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Research Article

Game Method in Education in Web-Based Information Resources: Readability Analysis

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Abstract: The study was carried out with 45 web pages reached as a result of scanning the relevant keywords in the 'Google' search engine, eliminating repetitive web pages, and applying the inclusion and exclusion criteria. Content analysis, readability calculation, and statistical analyses of the data obtained from web-based information sources were performed. It was observed that the web pages of various companies, academic texts, and the contents prepared by experts in the field of education were more common among the data sources. It is noticeable that the focus of the topics addressed in the texts is game-based learning. While the highest number of data sources are in the medium difficulty category according to Ateşman's readability formula, they are at the educational reading level according to Çetinkaya-Uzun's readability formula. According to both formulae, the average readability of journal/book/newspaper sources is statistically higher than that of company and university sources. In conclusion, when an evaluation is made in the context of lifelong learning, it can be said that our education life continues continuously. Therefore, our different life roles have always pushed us to seek learning. One of the sources in our learning journey is web pages. In the context of the research, it was concluded that it is essential for parents, teachers, and children in the target audience to understand the texts on web pages.

Anahtar Sözcükler:
Eğitim
Oyun yöntemi
Öğrenme
Okunabilirlik

Web Tabanlı Bilgi Kaynaklarında Eğitimde Oyun Yöntemi: Okunabilirlik Analizi

Özet: Araştırmada "Google" arama motorunda ilgili anahtar kelimenin taratılması, tekrar eden web sayfalarının elenmesi, dahil etme ve dışlama kriterlerinin uygulanması sonucunda ulaşılan 45 web sayfası ile çalışma gerçekleştirilmiştir. Web tabanlı bilgi kaynaklarında elde edilen verilerin içerik analizi, okunabilirlik hesaplaması ve istatistiksel analizleri yapılmıştır. Veri kaynaklarının içerisinde çeşitli firmalara ait web sayfalarının, akademik metinlerin ve eğitim alanında uzmanların hazırladıkları içeriklerin daha fazla olduğu görülmüştür. Metinlerde ele alınan konuların odağının oyun tabanlı öğrenme olduğu göze çarpmaktadır. Veri kaynakları Ateşman'ın okunabilirlik formülüne göre orta güçlük kategorisinde en yüksek sayıda iken Çetinkaya-Uzun'un okunabilirlik formülüne göre eğitsel okuma düzeyindedir. Her iki formüle göre de dergi/kitap/gazete kaynaklarının okunabilirlik ortalamasının, firma ve üniversite kaynaklarından istatistiksel olarak yüksek olduğu görülmektedir. Sonuç olarak yaşam boyu öğrenme bağlamında bir değerlendirme yapıldığında eğitim hayatımızın sürekli devam ettiği söylenebilir. Bu nedenle yaşamımız boyunca üstlendiğimiz farklı roller bizleri her zaman öğrenme arayışına itmiştir. Öğrenme yolculuğumuzdaki kaynaklardan bir tanesi de web sayfalarıdır. Araştırmanın konusu bağlamında hedef kitlede yer alan ebeveynlerin, öğretmenlerin ve çocukların web sayfalarında yer alan metinleri anlayabilmelerinin önemli olduğu sonucuna ulaşılmıştır.

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1. Introduction

Play, an effective learning tool for individuals from birth also supports learning as a fun activity (Özer, 2020). According to Huizinga, play is expressed as an innate, instinctive motive. However, he also emphasises that the game provides the skills and equipment demanded from individuals in life (Huizinga, 1955). It is seen that play is as important as nutrition and sleep in supporting physical and psychological development in children (Kaytez et al., 2014). Theorists have not been able to put forward a standard definition of play, which is very effective in developing individuals from childhood (Huizinga, 1995). This situation is justified because play is an irrational method that transcends human reason (Turner, 1983) and is ambiguous (Sutton-Smith, 2008). However, based on the view that various definitions of play should be made, in terms of theorists, play is defined as an essential tool that contributes to the development of many skills in children according to Piaget (Çakırer, 2017), while according to Vygotsky, it is expressed as an effective area that develops the potential of children (Vygotsky, 2004). According to Huizinga, who offers a different perspective on the game, games, as activities that form the basis of culture, constitute cultural elements of societies such as traditions, customs, and traditions. In this respect, the game's social value as an essential education step is emphasised (Kotan & Arslan, 2023; Sezgin, 2016).

