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DEVELOPMENT OF THE ONLINE RESEARCH AND READING COMPREHENSION SKILLS SCALE FOR MIDDLE SCHOOL STUDENTS[1]

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Abstract

Nowadays, online research and reading comprehension skills are among the prominent concepts. It is not possible to deny the effects of the internet on students' daily and academic lives. In the study, a scale was developed to be used in order to reveal the level of internet use of middle school students in their research processes and to determine the level of online research and reading comprehension skills. In the development of the scale, the relevant literature and curriculum were examined, the findings obtained from the interviews and observations with the students were used, and the opinions of the field experts were taken. As a result of all these operations, an item pool and a draft scale form were created for the instrument. The prepared form was applied to middle school students and explanatory and confirmatory factor analyses were conducted on the obtained data. As a result of the analyses, it was seen that the scale contains 30 items and the items of the scale were collected in five factors. It is thought that the instrument developed to determine the online research and reading comprehension skills levels of students has the potential to contribute to the related literature.

Keywords: Online research, reading comprehension, internet searching, middle school students.

INTRODUCTION

Information technologies affect the field of education deeply as well as every area of life as it thought. Now, we are in an era dominated by digital tools, not pens and paper any more. With these new tools, the concept of literacy has also changed. In addition to traditional literacy, which includes the ability to read and create certain symbols, digital literacy, internet literacy, multi-layered literacy, functional literacy, and other new types of literacy have entered into our lives (Kurudayıoğlu and Tüzel, 2010).

Students who are in the middle of digital literacy, internet literacy, multi-layered literacy, functional literacy and other new types of literacy are considered to be “digital natives”. Digital natives' reading, writing and communication practices have been an important area of research for media literacy researchers and teachers for the last few years. Little information is available about students' online activities, perceptions, preferences, and skills.

Lawless and Schrader (2008) stated that the internet had become a dominant source in today's digital world. The internet-related changes have led educators, researchers, politicians and administrators to think about what it is to read and understand online information. However, little is known about students’ understanding of what they read online on the internet and the strategies and processes they use to research online. New literacy of online research and understanding has recently become known. Countries such as Australia, Canada and the United States of America aim to integrate this research into new curricula and educational standards (Leu, McVerry, O’Byrne, Kiili, Zawilinski, Everett-Cacopardo, 2011; Leu, Zawilinski, Forzani, & Timbrell, 2015).

[1] This study was carried out as a doctoral thesis prepared by Süleyman Ünlü and executed by Prof. Dr. Musa Çifci

It is suggested that the internet and other information and communication technologies (ICTs) significantly change literacy skills over time (Coiro, Knobel, Lankshear, & Leu, 2008). The increasing importance of the internet, especially as an essential tool in our everyday and working life, necessitates new ways of thinking about both new literacy skills and traditional literacy skills required for competence on the internet. As a result of these developments regarding the internet, the concept of literacy affects our ability to comprehend critical evaluation of information, synthesize texts and read online. Indeed, critical evaluation has become one of the most important skill sets that readers need today (Goldman, Lawless & Manning, 2012; Wiley, Goldman, Graesser, Sanchez, Ash, Hemmerich, 2009).

Dual-Level Theory of New Literacy

Due to the rapidly developing nature of literacy, the object we are trying to research is constantly changing and redefined. Thus, the dual-level theory of new literacy has been proposed (Leu, Kinzer, Coiro, Castek & Henry 2013). One of the principles of new literacy (Leu, Kinzer, et al., 2013) is that the internet allows new social applications with technologies such as instant messaging, social networks, blogs, wiki and e-mail (Greenhow, Robelia and Hughes, 2009; Lewis and Fabos, 2005).

The internet is seen as an important tool in the development of new literacy skills. Skills in information and communication technologies also constitute the content area of new literacy. As Coiro et al. (2008a) stated, both information and communication technologies and online environments such as the internet YouTube, blog, Facebook, Twitter and forum created environments for the use of literacy skills.

In today's world, because of the constantly changing social applications and information communication technologies, it is difficult to make a definition of a concept which is also changing continuously. Today, the concept of literacy is tried to be defined through different theories and perspectives such as literacy as a new discourse (Gee & Handford, 2013), multimodality (Kress, 2003), multi-literacy (New London Group, 1996), information and communication technologies literacy (International ICT Literacy Panel, 2002) and digital literacy (Martin, 2006) (as cited in Yamaç, 2018). Researchers, on the other hand, are trying to gather these theories and perspectives under a single roof called the dual-level new literacy (Leu et al., 2015; Leu et al., 2013). The first one is "new literacy in lowercase letters" and the second is "New Literacy in Capital Letters".

