknown to the student should be kept in balance. In his input hypothesis, Krashen (1985) states that when information is presented slightly above the information that students know (input + 1), the input will be understood and the targeted success will be achieved. If the simplified text consists of structures below the student's level or only known, the student may get bored with such texts over time. Therefore, words and language structures that some students do not know should be included in the text. This encourages the student to learn and keeps the reading motivation alive.

Objectives and Research Questions

This research aims to dig up the bibliometric analysis of the articles on text simplification that published in scientific journals indexed in the Scopus database. Within the scope of this purpose, the following questions were tried to be answered:

1. What is the distribution of articles on text simplification by years?
2. Which articles are the most cited?
3. What are the most common keywords in articles on text simplification?
4. Which institutions are the most cited?
5. Which journals are the most cited?
6. Which authors are the most cited?
7. Which countries are the most articles published?
8. Which countries are the most cited?
9. What is the network analysis of the authors cited in articles on text simplification?

METHOD

This study aims to analyze the articles written on text simplification in journals indexed in the Scopus database in terms of different variables. In this section, detailed information about the research design, data collection tools and data analysis is given. The data collection and data analysis process is explained step by step.

Research Design

This study is a descriptive study and document analysis was used as a research design. In cases where it is not possible

to conduct in-depth interviews and observations, the document analysis referred is the detailed analysis of the sources containing written information about the targeted event or facts (Güçlü Nergiz, 2014). Document analysis is a qualitative research method that used in detail and systematically to analyze the content of written documents (Wach, 2013). Document analysis is a systematic method used to examine and evaluate all documents, both printed and electronic materials. Like other methods used in qualitative research, document analysis requires the analysis and interpretation of data in order to make sense, create an understanding about the relevant topic, and develop empirical knowledge (Corbin & Strauss, 2008). Bibliometric studies analyze specific characteristics of publications in a particular field (e.g. number of publications each year, common work topics, institutions that contribute the most, keywords) and find various findings on scientific production (Çiftçi et al., 2016). Bibliometric studies provide the opportunity to analyze the studies in the literature by mathematical or statistical analysis according to the distribution of citation, author, subject, country or the type of publication such as books and articles. It also makes it possible to reveal the interest in a discipline, the tendency towards certain subjects in that discipline, the change in these trends, the most cited areas, authors and publications (Zeren & Kaya, 2020). Bibliometric studies can be divided into narrow or wide-ranging studies depending on the scope of the analysis. Extensive studies are studies of evaluating publication performance across countries or on a single country basis. The number of such studies are limited in the related literature. Unlike large-scale studies, studies that deal with a specific subject, field or periodical are more preferred (Al, 2008). In this study, articles written on text simplification were examined in terms of different variables using bibliometric analysis method. These analyses will allow scientists who working in the field of reading education to see the big picture showing the current trends in text simplification.

Inclusion Criteria

- Social Sciences area (Studies on education are included in social sciences in the Scopus database),
- The journals are indexed in Scopus database,
- 194 articles,
- The topic of text simplification was included in this study.

Data Collection

The bibliographic database is very important in the content analysis studies of scientific journals. International databases offer different options to researchers who want to do such researches. Within the scope of bibliometric research, there are some international databases that researchers frequently refer to. Scopus, Web of Science (WoS), Education Resources Informatıon Center (ERIC), Microsoft Academic (MA) and Google Scholar (GS). In order to receive data from Scopus and Web of Science databases, it is necessary to be a member of the database system, while no membership is required to the Education Resources Information Center (ERIC), Microsoft Academic (MA) and Google Scholar (GS) databases. In this study, which aims to carry out the bibliometric analysis of the articles written on text simplification, the data were taken from the Scopus database.

The data collection process consists of two stages. The first step is to get data from the scopus database, and the second step is to save these data in the Microsoft Excel file under different variables titles in order to analyze them correctly.

In order to access the articles on text simplification that published in peer-reviewed journals, an online scan was made in the Scopus database on 15.01.2021. In the first scan, text - simplification as a search word and the article title, abstract and keywords as content and all years as time span were researched. And 937 documents were reached. When these documents were examined, it was seen that documents containing 26 different fields such as computer sciences, engineering, mathematics, medicine, genetics, molecular biology, business management, physics, astronomy, psychology, materials sciences. Of these 937 documents, it was seen that 401 are conference papers, 374 are articles, 52 are reviews, 43 are book chapters, 39 are conference reviews, 21 are books, 2 are editorals, 2 are in erratum, 2 are short survey and 1is note. The screenshot of the first scan is shown in Figure 1.

Since the main purpose of the study was to identify current trends in text simplification that with in the scope of reading comprehension, it was decided by the researcher to re-conduct the scan under limited titles. The second scan was done in limited under the following headings; in the content of article title, abstract, keywords, in the search word of text – simplification, in the subject area of social sciences, in the document type of article and in time span of all years. In the second scan, since educational sciences studies are under the title of social sciences, the search was done in this area. In addition, when it is considered in terms of its contribution to the related literature and accessing, the research has been deepened in the articles. As a result of the second scan, 194 articles were reached. These articles are the data set of the study. The screenshot of second scan is seen in Figure 2.

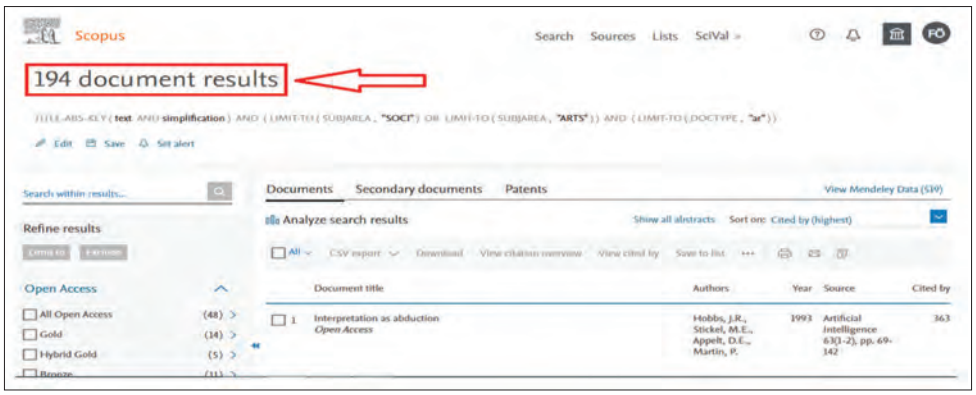
After scanning in the Scopus database, the data that obtained were recorded in a Microsoft Excel file in different variables by researcher. These variables are as follows; The distribution of articles by years, the most cited articles, the most cited authors, the most cited institutions, the most cited journals, the most cited countries, the most publishing countries, the most repeated keywords. Later the data that saved in Microsoft Excel file had been adapted to the VOSviewer visual mapping program, which was used in the analysis of the data, which is the next step.

Data Analysis and Interpretation

In this study, bibliometric analysis was used as a data analysis method. And bibliometric analysis was conducted in nine classsifications. These classifications are as follows; the distribution of articles by years, the most cited articles, the most cited authors, the most cited institutions, the most cited journals, the most cited countries, the most publishing countries,

Figure 1. The screenshot of first scan

Figure 2. The screenshot of second scan



the most repeated keywords and the network analysis of the authors cited in articles.

Visualization of bibliometric data is extremely important in bibliometry studies. There are some software tools used by researchers for this purpose. The most comprehensive of these and the easiest to use interface is the VOSviewer visualizing program. Van Eck and Waltman (2020) give detailed information about how to use this program. According to them, VOSviewer is a software tool used to create and visualize maps from bibliometric data from databases such as Web of Science and Scopus. VOSviewer offers researchers three different visualization possibilities. These are network visualization, overlay visualization and density visualization. In the network visualization, objects are visualized with their own labels and a circle. The size and circle of an object can vary depending on the weight of the item. Overlay visualization is similar to network visualization. The difference is that the items are colored differently. The coloring changes from blue to green and yellow. As the color change moves from blue to green and yellow, it means these objects are more up to date. There are two different options for density visualization. The first is object density, the second is cluster density. In object density visualization, there is a change from blue color to red color and objects' colours can be change according to their numbers. Cluster density visualization is only available when items are assigned to clusters.

In the data analysis stage of the study, version 1.6.16 of the VOSviewer visualization program was used. By using this program, relevant analyses were made for each research question excluding the question of what is the distribution of articles by years. A graphic has been created in the excel file for this research question. Figures that obtained from Voswiever, graphics that created from Microsoft Excel and tables that created from Microsoft Word for each research question are shared in the findings section of the research.