Studies on play as an essential predictor of culture transfer and related to different education disciplines emphasize that play is a learning tool that supports development. In the studies on the functions of the game, it is stated that the game is an activity that satisfies the desire of individuals to succeed, win, and prevail (Binark et al., 2009). In these studies, the educational aspect of the game that prepares individuals for the future is emphasised. In addition, the studies state that the game is the basis of fields such as trade, science, and art due to its rules (Binark et al., 2009; Huizinga, 1955). Research shows that play supports all areas of development as an effective tool for children to acquire life skills (Gülhan, 2012), to understand the importance of cooperation, to learn concepts, to learn rules (Çoban & Nacar, 2015; Yıldız, 2020). When evaluated in terms of the benefits of the game in terms of developmental areas, physical games provide children with rest by allowing them to discharge excess energy, strengthen the immune system, and provide large and small muscle development (Çoban & Nacar, 2015). Considering the benefits of play in terms of cognitive development, it is effective in the acquisition of different concepts such as long-short, less-more, proximity, distance, and quantity, and in the acquisition of cognitive process skills such as classification, sorting, analysis, synthesis and evaluation (Dönmez, 2000). When the game's contribution to the development of language skills is examined, it is an effective tool that enables children to enrich their vocabulary, supports the use of words for emotional expression, and contributes to communication skills (Akandere, 2013; Konzett, 2015).

Today, raising qualified individuals with 21st-century skills is frequently emphasised. As a particular field of education, it is necessary to create effective learning spaces to gain these skills. For a qualified learning environment that supports the multidimensional development of children, it is essential to use different learning strategies that are child-oriented and adopt a spiral approach. Play-based, formative assessment is practical. In addition, an effective learning environment should contain rich and child-oriented materials for children (Nihazram & Masnan, 2020). Due to the increase in digitalisation in recent years, introducing technology into education has become inevitable. With the development of technology, the effectiveness of education is increased by creating effective learning environments through games. It is stated that using games and technological tools in education increases attention and motivation and supports complete learning by providing fast feedback (Duman & Cumart, 2024; Uzun, 2009).

There is quite a lot of research about play in the literature. In these studies, it has been observed that play is handled from different perspectives. For example, Prens et al. (2022) concluded that nature games in early childhood education support children's cognitive development, while Forbes (2021) concluded that the use of games in higher education removes the learning barrier and supports active learning and also increases students' learning motivation by providing a warm classroom environment. Regarding current educational environments, studies have concluded that the interaction of games and robotic tools in early childhood education improves children's mathematics and executive function skills in games combined with block games compared to traditional games. In addition, it was concluded that games enriched with screen-free robotic applications contribute to developing analytical thinking skills (Yang et al., 2022). In this direction, it is seen that the tendency towards digital games has increased in recent years (Ergin & Ergin, 2022). Games are also essential to ensure that education is not disrupted worldwide during epidemics, earthquakes, etc., and that children are not negatively affected emotionally and psychologically. Lourenço et al. (2021) stated in their research that children learn by playing games during the COVID-19 process and that countries must invest in games on behalf of children for health and welfare. Play is considered an effective method that reduces aggression and depression in children and supports the development of social skills in children (Ergin & Ergin, 2017). As a result, play, which is also subject to different disciplines and is very important due to its social function, is a teaching method that positively affects children's learning and supports their development at all levels of education. For this purpose, many web-based games-related resources are available due to the increasing use of internet sites. It has become essential for these resources to be understandable for the benefit of society, accessible to individuals worldwide, and instructive for people of all ages. In this study, the readability of games in education and internet resources has been examined, and the findings are considered very valuable for the literature.