The basic principles of the New Literacy with Capital Letters Theory are as follow (Leu et al., 2013, p.1158):

- The Internet is the descriptive technology for literacy and learning in our global society.
- New literacy is needed to take full advantage of the internet and related technologies.
- New literacy is a concept that is constantly changing.
- New literacy is a multiple, multi-format and multi-modal literacy.
- The basis of new literacy is critical literacy.
- New types of strategic knowledge are required along with new literacy.
- New social practices are the basic element of new literacy.
- Teachers have an even more important function in literacy education with the change of their roles.

Leu et al. (2013) believe that these principles are useful for informing the "Theory of New Literatures" and to guide the development of new literary (lower-case) theories, many of which are emerging and developing. An example of the lowercase theory of new literacy developed is to understand online research and reading. In these online research and reading comprehension studies (Leu et al. 2013 p. 1164), 6 key elements are emphasized.

1. Online research and reading comprehension is a self-regulated process, as each reader can follow a unique method of structuring information and text.

2. There are five steps that define the process of online research and reading comprehension: (1) identification of a problem (2) reaching information to solve a problem (3) evaluation of the information, (4) synthesis and (5) reporting.

3. Online research and reading comprehension differ from offline reading, thus requiring additional skills and strategies.

4. Online content can be supportive, especially for some individuals who have difficulty in reading.

5. It cannot be said that adolescents are always skilled at online research and comprehension.

6. It can be said that collaborative online reading and writing practices increase understanding and learning skills (Leu et al., 2013, p. 1164).

Unlike the 8 principles expressed in capital letters, these 6 principles expressed in lowercase letters guide researchers in online research and reading comprehension.

We can express the new dual-level literacy theory, consisting of literacy with capital letters and literacy with lowercase letters, as follows: It would be beneficial to use this theory in order to discover new theory fields. Also, the lowercase letter literacy research can inform the capital letters literacy theory over time. Leu et al. (2013) stated that if traditional paradigms were used, we might not be able to keep up with the rapidly changing literacy environment. They also stated that we needed new epistemologies and research practices that kept pace with the rapid changes we envisioned, as new literatures are constantly changing (p. 1171). The dual-level literacy theory with lowercase and capital letters will help researchers understand online reading, read again, and understand social applications.

Online research and understanding begin with a question. The information needed to solve this question often leads the online research and understanding process (Zhang and Duke, 2008). Online readers often access information via search engines (Afflerbach, 2015). Online readers evaluate selectively in achieving results that are relevant to research questions. The ability to synthesize the information obtained as a result of the evaluation is an important aspect of online research and understanding (Deschryver & Yadav, 2015; Goldman et al., 2012). Readers choose important ideas from multiple sources and organize them to create a consistent understanding of the topic and compare similar and different aspects of these ideas (Cho & Afflerbach, 2015; Rouet, 2006; Strømsø, Bråten and Britt, 2010). Readers then integrate these ideas by creating unifying links to make consistent statements in writing (Spivey and King, 1989).

Purpose of the Study

In the current study, it is aimed to develop a scale to measure the online research and reading comprehension skills of middle school students (6^{th}, 7^{th} and 8^{th} grades). Today, there are not enough measurement tools to evaluate the online reading needs of middle school students. With this study, it is thought that some contributions will be made to the related literature. In accordance with this purpose, all steps of online research and reading are followed in the study: in the first stage, the problem is identified; in the second stage, information necessary to solve the problem is obtained; in the third stage, critical reading is performed to evaluate the data obtained; in the fourth stage, the obtained information is synthesised and in the last stage, the constructed information is shared via online tools with others.

METHOD

Participants

A total of 469 students attending eight middle schools in the central district in the city of İzmir participated in the current study. The mean age of the participating students is 12.3 (Sdev: 0.4). Of the participating students, 51.1% are males and 49% are females. Of the students, 149 (32%) are 6^{th} grade students, 163 (35%) are 7^{th} grade students and 157 (34%) are 8^{th} grade students.

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Table 1. Demographic characteristics of the sample

Participants	f	%
6th grade	149	31.8
7th grade	163	34.8
8th grade	157	33.5
Total	469	100.0

The participating students were found to be medium level internet users in general. Four students out of every ten students (43%) stated that they had been able to have access to content in the internet environment for three years while the internet history of the remaining students was found to be varying between one year and four years. The students' frequencies of daily internet use were close to each other.