FINDINGS AND COMMENTS

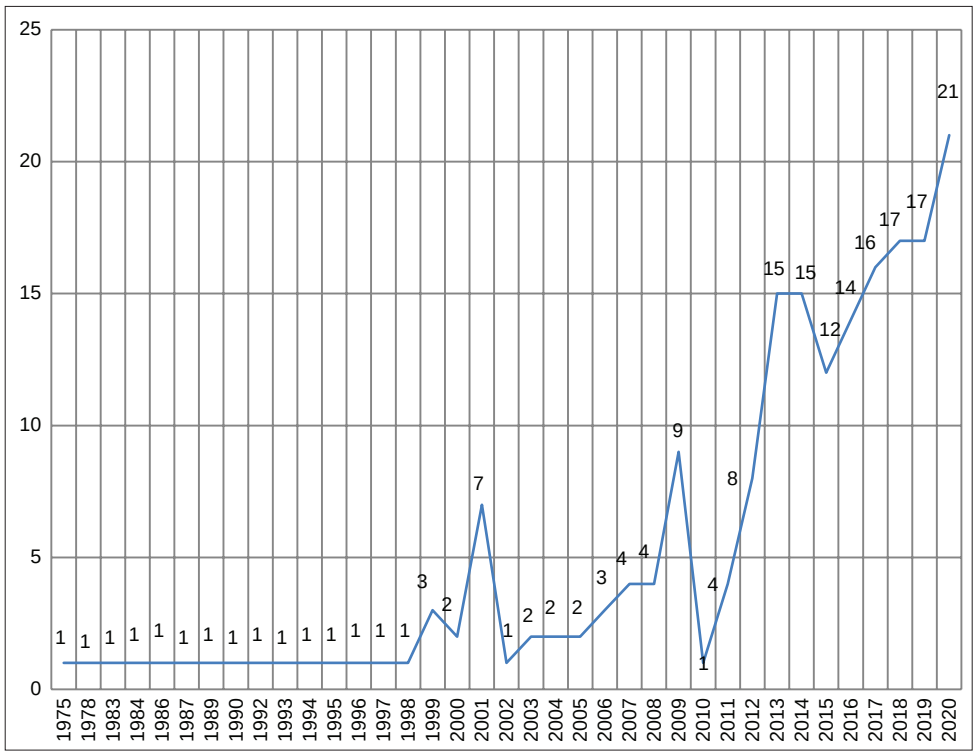
In this section, the findings for each research question are presented in the form of either figures and tables. Under the figures and tables shared in the Findings section, there are comments to explain the findings obtained.

Findings for the First Research Question

The findings regarding the first research question *"What is the distribution of articles written on text simplification by years?"* are shown in Figure 3.

When Figure 3 is examined, the distribution of articles written on text simplification by years is seen. According to the graphic, it is understood that the first article on text simplification in the field of social sciences was written in 1975. Between 1975 and 1998, it is seen that only one article was written each year. There has been a noticeable increase in 2001 and 2009 compared to the previous years. However there was a partial decrease in 2015 and 2016, between 2012 and 2020 the number of articles continued to increase. Considering the importance of text simplification in reading education, especially at the point of creating reading materials for individuals who have reading difficulties, it is thought

Figure 3. The distribution of articles on text simplification by years



that increasing the number of these studies on this subject in recent years are extremely important in terms of reading education.

Findings for the Second Research Question

The findings regarding the second research question *"Which articles are most cited?"* are shown in Table 1 and Figure 4.

The articles with more than 27 citations in the releated literature are shown in Table 1. Accordingly, the most cited article is the article titled *"Interpretation as Abduction"* released by Hobbs, J.R., Stickel, M.E., Appelt, D.E. and Martin, P. The article has received 363 citations in the Scopus database since 1993. The article in which an approach to abduction inference was developed, resulting in a significant simplification of how the problem of interpreting texts is conceptualized, is the most cited article. The second most cited article is titled *"The Effects of Simplified and Elaborated Texts on Foreign Language Reading Comprehension"* released in 1994 by Yano, Y., Long, M.H. and Ross, S. In this study, in which 483 Japanese students formed the study group, the researchers aimed to measure the effect of simplified texts and elaborated texts on reading comprehension in a foreign language. As a result of their studies, the researchers determined that the effect of simplified texts on students' reading comprehension is higher than the elaborated texts. This study received 84 citations in total. The third most cited article is titled *"Syntactic Simplification and Text Cohesion"* released in 2006 by Siddharthan, A. This study, which received 81 citations in total, aims to reveal the connection between syntactic simplification and textual harmony. In this study, the researcher formalized the interactions between syntax and discourse in the simplification process. Each of the articles in the table provides a rich literature resource for researchers who aim to study text simplification. In this context, presenting the most cited articles in the releated literature by tabulating is extremely important in terms of guiding researchers during the literature review stage.

In Figure 4, it is seen that the network visualization of the most cited articles. A total of 116 articles with at least 1 citation from 194 articles in the Scopus database were identified. When the figure is examined, When Figure 3 is examined, it is seen that the largest object is Hobbs J.R (1993). As the size of the objects in the visual increases, it means that the object has more content in the relevant variable than the others. As the size of the objects gets smaller, the number of their contents decreases. The difference in the colors of the objects does not contain any statistical significance. Coloring is completely random. Connection lines between some objects mean that these objects are related to each other.

Findings for the Third Research Question

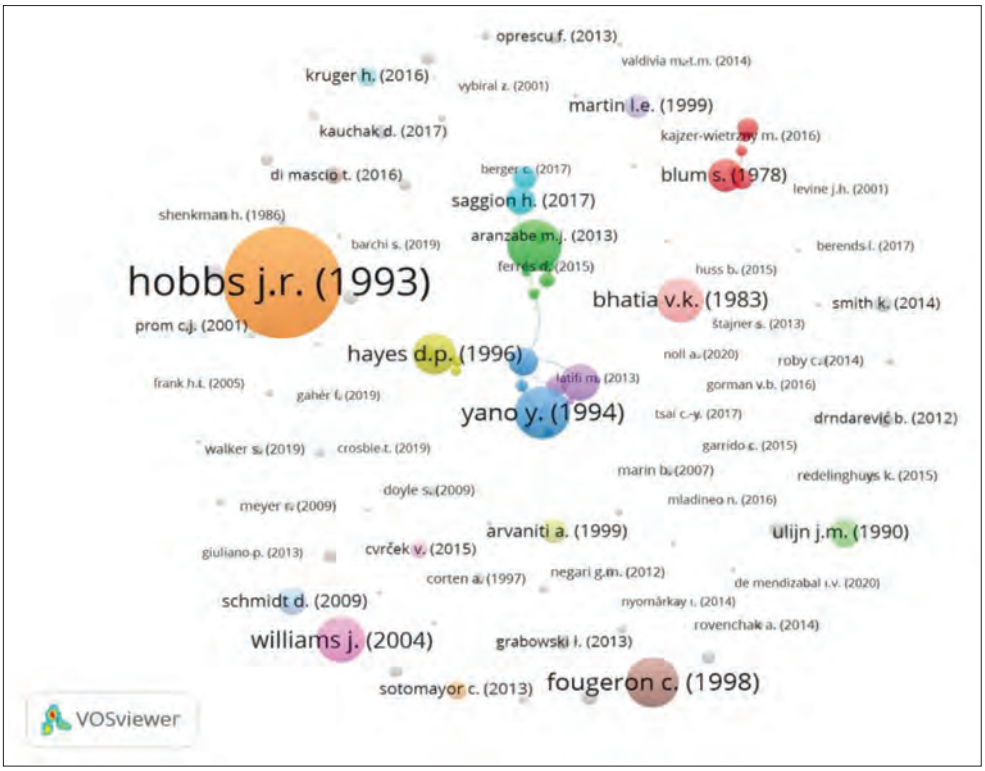
The findings regarding the third research question *"What are the most common keywords in articles on text simplification?"* are shown in Figure 5 and Figure 6.

Figure 5 shows the most commonly preferred keywords by the authors in the articles written on text simplification. A total of 624 different keywords were used in 194 articles that make up the data set. It was decided to share the first 20 keywords in the graph due to the large number of keywords used in total and the same number of repetitions in most of them. When the graph is examined, it is seen that the most commonly used keyword is *"simplification"* (f: 18). This keyword is followed by *"text simlification"* (f: 16), *"translation universals"* (f: 8) and *"lexical simplification"* (f: 6). The

Table 1. Top 10 most cited articles

Rank	Article Name	Author/s	Publishing Year	Scopus Citiation Number	Journal
1	Interpretation as Abduction	Hobbs, J.R., Stickel, M.E., Appelt, D.E. and Martin, P.	1993	363	Artificial Intelligence
2	The Effects of Simplified and Elaborated Texts on Foreign Language Reading Comprehension	Yano, Y., Long, M.H. and Ross, S.	1994	84	Language Learning
3	Syntactic Simplification and Text Cohesion	Siddharthan, A.	2006	81	Research on Language and Computation
4	Rate Effects on French Intonation: Prosodic Organization and Phonetic Realization	Fougeron, C. and Jun, S.A.	1998	77	Journal of Phonetics
5	Tutoring and Revision: Second Language Writers in the Writing Center	Williams, J.	2004	63	Journal of Second Language Writing
6	Simplification vs Easification - The Case of Legal Texts	Bhatia, V.K.	1983	59	Applied Linguistics
7	Schoolbook Simplification and Its Relation to the Decline in SAT-Verbal Scores	Hayes, D.P., Wolfer, L.T. and Wolfe, M.F.	1996	50	American Educational Research Journal
8	Linguistic Simplification of SL Reading Material: Effective Instructional Practice?	Young, D.J.	1999	42	Modern Language Journal
9	Universals of Lexical Simplification	Blum, S. and Levenston, E.A.	1978	35	Language Learning
10	The effect of syntactic simplification on reading EST texts as L1 and L2	Ulijn, J.M and Strother, J.B.	1990	27	Journal of Research in Reading

Figure 4. The network visualization of the most cited articles



number of repetitions of the remaining keywords is close to each other. This result can be regarded as a normal since the first two most commonly used words are directly related to the topic. However, it is striking that the third keyword is