In the study, it was necessary to determine the game's readability in internet-based texts due to the frequent use of games in education. The use of these texts in educational environments and the fact that these texts are accessible to individuals of all ages regardless of their educational status make it necessary for these texts to be simple, to provide accurate information, and to be accessible. In this respect, readability is a method that provides objective and measurable data (Ateşman, 1997). When the studies on readability were examined, it was seen that the studies were mostly related to health (Akbulut, 2022; Gordon et al., 2024, etc.), while in social and educational sciences, there are studies on the readability of stories in preschool education (Çeçen & Aydemir, 2011), family involvement (Ergin & Ergin, 2023), mathematics education (Patel et al., 2023), Turkish education (Karatay et al., 2013). Considering this information, the fact that there is no study on readability analysis in internet-based texts on a common subject, such as games in education, reveals the study's originality.

2. Present Study

With the definition of 21st-century skills in education, effective teaching methods have started to be developed and implemented for all individuals at all levels of education worldwide. When information about the effectiveness of game-based learning is examined, it is seen that using games as a tool for education is quite old. For this reason, studies aimed at raising individuals suitable for the requirements of the century we live in educational environments show that results proving the positive contribution of the game to learning continue to be produced. Starting from families, which are the child's first school, the multidimensional benefits of the game on the individual have been observed and analysed through research. It is suggested that the game, which is very effective in raising individuals who have acquired universal moral rules

following the values and expectations of society, should be used at all levels of education. The game, which contributes to the socialisation process of children, plays a vital role in the child's gaining the self-confidence to express himself as an individual effectively in society, as well as being a disciplined and successful individual in social rules and business life.

There is quite a lot of data in internet-based resources about this method, whose positive effect on the individual's learning and development is still emphasised from past to present. These can be academic or different introductory information pages. Considering that the Internet is a tool that provides ease of access to information worldwide, this information should be understandable for individuals. Readability analysis provides an objective analysis of these texts in terms of different educational levels and constitutes a reliable source for the comprehensibility of this information. For this reason, this study conducted a readability analysis to determine the comprehensibility of internet resources related to educational game methods. The study is unique primarily because the research on readability has been carried out in the international literature on subjects such as health, business administration, economics, etc. In contrast, studies on Turkish language teaching have been conducted in education. In addition, the study's findings will primarily contribute to preschool education and child development and be an essential resource for different disciplines.

3. Methods

3.1. Research Design

Open web-based information sources were used as data sources in the research. In the qualitative dimension of the study, readability and content analysis of data sources were carried out, while in the quantitative dimension, comparisons were made according to variables and measurements. Since publicly accessible web-based information sources were used as data sources in the study, ethics committee permission was not required.

3.2. Procedure

Search engines enable us to obtain content on the topics and concepts we are curious about from web-based information sources, enabling users to obtain up-to-date and relevant data by sorting and ranking the masses of information. In this direction, the search engine "Google" [Google LLC, Mountain View, California, USA], which has the highest market share in Turkey and is frequently preferred by users in Türkiye, was used in the study. In accessing the research data sources, the accounts open on the devices to be scanned were closed. Then, the search history and cookies were deleted from the browsers. Finally, the relevant keyword was searched in the search engine, inconsistencies in the results were checked, and the arrangements were completed. To reach the correct results in the analyses, unnecessary information in web-based sources was eliminated.