Table 2. Time of the İnternet use

Frequency of internet use	f	%
1-2 hours a day	152	32.41
3-4 hours a day	169	36.03
More than 4 hours a day	148	31.56
Total	469	100.0

Measurements

The Online Research and Reading Comprehension Skills Scale (ORRCSS) was developed to determine students' level of internet literacy and it is a 30-item self-assessment scale. In the development of the scale items, first the literature on online research and reading comprehension skills was reviewed (Coiro, 2005; Coiro and Dobler, 2007; Coıro, & Putman, 2016; Coiro, & Kennedy, 2011; Gambrell et al., 1996; Greene et al., 2011; Kiili,, Coiro, & Hämäläinen, 2016; Kiili, Leu, Utriainen, Coiro, Kanniainen, Tolvanen, et.al. 2018; Leu, Forzani, Burlingame, Kulikowich, Sedransk, Coiro, et.al. 2013; Leu, McVerry, O'Byrne, Kiili, Zawilinski, Everett, Cacopardo, et.al. 2011; Leu, Zawilinski, Forzani, & Timbrell, 2014; Li, 2020; Moos and Azevedo, 2008; Putman, 2014; Zawilinski, Carter, O'Byrne, McVerry, Nierlich, & Leu, 2007).

The scale items were designed in the form of a five-point Likert scale ranging from "Never" to "Always".

The scale was developed to include five sub-scales to determine middle school students' online research and reading comprehension skills. Brief information was given about these sub-scales below:

1. Problem posing and defining (has 4 items. Sample item: "I do not waste time on irrelevant subjects while researching in the internet.")
2. Having access to online information (has 9 items. Sample item: "I can use the "Advanced Search" option in the tools menu of the opening page of Google, Bing and Yandex.")
3. Analysing online information (has 7 items. Sample item: "I pay attention to whether pictures, sounds and other visuals on the web page are in compliance with my goal.")
4. Synthesising online information (has 7 items. Sample item: "I can determine the different, similar or contradictory aspects of the bits of information on different web pages.")
5. Conveying information by using multimedia (has 3 items. Sample item: "I can attach files to communication tools such as WhatsApp, Facebook Messenger, e-mail.")

Data Analysis

In the analysis of the collected data, SPSS 21.0 and AMOS Graphics were used. First, descriptive statistics and correlation analysis were employed and then structural equation modeling (SEM) and bootstrapping were conducted. In order to test the hypotheses of the relationships among career adaptability, EI, striving for a goal, and setting life goals, the SEM approach was used. On the basis of what has been recommended by Anderson and Gerbing (1988), first, confirmatory factor analysis was used to test whether the measurement model had an acceptable fit to the data. After the measurement model was confirmed, the maximum likelihood method was used to analyze the serial structural model. Chi-square statistic (χ^2), χ^2/df ratio, CFI, RFI, GFI, TLI, SRMR, and RMSEA χ^2/df ratio < 5; SRMR and RMSEA < .08; and CFI, RFI, GFI, and TLI > .90 were used as cut-off criteria in the evaluation of the fitness of the SEM (Hu & Bentler,1999; Kline, 2015). Finally, a bootstrapping procedure with 10,000 bootstrapped samples was used to determine the significance of the mediation effects. As proposed by Hayes (2013), the presence of significant mediation (i.e. an indirect effect) was determined when the 95% bias-corrected bootstrap confidence interval (CI) did not contain 0. While testing mediation, the bootstrapping procedure is preferred more as it has some advantages over Baron and Kenny (1986) and Sobel's (1982) traditional approaches (Hayes, 2015; Preacher et al., 2007).

RESULTS

In the current study, first, attempts were made to establish the content validity. To this end, a four-stage action plan was implemented: 1. Review of the relevant literature and curricula, 2. Analysis of the documents obtained from the interviews conducted with middle school students and observation notes, 3. Development of the item pool, 4. Interviews with field experts.

In the relevant literature, research on online research and reading comprehension was reviewed. Moreover, the content of information technologies and Turkish courses were examined and the relevant objectives were determined. The skills that could be related to online research and reading comprehension were listed such as how to conduct a search on the harms of radiation emitted by phones in search engines, how to limit the search, how to select key words and how to select the best results in search engines.