Figure 5. The distribution of most commonly used keywords

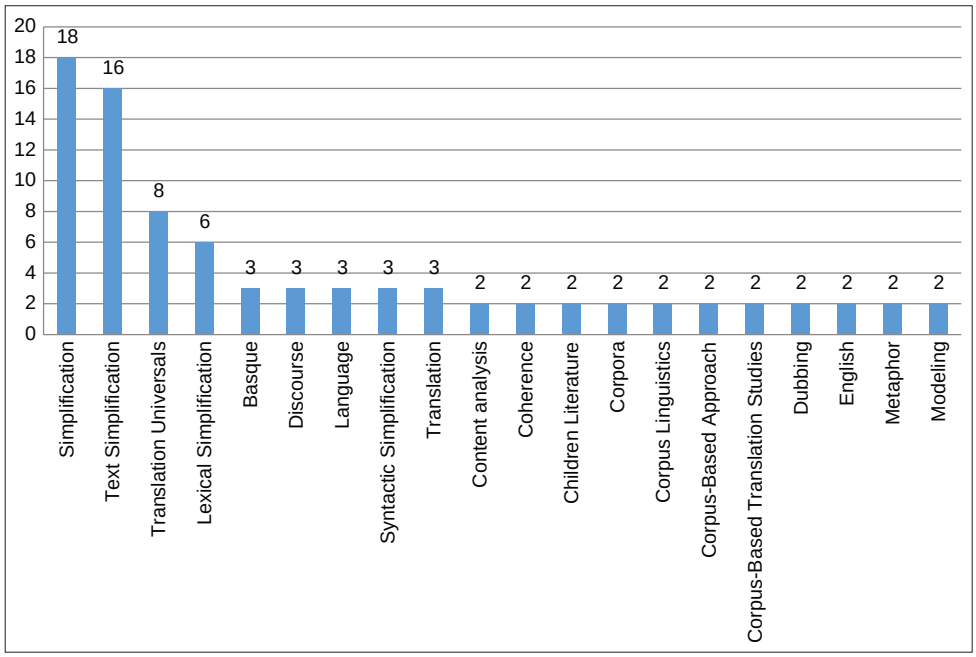
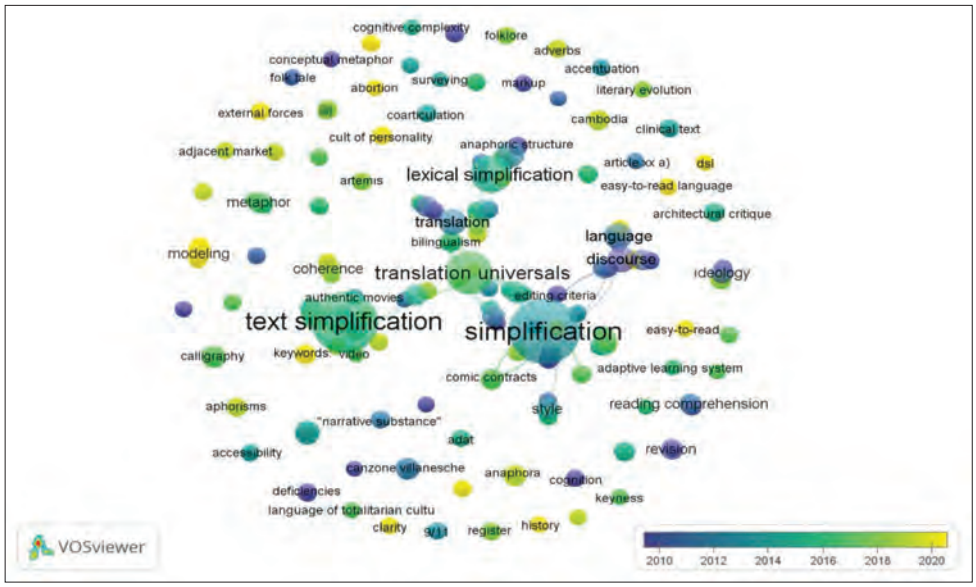


Figure 6. The overlay visualization of the most commony used keywords



related to translation. Especially for weak readers, who are frequently encountered in reading education, it is a widely used method to adapt authentic texts to different reader levels with translation method.

In Figure 6, it is seen that the overlay visualization of the most commonly used keywords in articles on text simplification. Keywords are shared in visual with objects and colors. The size of the objects means that the object has more content of the relevant variable. It means that the larger the object, the more commonly used that object is. As the objects get smaller, the frequency of use of the keyword decreases. Based on this information, it is seen that the largest objects in the visual are *"simlification", "text simlification", "translation universals"* and *"lexical simplification"* compared to other objects. Coloring has a different meaning. The color change from blue (lowest score) to green and yellow (highest score) shows that those objects are more up-to-date. An indicator that expressing this situation is located in the bottom right part of the figure. According to the figure and indicator, the greenest and yellowest objects are more up-to-date. Based on this information, it can be seen that some keywords such as modeling, history, easy to read, cult of personality, metaphor, clarity are expressed in yellow. This shows that these keywords have been used in articles recently. In addition, connecting lines between some objects show that these objects are related to each other. Objects that are related to each other are gathered in the center of the figure. It is thought that sharing the keyword selection of recent articles on text simplification with a visual will contribute to the releated literature in terms of providing information on what current research is.

Findings for the Fourth Research Question

The findings regarding the fourth research question *"Which institutions are the most cited?"* are shown in Figure 7 and Figure 8.

Figure 7 shows the distribution of the institutions with the most citations. As a result of the analyses made in the VOSviewer program, a total of 163 institutions that received at least 1 citation were reached. In the graph, only the first 20 institutions are shared. When the graph is examined, it is seen that the institution with the most citations is *"Artificial Intelligence Center"* (f: 363). According to information from Wikipedia (2021), the Artificial Intelligence Center is a laboratory that operating in the Information and Computational Sciences Division of SRI International in the United States of America. Founded by Charles Rosen in 1966, this center continues to work on artificial intelligence. This institution is

Figure 7. The distribution of the most cited institutions institutions

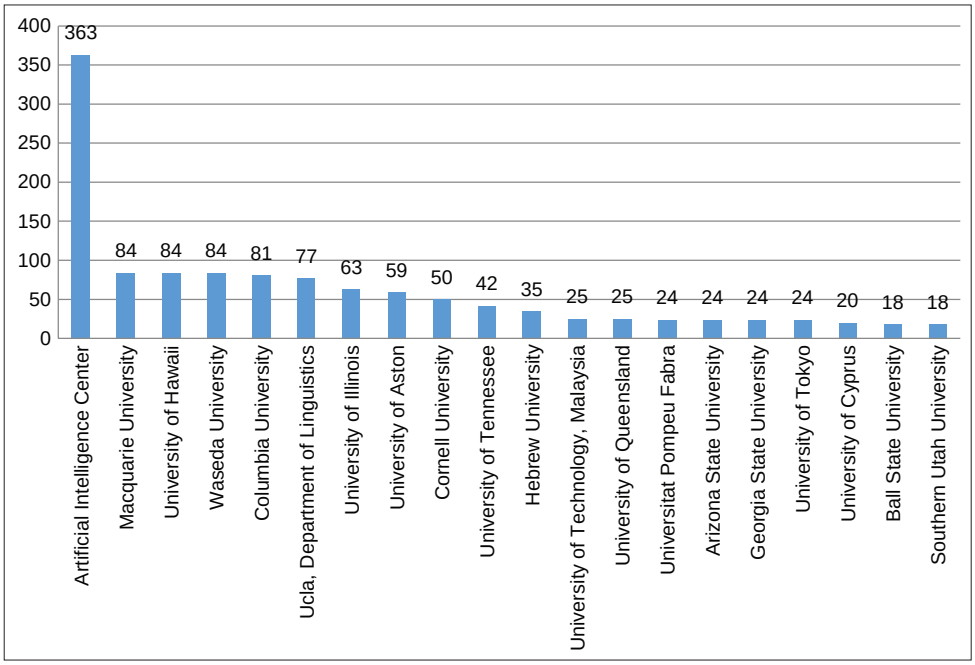
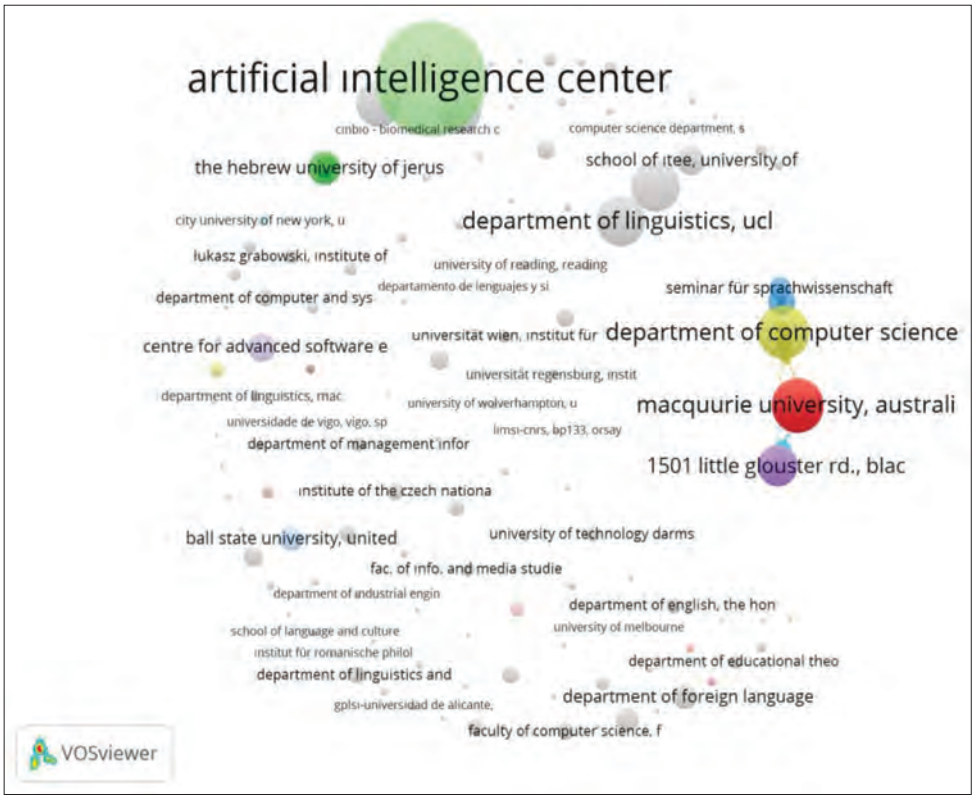