The data of this study were obtained from the first fifty web-based information sources obtained as a result of searching the keyword [game method in education] in the 'Google' search engine in January 2024. Since web-based information sources are ranked according to the level of relationship with the searched subject or concept, the first fifty web-based information sources were evaluated not to reduce the representativeness of the searched concept. Similar studies indicate that including fifty or more data sources in this type of research will reduce the quality (Ergin & Ergin, 2023). The first fifty web-based information sources were examined according to the inclusion and exclusion criteria, and forty-five non-repeating web-based information sources were examined. The inclusion criteria of the research are that it is web-based, content related to the subject being searched, it is written in Turkish,

it contains more than ten sentences of information on the subject, and it allows copying to be analysed. The exclusion criteria were as follows: not being web-based, being a visual source (video, picture, etc.), not having Turkish language, being chat/forum sites, having content appropriate to the scope of the subject, the information on the subject being less than ten sentences and the related link being broken. After all these evaluations, the extensions of the relevant data sources were recorded so that forty-five web-based information sources could be analysed. The texts in the web-based information sources that were found suitable for the inclusion and exclusion criteria were transferred to the "Microsoft Word [Microsoft Corporation, Redmond, Washington, USA]" file to prevent data loss problems. Then, the texts were transferred to the calculation tool "http://okunabilirlikindeksi.com/" one by one, and descriptive data were obtained. Then, the obtained data were transferred to the "Microsoft® Excel [Microsoft Corporation, Redmond, Washington, USA]" file containing Ateşman and Çetinkaya-Uzun's readability formulae. After all other variables (site type, text type, author occupation) and descriptive data were transferred to the file, statistical analyses were performed in 'The IBM SPSS Statistics Standard Concurrent User V 26 (IBM et al., USA)' program. Data sources were divided into three categories based on the descriptive parameters of the site type. These are company (private schools, personal sites, expert pages, various institutions), university resources (documents in PDF and Word format), and journal/book/newspaper (international journals, book chapters, newspaper news) texts. The text type is divided into two parts: having academic content and not having academic content. The author's profession was divided into two parts: being an educator and not an educator.

3.3. Content Analyses

Texts related to web-based information sources were evaluated within the subject's conceptual framework. In addition, the descriptive characteristics of the data sources were transferred to an Excel file.

3.4. Readability Assessment

In the study, the readability formula adapted to Türkiye by Ateşman and the readability formula developed by Çetinkaya-Uzun to evaluate the readability of Turkish texts, which are frequently used in similar studies, were used to evaluate the readability indexes of web-based-information resources. Ateşman's readability formula gives a score between 0 and 100 points. As the scores increase, it can be stated that the readability of the text increases. Similarly, according to Çetinkaya-Uzun's formula, an increase in points indicates that the text's readability increases. Both formulations and classifications are given in the table below (Table 1).

Table 1.
Readability Formulae

Ateşman (1997) Readability Formula	Çetinkaya-Uzun (2010) Readability Formula
Readability value= 198,825-40,175. [average word length in phonemes]-2,610. [average sentence length in words]	Readability value= 118,823-25,987. [average sentence length]-0,971.[average word length]
Readability level. Very easy (90-100), Easy (70-89), Medium difficulty (50-69), Difficult (30-49), Very difficult (1-29)	Readability level. Disability level (0-34), Educational reading (35-50), Independent reading (51 and above)

3.5. Statistical Calculations

The scores related to web-based information sources were analysed with 'The IBM SPSS Statistics Standard Concurrent User V 26 (IBM et al., USA)' software. Descriptive statistics,

normality tests, and comparison tests were performed in this context. In addition, the agreement value was calculated to correlate the readability scores.

4. Findings

4.1. Findings Related to Qualitative Data

The first fifty web pages obtained from searching the relevant keyword in the 'Google' search engine in January 2024 and eliminating repetitive web pages were evaluated according to the inclusion and exclusion criteria. Forty-five web-based information sources were accessed after removing inaccessible and inappropriate web pages. It is seen that the accessed data sources belong to course resources of various universities (n=11), resources such as journals, books, newspapers (n=13), and various companies (n=21). When the contents of the analysed web-based information resources were evaluated, it was found that different companies prepared academic texts (n=34) and non-academic information texts (n=11) to raise awareness on the subject. In creating the content of web-based information resources, it was determined that experts in the field of education (n=23) produced rich content. In addition, the fact that the researched subject is an interdisciplinary element shows that different professional groups (n=22) also addressed the subject.