In the interviews conducted with the students, the issues stated by the students in relation to online research and reading comprehension were determined and the data obtained from the observation forms were evaluated together with the students' journals. In this way, the students' opinions about online research and reading comprehension were determined and thus the items were written and added to the item pool.

In the item pool constructed, there were a total of 44 items. Then the draft scale was submitted to the review of five field experts (two teachers, three academicians) and two measurement and evaluation experts. In light of the feedback received from the experts, a total of 14 items were discarded from the pool and some changes were made on some of the remaining items.

The scale was then submitted to expert review again and it was agreed that this form of the scale could be administered to students. The data collected were analyzed in SPSS program package.

In this process, exploratory and confirmatory factor analyses were conducted. In order to evaluate the theoretical factor structure of the scale determined by the researcher and to reduce the item numbers into fewer factors, principal components factor analysis was carried out (Tabachnick and Fidell, 2001).

First, Kaiser-Meyer-Olkin sampling adequacy measurement was performed to investigate the adequacy of the data set for more analyses and the value was calculated to be 0.903. Barlett's Sphericity test was found to be significant (p <.001).

[*KMO* = .903, Barlett's Sphericity Test: App. *Chi-square* = 7458.52; *df* = 435, *sig* = .000].

Second, principle components analysis was conducted without rotating and a construct with 6 factors having eigenvalue higher than 1 was obtained. This construct explains 63.13% of the total variance. When the Scree plot was examined, it was seen that there is a high momentum fall after the fifth factor. Thus, it was decided to test the five-factor construct.
Oblique rotation method was preferred for testing the five-factor construct, since the items in the online research and reading comprehension skills scale are related to skills and include self-assessments of students. According to Tabachnick and Fidell (2001), attention should be paid to have coefficient values above .30 to adapt the scale items to the relevant factor construct. Then, to reveal the level of relationship between the factors and to determine the item-factor interaction, rotation analysis was performed both vertically and obliquely (using direct oblimin technique and 0 delta value).

In the tables below (Table 3), findings from the factor analysis are presented.

Table 3. Rotated design matrix of the online research and reading comprehension skills scale (principle components analysis)

Items	Mean	Std.Dev.	F1	F2	F3	F4	F5
1. When I encounter new information on the Internet, I know I can find better of this information.	3.11	1.49	-.034	.092	.018	.540	-.069
2. I do not waste time on irrelevant subjects while researching in the internet.	3.13	1.42	-.002	.035	-.089	.861	.018
3. I know how to research which topic in the internet.	2.58	1.41	-.131	-.053	.043	.858	-.009
4. I know how to research a topic I am researching in the internet without confusing it with other topics.	3.45	1.37	.200	-.013	.082	.560	-.003
5. I know how to use search engines (such as Google, Bing, Yandex, Yahoo, AOL) to find information in the internet.	4.26	1.37	.838	.155	-.042	-.060	-.017
6. I can access my previous search by browsing the history menu of advanced search engines like Google, Bing and Yandex.	4.44	1.19	.846	.092	-.072	-.022	-.048
7. When deciding on the web page I will enter, I pay attention to the type of results listed on the search page such as video, visual, news.	4.71	.93	.777	-.138	.067	.015	.030
8. If I do not get results with the words I use in a Google search, I change the words.	4.60	.99	.788	-.021	.032	.077	.106
9. I know what the extensions like com, org, gov, edu, net mean.	4.34	1.32	.887	.153	-.090	-.051	.022
10. I use “quotation marks” and detailed search tools when needed.	4.35	1.32	.865	.083	-.062	-.014	-.015
11. I know that in Google search, there may be useful information in its lower ranking sites.	4.65	.97	.784	-.133	.072	.005	-.035
12. I can choose the web page according to the short explanations below the web addresses.	4.44	1.19	.570	-.038	.205	.061	-.085
13. I can use the "Advanced Search" option in the tools menu on the opening page of Google, Bing and Yandex.	4.14	1.42	.535	.128	.127	-.007	-.111
14. Since I know that the words written in bold, CAPITAL LETTERS, *italic* and underlined, I pay attention to these words first.	2.50	1.27	.008	.733	-.098	.120	-.071
15. I pick the ones that work for me from the information I find on the website.	3,23	1.48	.136	.709	.022	-.038	-.028
16. I can understand the purpose of creating images, audio or video recordings on the web page.	4.14	1.31	-.075	.807	.094	-.066	.124
17. I check the reliability of the page that I will open by paying attention to the extensions like edu, gov, com in the results listed on the page at the end of the search.	3.75	1.50	-.032	.813	.131	-.060	.069
18. I check the conformity of the writings on the web	3.23	1.50	.058	.778	-.008	-.016	-.091