Figure 8. The network visualization of the most cited



followed by "*Macquarie University*" (f: 84), *"University of Hawaii"* (f: 84), *"Waseda University"* (f: 84) and "*Columbia University"* (f: 81). Macquarie University is in Sydney, Australia. University of Hawaii is located in Hawaii, United States. Waseda University is located in Tokyo, Japan. And Columbia University is in New York, United States. It is a point that draws attention that three of the top five cited institutions located in the United States.

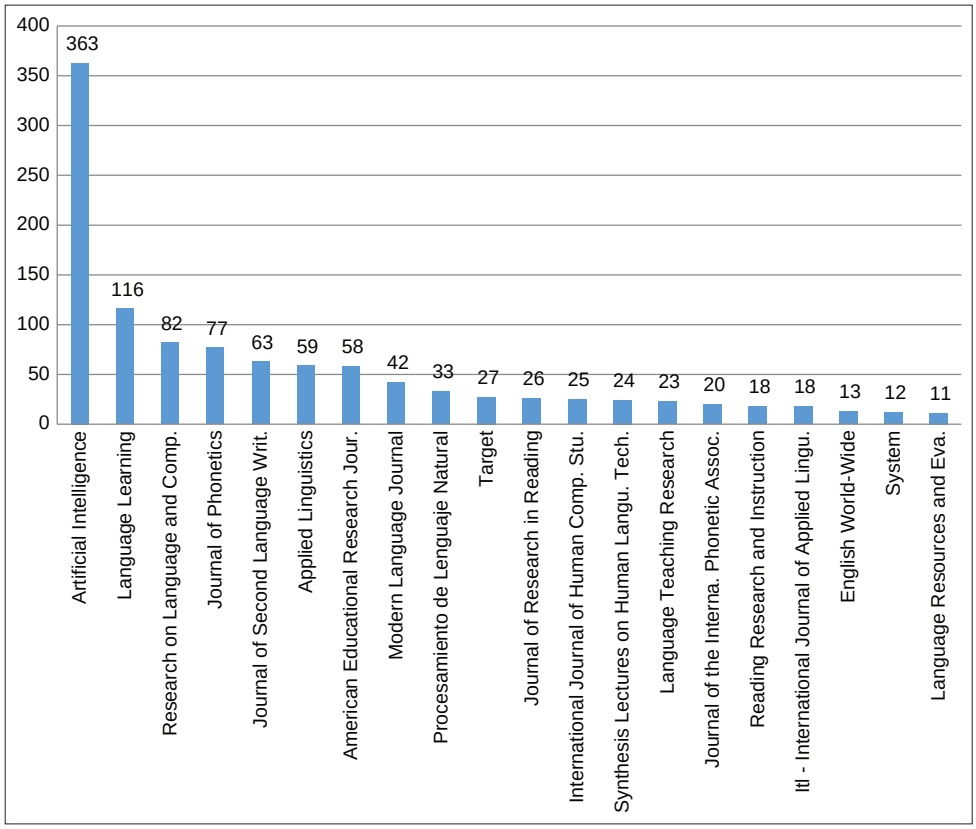
In Figure 8, it is seen that the network visualization of the most cited institutions. When Figure 8 is examined, it is seen that the largest object is the *"Artificial Intelligence Center"*. The size of objects is related to the numerical size of that object. As the objects are larger, the growth in content increases at the same rate. The fact that the colors of the objects are different does not mean anything numerically. In network visualization colors are given to objects automatically by the program. When the visual is examined, it is seen that the institutions related to each other are located in the right center of the figure. The connecting lines between these institutions show that there is a cooperation between these institutions.

Findings for the Fifth Research Question

The findings regarding the fifth research question *"Which journals are the most cited?"* are shown in Figure 9 and Figure 10.

Figure 9 shows the distribution of the journals with the most citations. When the figure is examined, it is seen that the top 20 journals in which articles written on text simplification are published. As a result of the analysis, a total of 97 journals with at least 1 citation were identified. Of these 97 journals, only the first 20 journals were shared in the findings. According to the chart, the most cited journal is *"Artificial Intelligence"* (f: 363). The journal of Artifical Intelligence, which has been scanned in the Scopus database since 1990, is published by Elsevier, a Netherlands-based information and analysis company specializing in scientific, technical and medical content. It includes studies on linguistics and language in the field of social sciences, and artificial intelligence in the field of computer sciences. According to Scopus data, the 2020 CiteScore is 7.7. The Artıfical Intelligence ranks 4th among 884 journals in linguistic and language fields. Also, it ranks 28th among 202 journals in the field of artificial intelligence. The second journal is *"Language Learning"* (f: 116). The journal of Language Learning, which has been scanned in the Scopus database since 1958, is published by Wiley-Blackwell, an international scientific, technical, medical and scientific publishing company. It includes studies in the field of linguistics, language and education in the field of social sciences. According to Scopus data, the 2020 CiteScore is 6.2. It is ranked 23rd among 884 journals publishing in the field of linguistics and language, and 69th among 1254 journals published in the field of education. The third journal is *"Research on Language and Computation"* (f: 82). The journal of Research on Languages and Computation, which was only scanned in Scopus database between 2005 and 2010, is published by the English-German academic publishing company Springer Nature. It includes studies in the field of linguistics, language in the field of social sciences.

Figure 9. The distribution of the most cited journals



In Figure 10, it is seen the network visualization of the most cited journals. As a result of the analysis, 157 journals were reached. When the analysis was limited to at least 1 citation, 97 journals were reached. When the visual is examined, it is seen the biggest object is *"Artifical Intelligence"*. That means that this object has more content than the other ones. Size differences between objects are related to numerical differences. It is seen that the objects that spread throughout the visual are randomly placed at any point of the visual since they are not in any relationship with each other. However, the clustering in the left center of the visual shows that these objects are in relation to each other. In addition, the connecting lines between them also express this. Based on this point, it can be stated that journals of "*Research on Language and Computation", "American Educational Research", "Language Learning"* and *"Target"* are in cooperation with each other according to any variable.

Findings for the Sixth Research Question

The findings regarding the sixth research question *"Which authors are the most cited?"* are shown in Figure 11 and Figure 12.

Figure 11 shows the top 20 authors of the articles on text simplification in social sciences journals indexed in the Scopus database. The citation and h index information of the authors, whose information is given below, were taken from the Scopus database. The first four authors are co-authors of the same article. This article name is "*Interpretation as Abduction"*. The first author of this article, the most cited about text simplification in Scopus database, is Douglas E. Appelt. Douglas E. Appelt continues his studies at SRI International, Menlo Park, United States. The h-index of the author who has published 19 documents so far is 7 and the total number of citations is 739. He recieved his PhD in computer sciences from Stanford University in 1981. His research areas include Computer Science, Engineering, Social Sciences, Mathematics, Arts and Humanities. The second author of this article is Jerry R. Hobbs. Jerry R. Hobbs continues his studies at the Information Sciences Institute, Marina del Rey, United States. The h-index of the author who has published a total of 79 documents is 18 and the number of citations so far is 2533. He received his PhD in computer science from New York University in 1974. In addition, His research interests include social sciences, computer sciences, computational linguistics, discourse analysis, and artificial intelligence. The third one is Paul A. Martin. He continues his studies in SRI International, Menlo Park, United States. He had puclished 4 documents so far. His h-index is 3 and his total citations are 498. The fourth author is Mark E. Stickel. The writer, who passed away in 2013, continued his work at SRI international. Stickel, who published 50 documents, has a h-index of 19 and the total number of citations was 1884.