When the texts in the web-based information resources were examined, it was determined that the advantages and disadvantages of using game technology in education were mentioned, the importance of games in child education was investigated, how the game learning approach was conceptualised as a student-centred method, how the phenomenon of game-based learning and education was integrated, the benefits it provides to child development, games in child recognition and evaluation, games in distance education, learning with digital games, game types and activities, games in special education and the role of games in student success.

The descriptive data of forty-five web-based information sources in the study were analysed according to readability formulas. In this direction, in the classification made according to Ateşman's readability level, it was determined that there was one data source in the [30-49] difficult category, 25 in the [50-69] medium difficulty category, and 19 in the [70-89] easy category. According to Çetinkaya-Uzun's readability levels, there were 5 data sources in the category of [0-34] inadequate reading level (10^{th}, $11^{th,}$ and 12^{th} grade) and 40 data sources in the category of [35-50] educational reading level (8^{th} and 9^{th} grade). The readability scores for all of the web-based information sources examined within the scope of the study were determined to be (min-max= 45-86; mean 68.41) according to Ateşman's formula and (min-max= 27-49; mean 39.01) according to Çetinkaya-Uzun formula. According to Ateşman's readability formula, the data source with the lowest readability was an academic article written in a journal. In contrast, the data source with the highest readability was a similar article. According to Çetinkaya-Uzun's readability formula, the data source with the lowest readability is a data source with academic content on the subject prepared by a company. The study with the highest readability value is the study with the highest readability according to Ateşman's readability formula.

4.2. Findings Related to Quantitative Data

This section gives the descriptive parameters of the research and the findings related to the comparisons between the parameters.

Table 2.
Comparison of Text Type and Author Profession According to the Type of Website (N=45)

	Website type			χ^2	*p*
	Company	University resources	Magazine/Book /Newspaper		
	n=21	*n*=11	*n*=13		
Text type					
Academic	11 (%52.4) [b]	11 (%100) [a]	12 (%92.3) [a]	11.641	0.003
Non-academic	10 (%47.6) [b]	0 (%0) [c]	1 (%7.7) [c]		
Author profession					
Educator	5 (%23.8) [b]	7 (%63.6) [a]	11 (%84.6) [a]	12.795	0.002
Other	16 (%76.2) [a]	4 (%36.4) [b]	2 (%15.4) [b]		

The web-based information sources examined within the scope of the research were categorised according to their content. These classifications are given in Table 2, and it is seen that 21 sources examined within the scope of the research were prepared by companies. Universities prepared 11 and 13, prepared by journals/books/newspapers. When evaluated according to the academic content of the prepared web-based information resources, it was determined that there were 11 (52.4%) resources prepared by companies, 11 (100%) resources prepared by universities, and 12 (92.3%) resources prepared by journals/books/newspapers. When evaluated according to the non-academic content of web-based information sources, it was determined that there were 10 (47.6%) sources prepared by companies, 0 (0%) sources prepared by universities, and 1 (7.7%) sources prepared by journals/books/newspapers. When an evaluation was made according to the text type of web-based information sources, it was concluded that university and journal/book/newspaper sources were statistically more in academic content, and sources prepared by companies were more in non-academic content ($p<0.05$). When an evaluation was made according to the professions of the content producers of web-based information resources, it was determined that there were 5 (23.8%) company resources produced by educator authors, 7 (63.6%) resources produced by universities, and 11 (84.6%) resources produced by journals/books/newspapers. It was determined that there were 16 (76.2%) company resources produced by non-educator authors, 4 (36.4%) resources produced by universities, and 2 (15.4%) resources produced by journals/books/newspapers. When an evaluation was made according to the professions of the content producers of web-based information resources, it was concluded that university and journal/book/newspaper resources were statistically more in resources whose authors were educators, and company resources were more in resources whose authors were not educators ($p<0.05$).