page to the spelling rules.							
19. I pay attention to whether the images, sounds and other visuals on the web page comply with my purpose.	3.08	1.50	.031	.782	-.048	.104	-.084
20. I pay attention to the date on which the information in the website was created.	3.96	1.48	.052	.658	.015	.105	-.032
21. I prepare a new assignment by associating the information, images and videos I have obtained from different websites.	4.26	1.35	-.080	.094	.804	-.021	-.003
22. I question the suitability of the information on the website for the subject I am researching.	4.29	1.33	.065	.013	.664	.058	.134
23. I check the reliability of the web page by looking at the site extensions such as com, edu gov, sections such as "contact - about us" and whether there are any spelling errors.	4.75	.75	.076	-.025	.576	.095	.112
24. I pay attention to the interest in and expertise on the subject of the person who created the information on the web page.	4.11	1.45	.004	.084	.730	-.088	-.111
25. I compare the information on the web page with the information from different sources and reach a conclusion.	4.23	1.32	.214	.159	.383	.083	.055
26. I rearrange the thoughts on the web page from my own perspective.	4.14	1.42	-.023	.006	.694	.026	-.127
27. I can identify similar, different, or contradictory aspects of information on different web pages.	4.29	1.27	.029	-.070	.653	-.029	-.146
28. By using video, sound recording, visuals and written texts, I convey to the reader clearly what I want to tell.	2.69	1.42	-.014	-.013	.098	-.022	-.781
29. I convey the information I obtained from the web page to the concerned people by using tools such as blog posts, YouTube video, e-mail, Facebook Messenger, WhatsApp, Twitter, and Instagram.	2.98	1.39	.011	.000	.013	.003	-.831
30. I can attach files to communication tools such as WhatsApp, Facebook Messenger, e-mail.	2.95	1.43	.042	.047	-.046	.102	-.754
Eigenvalue			9.07	2.92	2.44	1.85	1.59
Percentage of Variance			30.25	9.75	8.14	6.20	5.30
Cronbach Alpha Reliability			.93	.89	.82	.70	.75
Total Variance: 59.63%							
Total Reliability of the Scale: .909							
Principle Components Analysis.							
Oblimin with Kaiser Normalization.							

As a result of the analysis, the five-factor construct in the online research and reading comprehension skills scale was found to account for 59.63% of the total variance and the total reliability coefficient of the scale was found to be .90.

The first factor is labelled as having access to online information and includes 9 items. This first factor explains 30.25% of the total variance. Its Cronbach alpha internal consistency coefficient was calculated to be .93. The factor loadings of the items in this factor were found to be ranging from .887 (I know what the extensions like com, org, gov, edu, net mean.) to .535 (I can use the "Advanced Search" option in the tools menu on the opening page of Google, Bing and Yandex.). The majority of the item factor loadings in this factor were found to be higher than .75.

The second factor is labelled as analysing online information and includes 7 items. This second factor explains 9.75% of the variance. Its Cronbach alpha internal consistency coefficient was calculated to be .89. The factor loadings of the items in this factor were found to be ranging from .813 (I check the reliability of the page that I will open by paying attention to the extensions like edu, gov, com in the results listed on the page at the end of the search.) to .658 (I pay attention to the date on which the information on the website was created.). The majority of the item factor loadings in this factor were found to be higher than .70.

The third factor is labelled as synthesising online information and includes 7 items. This third factor explains 6.20% of the variance. Its Cronbach alpha internal consistency coefficient was calculated to be .82. The factor loadings of the items in this factor were found to be ranging from -.804 (I prepare a new assignment by associating the information, images and videos I have obtained from different websites.) to .383 (I compare the information on the web page with the information from different sources and reach a conclusion.). The majority of the item factor loadings in this factor were found to be higher than .65.

The fourth factor is labelled as problem posing and defining and includes 4 items. This fourth factor explains 8.14% of the variance. Its Cronbach alpha internal consistency coefficient was calculated to be .70. The factor loadings of the items in this factor were found to be ranging from .861 (I do not waste time on irrelevant subjects while researching in the internet.) to .560 (I know how to research a topic I am researching in the internet without confusing it with other topics.). The majority of the item factor loadings in this factor were found to be higher than .65.