5th, 6th and 7th ranks are the authors of the same article. This article name is *"The Effects of Simplified and Elaborated Texts on Foreign Language Reading Comprehension"*. The first author of this article is Micheal H. Long. He works in Maryland University, College Park, United States. He recieved his PhD in applied linguistics from University of California. He is currently working on second language acquisition at the University of Maryland. Accordint to scopus database, The h-index of the author who published 39 documents is 24 and the total number of citations is 3726. His research areas are second language acquisition, applied linguistics, language teaching. The second author is Steven J. Ross. He is also works in Maryland University, College Park, United States. He recieved his PhD in second language acquisition from University of Hawaii. Ross published 33

Figure 10. The network visualization of the most cited journals

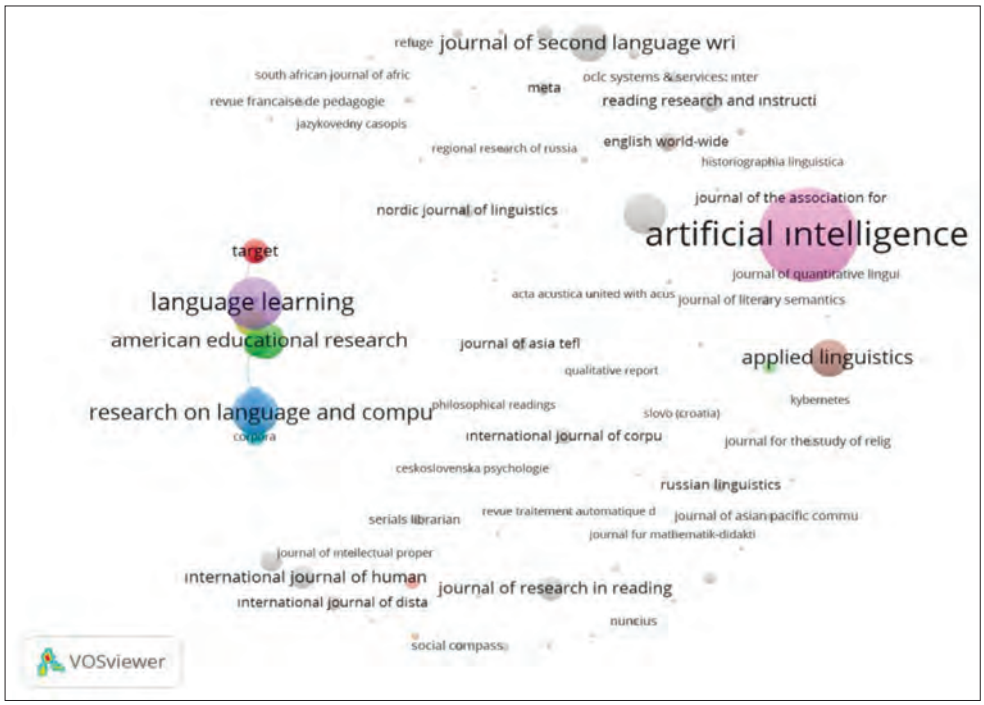


Figure 11. The distribution of the most cited authors

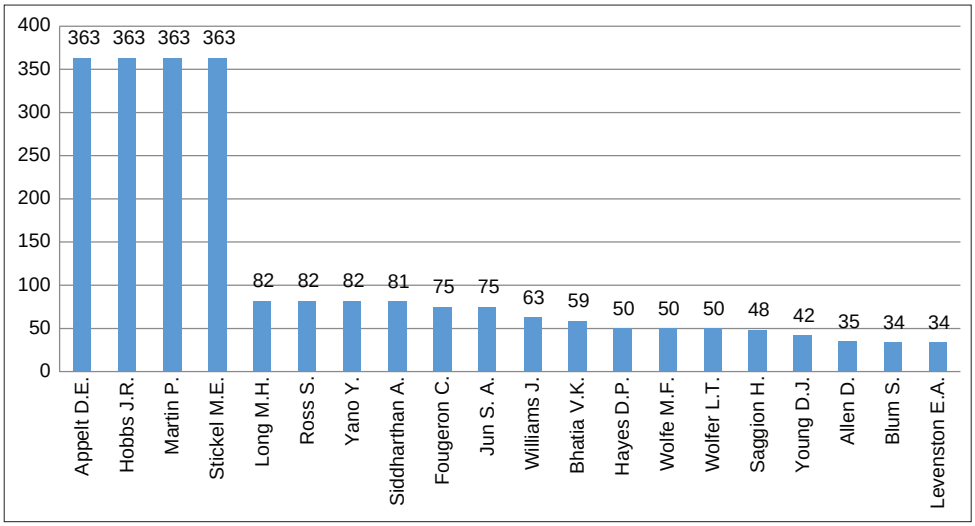
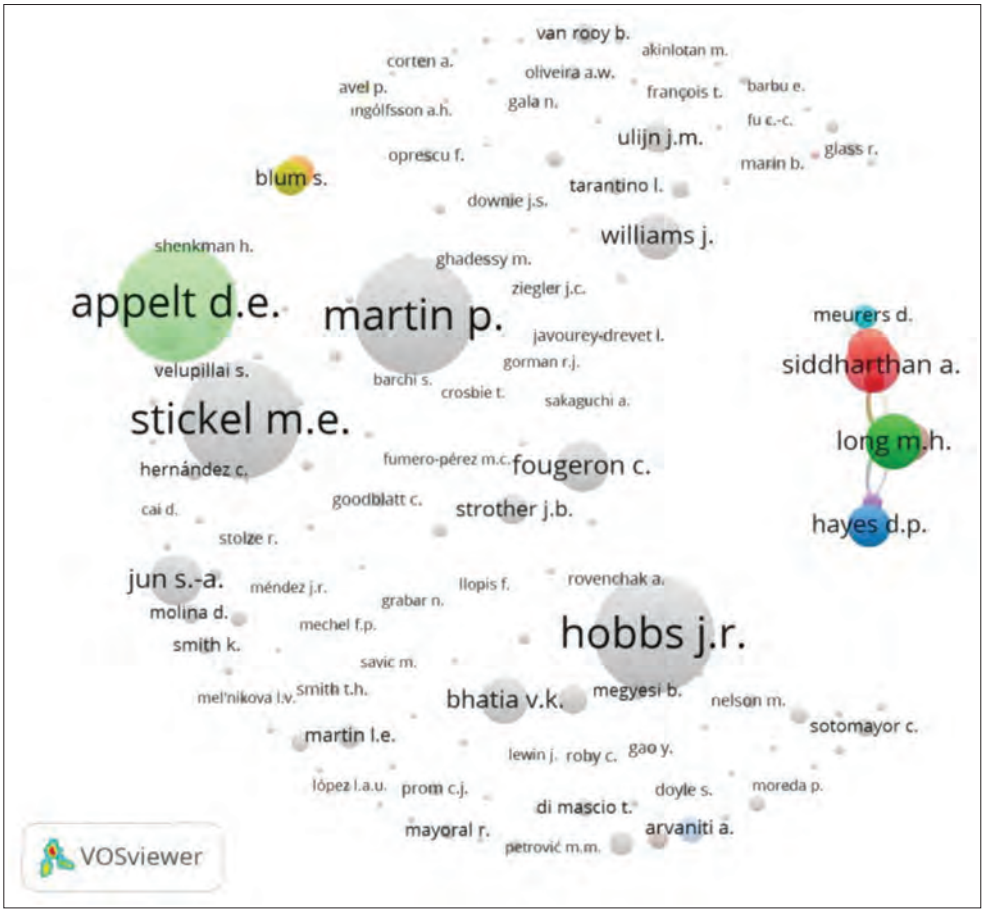


Figure 12. The network visualization of the most cited authors



documents and his h-index is 13. And his total number of citations is 802. His research areas are longitudinal research methods, the influence of metalinguistic knowledge on proficiency growth, language attrition, discourse analyses of oral proficiency interviews and the assessment of second language pragmatics. The third author is Yasukata Yano. He works in the center of English language education in Waseda University. He recieved his PhD in linguistics from Wisconsin-Madison University. According to the Scopus database, Yano has published 11 documents so far. His h-index is 5 and his total number of citations is 269.

In Figure 12, it is seen the network visualization of the most cited authors. As a result of the author citation analysis performed in the VOSviewer program, a total of 209 authors who received at least one citation were identified. When the visual examined, it is seen that the sizes of some objects are the same. This means that these objects have the same numerical content. It is understood that the sizes of the

four objects are the same. It was shared in the previous graph that these four authors were co-authors in the same article. For this reason, it is an expected result that the sizes of the objects belonging to these authors are the same. VOSviewer program gives random colors to objects in network visualization. Coloring has no statistical significance. It is understood that Martin P, Appelt D.E, Stickel M.E, and Hobbs J.R. who are represented by the largest objects, do not refer to each other in their other works because there are no connecting lines between them. However, it is understood from the presence of connecting lines between Siddhartan A., Long M.H, Hayes D.P, Saggion H., Meurers D. and Hogue A. to which they refer to each other.

Findings for the Seventh Research Question

The findings regarding the seventh research question *"Which countries are the most articles published?"* are shown in Figure 13 and Figure 14.

Figure 13 shows the distribution of the countries that most published articles about text simlification in journals indexed in Scopus database. As a result of the Vosviewer analysis based on the data obtained from the Scopus database, a total of 55 countries with at least 1 publication were identified. In Figure 13, the first 20 countries are shared. According to Figure 13, the most published country is *"United States of America"* (f: 30). United States of America is followed by *"Spain"* (f: 23) and *"United Kingdom"* (f: 15).