Table 3 gives descriptive parameters related to the categorised web-based information sources. Among these parameters, the number of words, number of characters, number of difficult words, unique words, number of short words, number of characters without spaces, number of sentences, number of paragraphs, and average number of words do not show statistically significant difference according to the type of the site ($p>0.05$). It was determined that only the average number of sentences differed statistically ($p<0.05$). The median value of the average sentence parameter of the texts in the web pages prepared by the companies was determined to be larger than the other two groups.

Table 3.
Comparison of Readability Data of the Pages According to the Type of the Website (N=45)

	Website type			F	*p*
	Company *n*=21	University resources *n*=11	Magazine/Book /Newspaper *n*=13		
	Number of words				
X ± *SS*	1299.19 ± 665.95	6797.36 ± 8455.53	9606.23 ± 24822.96	1.549	0.224
M (*min-max*)	1099 (518-2647)	1640 (579-22650)	2725 (296-91917)		
	Number of characters				
X ± *SS*	10407.48 ± 5294.81	55776.00 ± 69898.82	76778.85 ± 200771.56	1.524	0.230
M (*min-max*)	9540 (4233-20058)	12753 (4906-186437)	21255 (2595-742637)		
	Number of difficult words				
X ± *SS*	1257.24 ± 654.37	6493.45 ± 8082.88	9110.00 ± 24034.40	1.484	0.238
M (*min-max*)	1092 (494-2599)	1571 (570-21367)	2575 (290-88849)		
	Unique word				
X ± *SS*	302.86 ± 286.57	158.82 ± 228.59	112.46 ± 235.91	2.470	0.097
M (*min-max*)	391 (0-778)	0 (0-602)	0 (0-706)		
	Number of short words				
X ± *SS*	211.95 ± 122.96	1190.55 ± 1518.29	1772.46 ± 4436.99	1.680	0.199
M (*min-max*)	163 (68-485)	339 (65-4395)	459 (35-16464)		
	Gapless character				
X ± *SS*	9043.05 ± 4613.93	48960.36 ± 61446.42	67096.15 ± 175808.67	1.523	0.230
M (*min-max*)	8392 (3656-17381)	11109 (4311-163757)	18516 (2288-650169)		
	Number of sentences				
X ± *SS*	179.81 ± 78.63	1343.18 ± 1737.81	1719.92 ± 4344.73	1.781	0.181
M (*min-max*)	156 (71-325)	352 (94-5019)	461 (63-16115)		
	Number of paragraphs				
X ± *SS*	104.71 ± 53.53	886.18 ± 1134.23	1026.31 ± 2644.70	1.810	0.176
M (*min-max*)	90 (37-228)	201 (14-3164)	299 (38-9798)		
	Average word				
X ± *SS*	2.83 ± 0.12	2.91 ± 0.23	2.77 ± 0.16	2.058	0.140
M (*min-max*)	3 (3-3)	3 (2-3)	3 (3-3)		
	Average sentence				
X ± *SS*	7.31 ± 1.96 [a]	5.53 ± 2.11 [b]	5.42 ± 1.05 [b]	5.952	0.005
M (*min-max*)	7 (3-11)	5 (4-12)	5 (4-8)		

In Table 4, the comparison of Ateşman and Çetinkaya-Uzun readability scores of web-based information sources according to the type of site is analysed. According to Ateşman's readability formula, the median values were found to be 66 (65.89±8.48) for pages produced by companies, 67 (67.53±5.29) for resources produced by universities, and 74 (73.26±7.10) for journal/book/newspaper resources. It was determined that the average readability of journal/book/newspaper sources was statistically higher than that of company and university sources ($p<0.05$). According to Çetinkaya-Uzun's readability formula, the median values were 38 (38.08±4.33) in the pages produced by companies, 37 (37.86±4.37) in the sources produced by universities and 42 (42.26±4,41) in the journal/book/newspaper sources. It was

determined that the average readability of journal/book/newspaper sources was statistically higher than that of company and university sources ($p<0.05$).