The last factor is labelled as conveying information by using multimedia and includes 3 items. This fifth factor explains 5.30% of the variance. Its Cronbach alpha internal consistency coefficient was calculated to be .75. The factor loadings of the items in this factor were found to be ranging from -.831 (I convey the information I obtained from the web page to the concerned people by using tools such as blog posts, YouTube video, e-mail, Facebook Messenger, WhatsApp, Twitter, Instagram.) to -.754 (I can attach files to communication tools such as WhatsApp, Facebook Messenger, e-mail.).

Pearson product-moment correlation coefficients were calculated between the total correlations of the five sub-scales called having access to online information, analysing online information, problem posing and defining, synthesising online information and conveying information by using multimedia (Cohen, 1988) and are presented in Table 4:

Table 4. Correlations between the Sub-scales of the online research and reading comprehension Skills Scale

	HAOI	AOI	SOI	PPD	CIUM
HAOI	1	.233**	.270**	.259**	.286**
AOI		1	.452**	.527**	.212**
SOI			1	.349**	.242**
PPD				1	.273**
CIUM					1

**p<.05

“HAOI: Having access to online information”; “AOI: Analysing online information”; “SOI: Synthesising online information”; “PPD: Problem posing and defining”; “CIUM: Conveying information by using multimedia”.

Strong correlations were observed between the first, third and fourth factors. Significant correlations were observed between the first and fifth factors and the second, third and fourth factors. All the correlations observed are significant at the level of 1%.

Confirmatory factor analysis was conducted for the next stage. In order to confirm the 30-item and 5-factor construct of the scale, the structural equation model was constructed in IBM Amos program.

In order to evaluate the results of the confirmatory factor analysis, the ratio of Chi-square to the degree of freedom, RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Square Residual) TLI (Tucker-Lewis Index) and CFI (Comparative Fit Index) were used.

The ratio of Chi-square to the degree of freedom was found to be ($\chi 2$ /df) 2.58 (1011.93/391); RMSEA value was found to be .058; TLI value was found to be .906 and CFI value was found to be .915. When the standardized RMR value was examined, the fit index was found to be

.068. In general, the model yielded acceptable fit values. The standardized parameter values obtained for the online research and reading comprehension Skills Scale through the confirmatory factor analysis are given in Figure 1.