In Figure 14, it is seen the density visualization of the the countries that most published articles on text simplification. In this visual, the density map option of the VOSviewer program was used. It is seen that objects of different sizes are formed in the density map. It is seen that the colors of blue, yellow and red are located in the center of these objects. The changing from color of blue to yellow and red means that the content of the objects increases numerically. Based on this information, it is understood that the most published country is the United States of America. The redness in the center of

Figure 13. The distribution of the most published countries

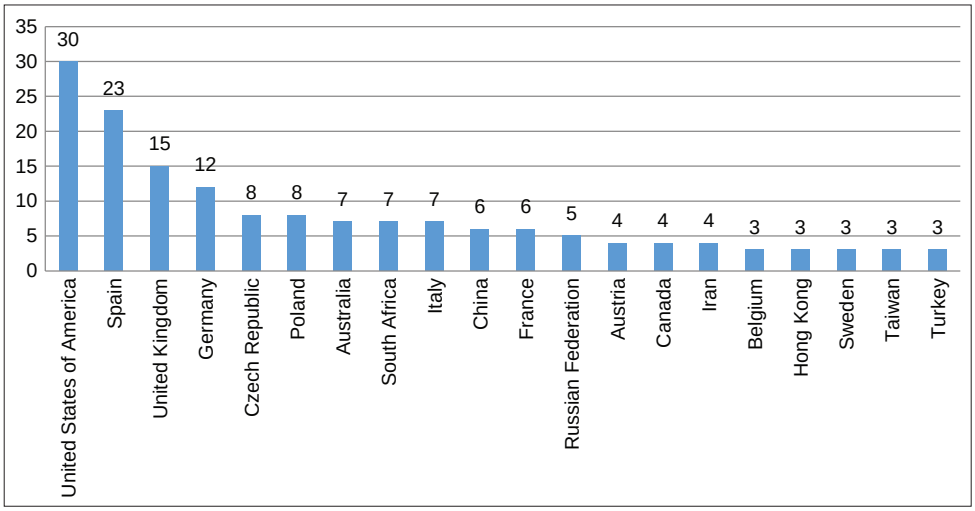
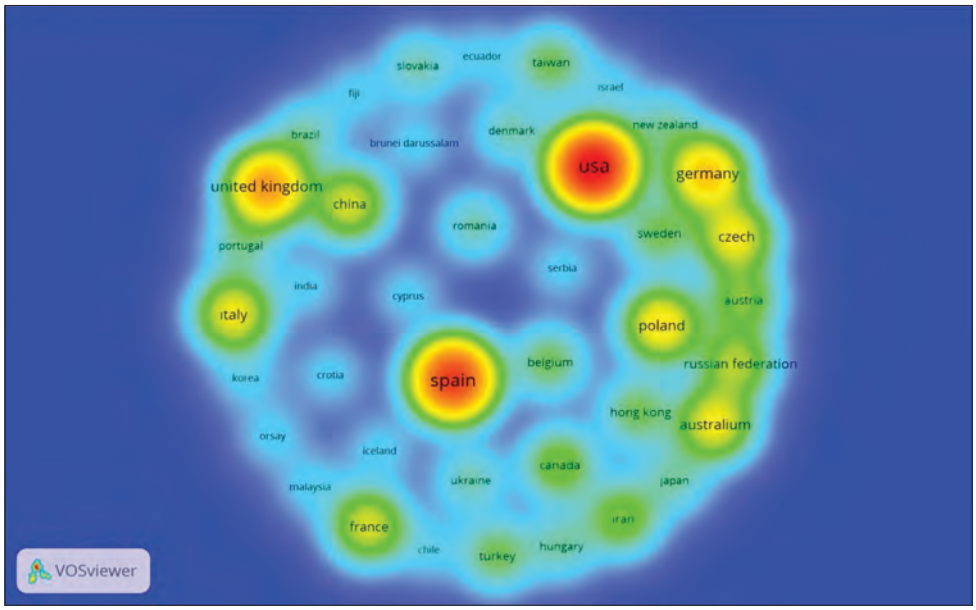


Figure 14. The density visualization of the most published countries



the USA object in the visual means this. The yellowish color in the center of the Spain object indicates that this country ranks second. Although the color in the centers of the United Kingdom and Germany objects are close to each other, the larger the United Kingdom object means that this country published more.

Findings for the Eight Research Question

The findings regarding the eight research question *"Which countries are the most cited?"* are shown in Figure 15 and Figure 16.

In Figure 15, it is seen the distribution of the most cited countries that published articles about text simlification in journals that indexed in Scopus database. In the citation analysis of countries conducted in the VOSwiever program, a total of 44 countries that received at least one citation were identified. When the figure is examined, it is seen that the most cited country is the United States of America (f: 863). United States of America is followed by Australia (f: 126) and Japan (f: 105). The difference between the United States of American and other countries in terms of citation number is striking. Although Australia and Japan are not among the top three countries in terms of the number of articles written on text simplification, it is an important result that they are among the top three countries in the number of citations. The light blue color in the centers of objects such as Malaysia, South Africa, Germany, Israel and Italy shows that the citation numbers of these countries are close to each other.

In Figure 16, it is seen the density map of the most cited countries that puclished articles on text simlification. As a result of the density visual analysis provided by the VOSwiever program, objects that change from blue to yellow and red in their centers were formed. The different size of some objects, the color in the center and the font size of the countries are due to the different content numbers of the objects. When the density map of the number of citations of countries is examined, it is seen that the largest object is

Figure 15. The distribution of the most cited countries

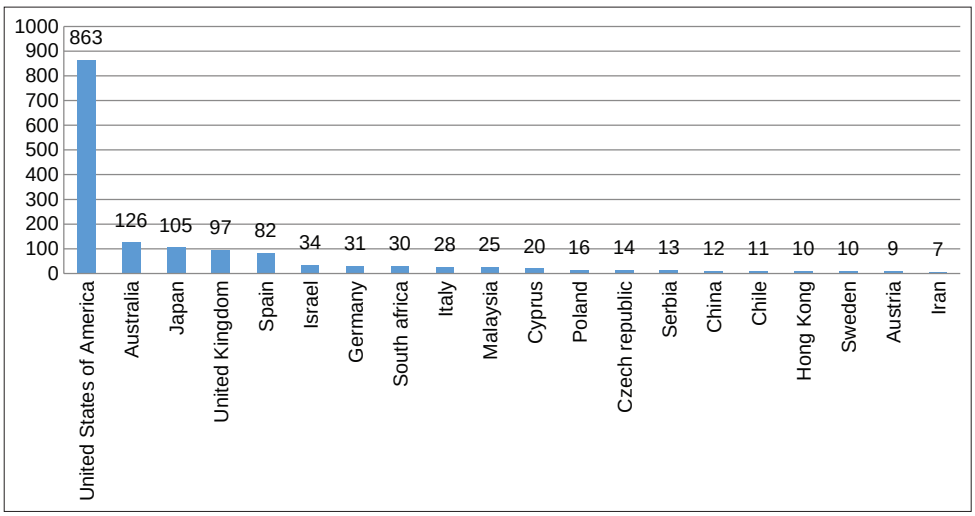
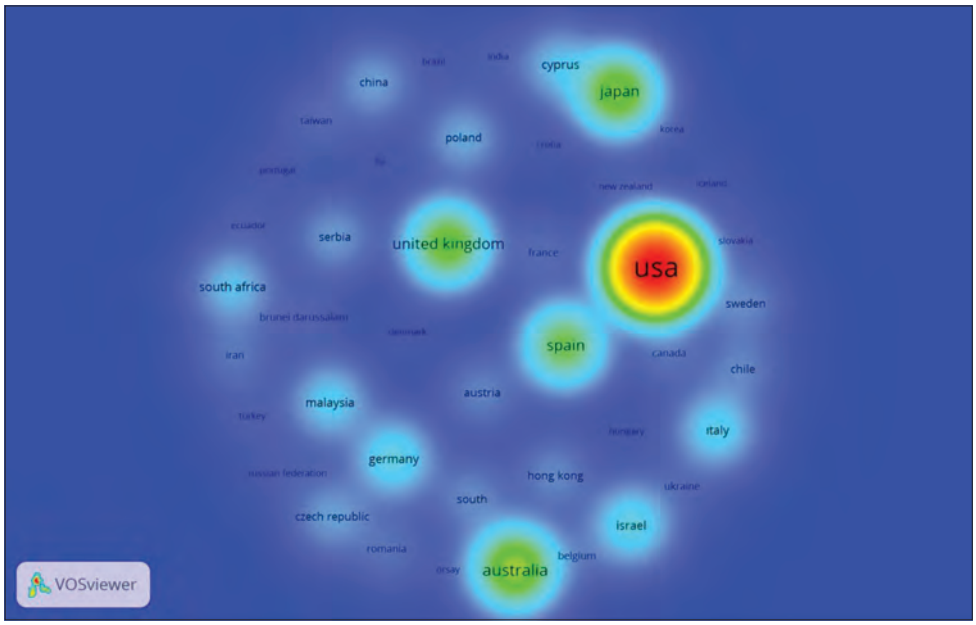


Figure 16. The density visualization of the most cited countries



USA. The intensity of red in the center of this object means that this country has the highest number of citations. The partial yellow color in the center of the Australia object means that this country is cited more than Japan. The fact that the size of the United Kingdom object is larger and the color in its center is more yellowish than the Spain object shows that the United Kingdom is more cited than Spain. The change from red to blue color and the decrease in the font size of the names of the countries mean that the number of content has decreased.

Findings for the Ninth Research Question

The findings regarding the ninth research question *"What is the network analysis of the authors cited in articles on text simplification?"* are shown in Figure 17.