Table 4.
Comparison of Ateşman and Çetinkaya-Uzun Measurements According to the Type of Site (n=45)

	Website type			*F*	*p*
	Company	University resources	Magazine/Book/New spaper		
	n=21	*n*=11	*n*=13		
Ateşman					
X ± *SS*	65.89 ± 8.48 [b]	67.53 ± 5.29 [b]	73.26 ± 7.10 [a]	4.053	0.025
M (*min-max*)	66 (45-79)	67 (60-76)	74 (61-86)		
Çetinkaya					
X ± *SS*	38.08 ± 4.33 [b]	37.86 ± 4.37 [b]	42.26 ± 4.41 [a]	4.411	0.018
M (*min-max*)	38 (27-45)	37 (32-47)	42 (33-49)		

According to Table 5, the value of the agreement between the parameters of web-based information sources obtained according to Ateşman and Çetinkaya-Uzun's readability formulae was found to be 88.6%, and the result was statistically significant. According to this result, it was determined that there was perfect agreement between the scores obtained for the whole sample between Ateşman and Çetinkaya-Uzun's readability formulas according to Landis and Koch's (1977) classification ($p<0.05$). In this sense, it can be stated that the readability formulae produced similar results.

Table 5.
Inter-rater agreement (reliability) analysis between Ateşman and Çetinkaya-Uzun values (n=45)

Reliability analysis	Ateşman - Çetinkaya
ICC	0.886
(95% *CI*)	(0.793-0.937)
p	<0.001

'Intraclass Correlation Coefficient (ICC); CI: Confidence interval.'

5. Discussion and Conclusion

The study evaluated the first fifty web pages obtained from searching the relevant keyword in the 'Google' search engine and eliminating repetitive web pages according to the inclusion and exclusion criteria. The study was carried out with 45 web pages that meet these criteria. Content analysis, readability calculation, and statistical analyses of the data obtained from web-based information sources were performed. It was observed that the web pages of various companies, academic texts, and the contents prepared by experts in the field of education were more common among the data sources. It is noticeable that the focus of the topics addressed in the texts is game-based learning. While the highest number of data sources are in the medium difficulty category according to Ateşman's readability formula, they are at the educational reading level according to Çetinkaya-Uzun's readability formula. According to both formulae, the average readability of journal/book/newspaper sources is statistically higher than that of company and university sources. It can be stated that the readability formulae produce similar results.

The subject areas of the internet resources examined in the research are the determination of the advantages and disadvantages of the game, conceptualisation of the game, the use of

game-based learning as a teaching method in the educational process, the process of recognising and monitoring the child, examples of different types of games, the benefit of the child's development, the use of games in special education, learning through digital games. In the literature, there is no research on the readability of games in education. According to the research findings, it is thought that the results of bibliometric analyses related to the game will support this finding based on the high number of academic texts in web-based information resources. In these studies, game-based learning, digital games, educational games, and learning/teaching strategies came to the fore (Boztepe & Koç, 2022; Ergin & Ergin, 2022).

The readability analysis of 45 web-based texts accessed within the framework of the criteria determined in the research was carried out. In this context, the web-based resources analysed were divided into three groups. These were categorised as a company, university source, magazine/book/newspaper. As a result of the descriptive analysis of the data, it was concluded that in terms of readability level, according to the Ateşman formula, internet resources were primarily found in the medium difficulty category, and according to the Çetinkaya-Uzun formula, most resources were found at the educational reading level. Sezin and Sarpkaya (2023) found that the Ateşman score of their study on sound hygiene was at medium difficulty, and the Çetinkaya-Uzun score was at the educational level. In the studies, results were obtained that there was a difference in the classification of Ateşman and Çetinkaya-Uzun scores (Perker et al., 2024). In parallel with the similar results obtained in both formulae in this study, Tahir and Kent (2021) also obtained similar results in their research. They pointed out that texts must be 'readable at a similar level.' However, for texts to be comprehensible for individuals, 8-9 years of education level is required in the educational reading category or 10-12 years of education level is required in the problematic or disabled reading category (Köse, 2009). Studies conducted in different disciplines found that the difficulty level of the texts was sixth grade and above (Armache et al., 2024; Eryılmaz et al., 2022; Kozanhan & Tutar, 2017). In light of this information, it is concluded that the texts related to games in education are primarily academic, and individuals who access these texts should have at least a secondary education level. When this result is evaluated in the context of literacy, it is thought that the texts should have more straightforward and more understandable content.