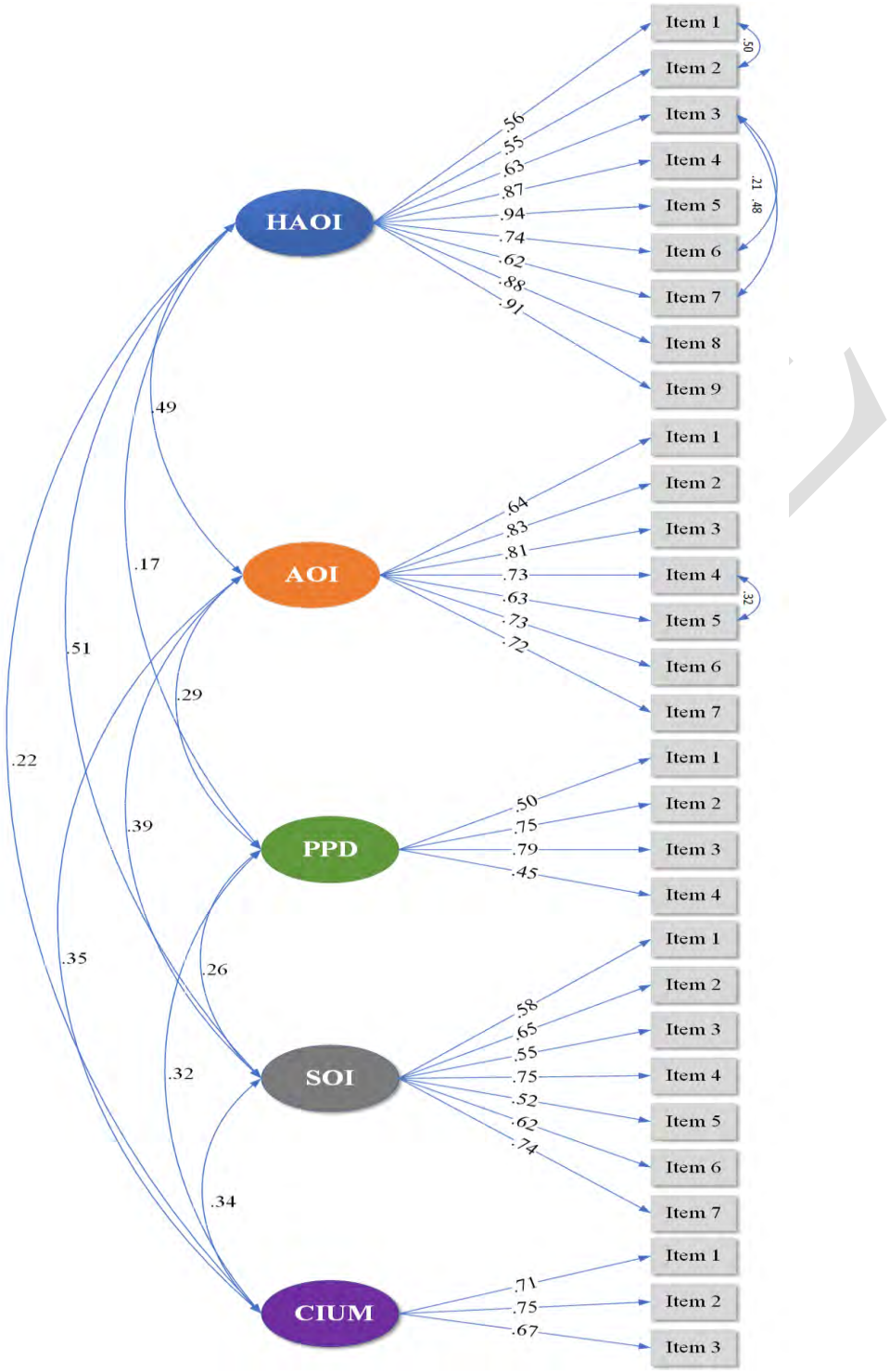

Figure 1. Online research and reading comprehension skills scale confirmatory factor analysis path scheme "standardized values"

Note. "HAOI: Having access to online information"; "AOI: Analysing online information"; "PPD: Problem posing and defining"; "SOI: Synthesising online information"; "CIUM: Conveying information by using multimedia".

DISCUSSION and CONCLUSIONS

Today, in line with the development of technology, the concept of literacy is changing and redefined. In order to adapt to the conditions of the technology age we are in, it is necessary to use the internet effectively together with information technology. Starting from the first stages of education, it is important to develop students' skills in using the internet, accessing information and organizing it as they need. In this context, we see that the concept of online research and reading comprehension comes to the fore.

While there are studies of online reading conducted on university students in Turkey, there is a very limited number of studies conducted with the participation of primary and middle school students. Among the studies conducted on university students, Baştuğ (2015) aimed to develop the online reading strategies scale. The participants of the study are 371 pre-service teachers attending the Elementary School Teaching Department of Niğde University. The collected data were subjected to exploratory and confirmatory factor analysis. As a result of these analyses, a construct consisted of 16 items gathered under 4 factors ("purposeful reading", "reading readiness", "selective reading" and "checking reading") was obtained. Geçer & İra (2014) aimed to adapt the scale of information seeking and interpretation strategies in the web environment developed by Wu and Tsai (2005) to Turkish. The study was conducted with the participation of a total of 676 pre-service teachers attending the Technical Education Faculty and Education Faculty in Kocaeli University. As a result of the study, a construct consisted of 23 items and 6 factors was obtained. Altay and Altay (2017) investigated the effect of online reading activities of the students learning English as a foreign language and their metacognitive reading strategies on their reading achievement scores. Ulusoy and Dedeoğlu (2015) examined the pre-service teachers' perceptions of their comprehension strategies they use while performing e-reading and of their using e-literacy and comprehension strategies in the classrooms where they will teach in the future. Askar & Mazman (2013) adapted the "Online Information Seeking Inventory" developed by Tsai (2009) into Turkish and conducted reliability and validity studies of the adapted inventory. There were a total of 788 participants of the study. After the translation of the scale, first level and second level confirmatory factor analyses were conducted for validity studies while Cronbach Alpha coefficient and McDonald's omega coefficient were calculated for reliability studies. As a result of the confirmatory factor analysis of the inventory consisted of 25 items and 7 factors ("getting lost", "evaluation", "purposeful thinking", "distinguishing basic ideas", "trial and error", "control" and "problem solving"), the model was found to have a good fit.