Figure 17 shows the network map of the authors who are frequently cited in articles on text simplification in journals within the scope of social sciences indexed in the Scopus database. A co-citation analysis was conducted to identify the authors cited extensively in the reference lists of the articles on text simplification indexed in Scopus. This analysis was carried out based on the names of the cited authors in the reference sections of the studies. In the analysis made with VOSviewer, it was determined that a total of 7651 authors were cited in the articles, a network map with 289 authors who were cited at least "5" times from these authors was created.

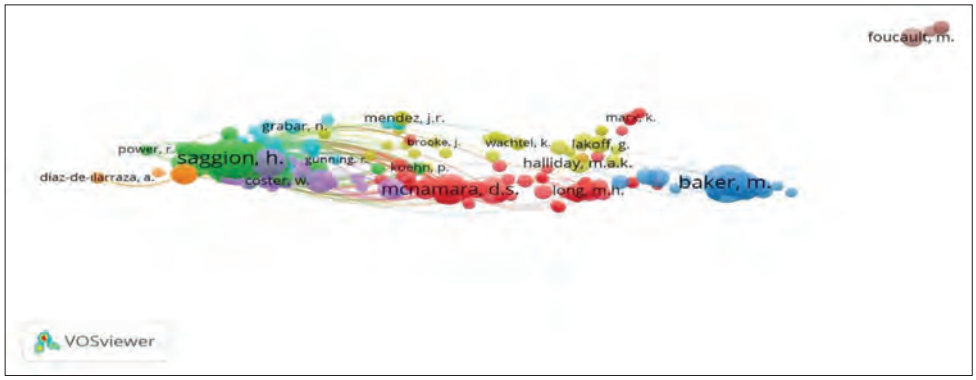
When the network analysis of the frequently cited authors in the articles on text simplification is examined, it is seen that 8 clusters are formed. The cluster with the highest total link strength (TLS) is the green cluster (TLS: 9687). Green cluster is followed by purple (TLS: 3595), red (TLS: 2277), turquoise (TLS: 1306), blue (TLS: 1296), Orange (TLS: 1240), yellow (TLS: 565), brown clusters (TLS: 228).

The author with the highest TLS in the green cluster is Haracio Saggion (TLS: 9687 and Links: 141). He continues his research in the depermant of information and communication technologies in University of Pompeu Fabra, Barcelona, Spain. The author with the highest TLS in the purple cluster is Advaith Siddharthan (TLS: 3595 and Links: 156). The author, who continues his studies at The Open University, UK, works on Computational Linguistics, Citizen Science, Natural Language Processing, Natural Language Generation, Text Simplification. In red cluster, Danielle S. McNamara (TLS: 2277 and Links: 175) is the prominent author. McNamara conducts theoretical and empirical studies on the development of reading comprehension and game-based literacy technologies and is a professor of psychology at Arizona State University. The author with the highest TLS in the turquoise cluster is Natalia Grabar (TLS: 1306 and Links: 138). The author, who has studies on linguistic and informatin sciences, continues her academic life at the University of Lille. The author with the highest TLS in the blue cluster is Mona Baker (TLS: 1296 and Links: 65). Mona Baker, who has studies on translation and intercultural, continues her academic career as a Professor at the University of Manchester. The author with the highest TLS in the orange cluster is Itziar Gonzalez-Dios (TLS: 1240 and Links: 136). She works as a lecturer in University of Basque, Spain. Her research topics include text simplification, readability measurement, syntax, terminology, linguistic and foreign language teaching. She recieved PhD with her doctoral dissertation on automatic simplification of texts in the Basque language. The author with the highest TLS in the yellow cluster is Micheal Halliday (TLS: 565 and Links: 185). Halliday, an English linguist, developed an international grammar model with a systemic functional grammar approach. The author, who had studies in the field of linguistics, passed away at the age of 93 in 2018. The author with the highest TLS in the brown cluster is Michel Foucalt (TLS: 228 and Links: 7). Foucault, a French scientist, had worked on the history of ideas, epistemology, ethics, and political philosophy. Michel Foucault, who was born in France in 1926, passed away at the age of 57 in 1984.

DISCUSSION

With the bibliometric analysis method, many researchers conducted studies within the scope of different research questions. In this study, articles written on text simplification in journals scanned in the field of social sciences in the Scopus database were subjected to bibliometric analysis. According to Pritchard (1969), bibliometry is the application of mathematical and statistical methods to scientific communication. McBurney and Novak (2002) state that bibliometric research can be descriptive as well as evaluative. Atılgan et al. (2008) state that due to bibliometric research clearly reveals the

Figure 17. The network analysis of co-cited author



effectiveness of scientific publications, it contributes to the relevant literature and researchers in the context of having an idea about the use of the literature or publication.

When the releated literature for biblometric research is examined, it is seen that many researchers (Julia & et al., 2020; Xiyang, 2020; Ali & Aboelmaged, 2020; Sökmen & Nalçacı, 2020; Julia et al., 2020; Torrana & Ibrayeva, 2020; Ha et al., 2020; Grosseck et al., 2020; Göksu, 2020; Huang et al., 2020; Cretu & Morandau, 2020; Sönmez, 2020; Segura-Robles et al., 2020; Bozdoğan, 2020; Karagöz & Şeref, 2020; Batur & Özcan, 2020; Özteke Kozan, 2020; Sönmez & Bozdoğan, 2020; Gülmez, Özteke & Gümüş, 2020; Şeref & Karagöz, 2019) have made bibliometric analysis in education with the help of VOSviewer visualising program in the last couple of years.

When the literature about the studies on text simplification and bibliometric analysis is scanned, It was observed that no bibliometric study had been done on text simplification. In this context, this study is important in terms of creating a great resource for researchers who will conduct research on text simplification, which is a method frequently used for developing reading material for poor readers and foreign language learners in reading education.

CONCLUSION

Reading education and literacy that have developed over time is now at a very different point today. Literacy that goes beyond just reading and writing written symbols requires much more functional skills in the digital age we live in. In this context, it is vital to prepare reading texts for children who are new to literacy education and individuals learning foreign languages in order to fulfill these requirements. As a result of this study, which aims to presents the bibliometric analysis of the articles on text simplification, which is a method that is frequently used in creating the reading materials prepared for poor readers and foreign language learners, published in journals indexed in the Scopus database, the following results have been reached;

Based on the findings of the first research question of the study *"What is the distribution of articles on text simplification by years?"* it was concluded that the first article on text simplification was written in 1975, and the most articles were written in 2020. In addition, it is observed that the number of articles continues to increase in recent years.

Based on the findings of the second research question of study *"Which articles are the most cited?"* it was concluded that there are 116 articles in total with at least one citation and the most cited article is named *"Interpretation as Abduction*" (f: 363) written by J.R Hobbs, M.E Stickel, D.E Appelt and P. Martin in 1993. This article is followed by the article *"The Effects of Simplified and Elaborated Texts on Foreign Language Reading Comprehension"* (f: 84) written by Y. Yano, M.H Long and S. Ross in 1994. The third most cited article is named *"Syntactic Simplification and Text Cohesion"* (f: 81) written by A. Siddharthan in 2006.

Based on the findings of the third research question of study *"What are the most common keywords in articles on text simplification?"* it was concluded that total of 624 different keywords are used by the authors and the most repeated keyword in these articles about text simlification is *"Simplification"* (f: 18). This keyword is followed by *"Text Simlification"* (f: 16) and *"Translation Universals"* (f: 8).

Based on the findings of the fourth research question of study *"Which institutions are the most cited?"* it was concluded that there are 161 institutions in total with at least one citation. *"Artificial Intelligence Center"* (f: 363) is the most cited institutions out of these 161. Second place is *"Macquarie University"* (f: 84), third is *"University of Hawaii"* (f: 84), and fourth is *"Waseda University"* (f: 84).

Based on the findings of the fifth research question of study *"Which journals are the most cited?"* it was concluded that there are 96 journals in total with at least one citation. *"Artifical intelligence"* (f: 363) was determined to be the most cited journal among these 96 journals. This journal is followed by journal of *"Language Learning"* (f: 116) and journal of *"Research on Language and Computation"* (f: 82).

Basen on the findings os sixth research question of study *"Which authors are the most cited?"* it was concluded that there are 209 authors in total with at least one citation. As a result of the analysis, the number of citations of the first four authors are the same because they are co-authors in the same article. These authors are *"J.R. Hobbs"* (f: 363), *"M.E. Stickel"* (f: 363), *"D.E. Appelt"* (f: 363) and *"P. Martin"* (f: 363). The next three authors are also co-authors on the same article, so they have the same citation count. These are *"Y. Yano"* (f: 84), *"M.H. Long"* (f: 84) and *"S. Ross"* (f: 84). Their article is a quality study that aims to examine the effect of texts, created by using simplification and elaboration, for foreign language learners' reading comprehension.

Based on the findings of seventh research question of study *"Which countries are the most articles published?"* it was concluded that there are 44 countries that puclished at least one article. Among these 44 countries, the most published country is *"United States of America"* (f: 30). United States of America is followed by *"Spain"* (f: 23) and *"United Kingdom"* (f:15).

Based on the findings of eighth research question of study *"Which countries are the most cited?"* it was concluded that there are 44 countries in total with at least one citation. Among these 44 countries, the most cited country is *"United States of America"* (f: 863). United States of America is followed by *"Australia"* (f: 126) and *"Japan"* (f: 105).