The 45 web-based resources accessed in the study were analysed based on text type and author profession. As a result of the analysis, it was concluded that journal/book/newspaper sources and university sources are more academic than company sources. In addition, according to the author's profession, the analysis determined that the group with the highest number of educator authors was university and journal/book/newspaper sources. In line with the results of the study, as Perker et al. (2024) conclude, the authors of the text were mainly experts in their field in their study on the readability of internet-based Meniere's information texts. In addition, in the study conducted by Sezin et al. (2023) regarding the author's profession, it is in parallel with the study results that the authors of internet-based texts are more academic. As a result of the results of the text type analysis and author profession in internet-based applications, it is thought that an educator or academic author mostly writes the contents for internet information pages, and these texts belong to the personal page or article of the relevant authors.

In the study, descriptive statistics of the web pages were made, and no significant difference was found according to the site type in the analyses other than the average number of sentences. It was concluded that the scores related to the average number of sentences were

significant in favour of the company. Similar to the research findings, Tahir and Kent (2021) found no difference in the number of words, complex words, and average number of syllables of internet resources related to dizziness according to resource types. Sezin et al. (2023) found that the average number of words per sentence on personal and hospital websites was more significant than the texts on magazine/newspaper websites. In parallel with the study's findings, the results are similar to those related to personal and hospital website texts since the type specified as a company in the study covers expert pages and information pages of educational institutions.

The study compared Ateşman and Çetinkaya-Uzun measurements according to the site type. As a result of the analysis, it was determined that the highest readability average belongs to the magazine/book/newspaper type according to Ateşman and Çetinkaya-Uzun formulas. Similar to the study, Sezin et al. (2023) and Duymaz et al. (2023) concluded that newspaper/magazine text type was significant in terms of Ateşman and Çetinkaya-Uzun score compared to personal and hospital websites texts. In the results of the study, the fact that the average readability of the texts of magazine/book/newspaper websites was found to be high in both formulae suggests that the sample of these resources is more inclusive than other types and is at a level that all individuals can access and understand regardless of their educational status. This result is also consistent with the reliability analysis of the formulas.

In summary, play, an essential part of lifelong learning, is discussed in this research. Since education is a lifelong process starting from birth, the game is seen as an effective method in every development period. With the widespread use of the Internet and digital tools worldwide, individuals have found themselves in the virtual world. Today, web resources are a guide for patients, families, teachers, academicians, and almost the whole society. The ease of access to information resources has led to the diversification of resources regardless of literacy status in web environments. In this study, the game method in education, which was analysed for readability, provided a qualitative and quantitative description of these data. The findings of this study, which is contextually unique in educational sciences, reveal how the concept of games in education is handled in the web environment and its comprehensibility for individuals.

6. Limitations and Recommendations

This research deals with the game method in education in web-based information resources and is limited to the data sources obtained from the 'Google' search engine. In this sense, not using different data sources related to the same concept is a limitation. However, it is thought that the pages evaluated within the scope of the study represent the subject. Evaluations can be made using different written documents and databases related to the same concept. The verifiability of the results can be increased by expanding the criteria. The methods and visuals used in the study can be diversified. Studies can be designed this way, focusing on the topics and concepts of different disciplines.

Note on Ethical Issues

The author confirms that the study does not need the ethics committee's approval, according to the research integrity rules in their country (Approval Date: 04/08/2024).

Conflict of Interest

The authors declare no conflict of interest.

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