The number of the studies on middle school students seems to be very limited. Henkoğlu, Keser, & Mahiroğlu (2017) developed a measurement tool to determine the information seeking strategies used by middle school students in the internet. As a result of the factor analysis, the scale was found to have an eight-factor structure. Aydemir, Sakız & Doğan (2019) aimed to develop a valid and reliable alternative evaluation tool to measure the digital literacy skills at elementary level. The study group of the study is comprised of 31 elementary school fourth grade students. The Digital Literacy Skills Rubric (DLSR) was developed on the basis of the ORCA (Online Reading Comprehension Assessment-Elementary) used by Kingsley (2011). The reliability of the rubric was tested through internal consistency coefficient, item analysis, Fleiss Kappa coefficient and inter-rater reliability while its validity was tested through expert opinions and Pearson Product-Moment Correlation Coefficient. Thus, it is seen that there is a need for an online research and reading comprehension skills scale for middle school students.

The online research and reading comprehension skills scale to be developed in the current study for middle school students' skills to encourage readers to think critically, such as defining the problem, formulating questions and analysing and synthesizing various online resources, and communicating the acquired information to the necessary people is different from other scales developed before with its features and it is believed to fill an important gap in the literature.

In the current study, the online research and reading comprehension Skills Scale was developed, which is thought to contribute to the development of online research and reading comprehension levels of middle school students. The scale has the potential to provide middle school students with useful information for their ever-changing research and data access needs in the context of technology. In addition, it can be said that the scale will contribute to researchers on how students access information on the internet, how they organize the information they access, how they use the information, and how they select information and turn it into useful information.

On the basis of a literature review, the item pool was constructed. As a result of the analysis, a construct consisted of 30 items and 5 factors was obtained. Moreover, within the context of the reliability study, internal consistency coefficients were calculated. Seçer (2015) stated that an internal consistency coefficient that was .70 or higher was acceptable. In the current study, the internal consistency coefficients calculated for the sub-dimensions of the scale were found to be ranging from .70 to .93. A construct whose item loadings vary between .65 and .82 was obtained.

The first factor named as having access to online information and consisting of 9 items was found to be explaining 30.25% of the variance and its Cronbach alpha internal consistency coefficient was calculated to be .93. In this factor, the majority of the item factor loadings were found to be higher than .75. The second factor was named as analysing online information and included 7 items. This second factor explained 9.75% of the variance and its Cronbach alpha internal consistency coefficient was calculated to be .89. In this factor, the majority of the item factor loadings were calculated to be higher than 0.70. The third factor named as synthesising online information and including 7 items explained 6.20% of the variance and its Cronbach alpha internal consistency coefficient was calculated to be .82. In this factor, the majority of the item factor loadings were calculated to be higher than .65. The fourth factor was labelled as problem posing and defining and included 4 items. This fourth factor explains 8.14% of the variance and its Cronbach alpha internal consistency coefficient was calculated to be .70. In this factor, the majority of the item factor loadings were calculated to be higher than .65. The last factor named as conveying information by using multimedia and including 3 items explained 5.30% of the variance and its Cronbach alpha internal consistency coefficient was calculated to be .75. In this factor, the item factor loadings were calculated to be -.781, -.831, and -.754.

The scale items are designed in the form of a five-point Likert scale ranging from Never=1 to Always=5. The scale can be evaluated over the total score taken from the scale or over the scores taken from its sub-dimensions. Yet, when it evaluated over the total score, the scale is believed to be more useful in terms of revealing the level of online research and reading comprehension.

The scale proved to be valid and reliable is the first measurement tool to be developed to determine middle school students' perceptions of online research and reading comprehension skills in Turkey.

Given the results of the validity and reliability studies conducted on middle school students for the "Online Research and Reading Comprehension Skills" scale and given that the scale has psychometric features that can measure middle school students' perceptions of "Online Research and Reading Comprehension Skills" with its five factors;

It is thought that the scale has a valid and reliable structure,

That the results to be obtained from the actual administration of the scale can provide the necessary feedbacks about middle school students' perceptions of "Online Research and Reading Comprehension Skills",

That with the future applications of the scale in different samples, the developed scale can be examined at a meta-analytic level,

That the "Online Research and Reading Comprehension Skills" scale can be used in experimental and descriptive studies to determine middle school students' perceptions of their "Online Research and Reading Comprehension Skills".

Limitations

The study group of the current study is comprised of 469 middle school students attending five different state schools in different districts of the city of İzmir in the 2019-2020 school year and participating in the study on a volunteer basis.

Ethics Committee Approval

The authors confirm that ethical approval was obtained from Uşak University the Committee for Research and Publication Ethics in the Social Sciences and Humanities (Approval Date: 16/09/2019 and Number 2019-46).

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