Based on the nınth research question of study *"What is the network analysis of the authors cited in articles on text simplification?"* it was concluded that eight clusters that related to the authors' co-citation analysis, have been formed. Among these clusters, the green cluster has the highest total link strength. The author with the highest total link strength in this green cluster is *"H. Saggion"* (TLS: 9687). The prominent authors in other clusters are as follows; in purple cluster is *"A. Siddharthan"* (TLS: 3595), in red cluster is *"D. McNamara"* (TLS: 2277), in turquoise cluster is *"N. Grabar"* (TLS: 1306), in blue cluster is *"M. Baker"* (TLS: 1296), in orange cluster is *"I. Gonzalez-Dios"* (TLS: 1240), in yellow cluster is *"M. Halliday"* (TLS: 565), in brown cluster is *"M. Foucault"* (TLS: 228).

REFERENCES

Al, U. (2008). *Scientific Publications Policy in Turkey: An Approach Based on Bibliometric Citation Index* (Unpublished Doctoral Thesis). Hacettepe University, Social Sciences Institute

Ali, I. & Aboelmaged, M. (2020). A bibliometric Analysis of Academic Misconduct Research in Higher Education: Current Status and Future Research Opportunities, *Accountability in Research*, 12 (3), 1-30.

Allen, D. (2009). A study of the role of relative clauses in the simplification of news texts for learners of English. *System,* 37, 4, pp 585–599.

Atılgan, D., Atakan, C. & Bulut, B. (2008). Citation analysis of Turkish library journals. *Turkish Librarianship*, 22 (4), 392-413.

Batur, Z. & Özcan, H.Z. (2020). Bibliometric Analysis of Graduate Theses Written on Critical Thinking. *International Journal of Turkish Literature Culture Education, 9*(2), 834-854.

Bloom, B. S. (1995*). Human Qualities and Learning in School.* (Translated by D. Ali Özçelik), Milli Eğitim Publishing House.

Bozdoğan, K. (2020). A Bibliometric Analysis of Educational Studies About "Museum Education. *Participatory Educational Research,* 7(3), 161-179.

Bölükbaş, F. (2015). Simplifying Reading Texts According to Language Levels in Teaching Turkish as a Foreign Language. *International Journal of Languages' Education and Teaching,* UDEST2015*,* 924-935.

Chang, S. (2008). *A Preliminary Categorization of Techniques of Simplification in ESL/EFL Graded Readers*. (Ed. Martin Edwardes) Proceedings of the BAAL Annual Conference. London: Scitsiugnil Press.

Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage.

Cretu, D. M. & Morandau, F. (2020). Initial Teacher Education for Inclusive Education: A Bibliometric Analysis of Educational *Research. Sustainability*, 12(12) 1-27.

Crossley, S.A., Allen, D.B. & McNamara, D.S. (2012). Text Simplification and Comprehensible Input: A Case For an Intuitive Approach. *Language Teaching Research,* 16, 89–108.

Crosley, S.A & Yang, H.S. (2014). What's so simple about simplified texts? A computational and psycholinguistic investigation of text comprehension and text processing, *Reading in a Foreign Language*, 26(1), 92-113.

Çiftçi, Ş. K., Danişman, Ş., Yalçın, M., Tosuntaş, Ş. B., Ay, Y., Sölpük, N. & Karadağ, E. (2016). Map of Scientific Publication in the Field of Educational Sciences and Teacher Education in Turkey: A Bibliometric Study. *Educational Sciences: Theory & Practice*, 16, 1097-1123.

Durmuş, M. (2013). Linguistic Processes of Text Modification. *JASSS,* 6(4) 391-408.

Grosseck, G., Malita, L. & Sacha, G. M. (2020). Gamification in Higher Education: A bibliometric Approach. *eLearning & Software for Education*, 3, 20-30.

Göksu, İ. (2020). Bibliometric mapping of mobile learning. *Telematics and Informatics*, 56, 1-20.

Güçlü Nergiz, H. (2014). The bibliometric profile of the graduate thesis tourism in Turkey (1990-2013). *VII. Graduate Tourism Students Research Congress*, pp 04-05.

Gülmez, D., Özteke, İ. & Gümüş, S. (2020). Overview of Educational Research from Turkey Published in International Journals: A Bibliometric Analysis. *Education and Science,* Early Release, 1-27.

Güneş, F. (2019). Literacy Approaches. *The Journal of Limitless Education and Research*, 4(3), 224-246.

Ha, C. T., Thao, T. T. P., Trung, T. N., Huong, T. T. L., Dinh, V. N. & Trung, T. (2020). A Bibliometric Review of Research on STEM Education in ASEAN: Science Mapping the Literature in Scopus Database, 2000 to 2019. *EURASIA Journal of Mathematics, Science and Technology Education,* 16(10) 1-11.

Huang, C., Yang, C., Wang, S., Wu, W., Su, J. & Liang, C. (2019). Evolution of Topics in Education Research: A Systematic Review Using Bibliometric Analysis. *Educational Review*, 72 (1), 1-18.

Julia, J., Supriatna, E., Isrokatun, I., Aisyah, I., Nuryani, R & Odebode, A.A. (2020). Moral Education (2010-2019): A Bibliometric Study. *Universal Journal of Educational Research, 8*(6), 2554-2568.

Julia, J., Afrianti, N., Soomro, K. A., Supriyadi,T., Dolifah, D., Isrokatun, I., Erhamwilda, E. & Ningrum, D. (2020). Flipped Classroom Educational Model (2010-2019): A Bibliometric Study. *European Journal of Educational Research,* 9(4) 1377-1392.

Karagöz, B. & Şeref, İ. (2020) A Review of Articles on the Writing Skill: Trends in the Web of Science Database, *Journal of Mother Tongue Education*, 8(1), 67-86.

Krashen, S. (1985). *The Input Hypothesis: Issues and Implications.* Longman.

McBurney, M. K. & Novak, P. L. (2002). *What is bibliometrics and why should you care? Professional Communication Conference,* IPCC. Proceedings USA: IEEE International, pp 108-114.

Nation, P. (1993). *Measuring Readiness for Simplified Material: A Test of The First 1,000 Words of English. In M. L. Tickoo (Ed.), Simplification: Theory and Application.* SEAMEO Regional Language Center.

Nation, P. (2001). *Learning Vocabulary in Another Language.* Cambridge University Press.

Nunan, D. (1999). *Second language teaching and learning.* Heinle & Heinle.

Oh, S. Y. (2001). Two Types of Input Modification and EFL Reading Comprehension: Simplification versus Elaboration. *TESOL Quarterly*, 35(1), 69-96.

Özteke Kozan, H. İ. (2020). A Bibliometric Analysis of School Counseling Researches: 1980- 2019. *Journal of School Counseling*, 3(1), 1-28.

Pritchard, A. (1969). "Statistical bibliography or bibliometrics?" *Journal of Documentation*, 25, 348-349.

Sandom, M. (2013*). Investigation Into the Efficacy of Text Modification: What Type of Text Do Learners of Japanese Authenticate?* (Unpublished Doctoral Thesis). School of Languages and Cultures, Victoria University of Wellington.

Segura-Robles, A., Parra-González, M. & Gallardo-Vigil, M. (2020). Bibliometric and Collaborative Network Analysis on Active Methodologies in Education. *Journal of New Approaches in Educational Research (NAER Journal),* 9(2), 259-274.

Shardlow, M. (2014). A Survey of Automated Text Simplification, (IJACSA) International Journal of Advanced Computer Science and Applications, *Special Issue on Natural Language Processing,* pp 58-70.

Sökmen, Y. & Nalçacı, A. (2020). A Bibliometric Analysis of The Articles About Values Education. *International Journal of Curriculum and Instruction,* 12(2), 720-735.

Sönmez, Ö. (2020). Bibliometric Analysis of Educational Research Articles Published in the Field of Social Study Education Based on Web of Science Database. *Participatory Educational Research*, 7(2), 216-229.

Sönmez, Ö.F. & Bozdoğan, K. (2020). Bibliometric Analysis Of Values Education Researches Based On Web Of Science Database, *International Journal of Education Technology and Scientific Researches*, 5(13), 1543-1577.

Şeref, İ & Karagöz, B. (2019). An Assessment of the Academic Field of Turkish Education: A Bibliometric Analysis Based on the Web of Science Database. *Journal of Language Education and Research,* 5(2), 213-231.

Torrana, D.H. & Ibrayeva, L. (2020). Creativity and education: A bibliometric mapping of the research literature (1975–2019). *Thinking Skills and Creativity,* 35, 1-17.

Van Eck, N.J. & Waltman, L. (2020). VOSviewer Manual. (https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.16.pdf)

Wach, E. (2013). Learning About Qualitative Document Analysis (https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/2989/PP%20InBrief%2013%20QDA%20FINAL2.pdf?sequence=4)

Yılmaz, M. (2008). Ways to Improve Reading Comprehension Skills in Turkish Language. *Mustafa Kemal University Journal of Social Sciences Institute,* 5(9), 131-139.

Zeren, D & Kaya, N. (2020). Digital Marketing: Bibliometric Analysis of National Literature. *Çağ University Journal of Social Sciences*, 17(1), 35-52.

Xiyang, H. (2020). Bibliometric Analysis and Visualization of College Students' Entrepreneurial Psychology Research Based on VOSviewer Software. *International Journal of Research in Engineering and Science,* 8(12), 36-43.

https://en.wikipedia.org/wiki/Artificial_Intelligence_Center (Date of access: 10/01/2021)