The Role of Media Literacy in Online Information: Searching Strategies

İsmail Tatar
ismailtatar@mu.edu.tr
Muğla Sıtkı Koçman University, Turkey

Yusuf Levent Şahin
ylsahin@anadolu.edu.tr
Anadolu University, Turkey

Ezgi Doğan
ezgidogan@yyu.edu.tr
Van Yüzüncü Yıl University, Turkey

Abstract

Along with the spread of Web 2.0 technologies, individuals' habits such as learning, socializing, and getting information have changed rapidly. A lot of information, the accuracy of which cannot be trusted, is available in the web, and it becomes difficult to choose useful, relevant, and accurate information. This pollution is also present in the media. The abilities to choose messages in the media, to look at these messages critically, and to produce your own messages are considered among the 21st-century skills. These reasons bring media literacy (ML) and online information searching strategies (OISS) to the agenda. The processes of ML and OISS have interrelated features. Therefore, it is important and necessary to examine these concepts together. Based on this necessity, the aim of the study was to determine the role of ML in OISS. To this end, the data were collected from 1809 pre-service teachers using the OISS inventory and the ML level determination scale. Data were analyzed by descriptive statistics, MANOVA, and multiple regression analysis. According to the results, pre-service teachers' ML and OISS levels were above the moderate level. ML and OISS vary significantly according to the type of websites. In conclusion, ML was revealed as a predictor variable that could explain OISS at a rate of 33.2%.

Keywords

Media literacy, online information searching strategies, pre-service teachers, teacher education, 21st-century skills

I. Introduction

The static structure during the infancy of the internet has been replaced by a dynamic structure nowadays. Along with the spread of Web 2.0 technologies, the effort and expertise required to be included in the internet environment have decreased, and individuals have become able to produce their personal spaces and environments very simply. Easier access to information has also facilitated information sharing. Individuals can share the content of the information, news, etc. they encounter in a virtual environment from their personal accounts by just a few clicks, thus taking an effective part in the dissemination of information. With the development of social networks and content provider sites and their spread to a wide user base, individuals have been transformed from content consumers to producers. Individuals can share the content of the information, news, etc. they encounter in a virtual environment from their personal accounts by just a few clicks, thus taking an effective part in the dissemination of information. Thanks to media such as blogs and social media networks, news events can be quickly transferred to the internet environment by individuals. With the widespread use of smartphones that can record audio and video very easily, people on the street have become a kind of reporters. This dynamic structure has played a significant role in the transformation of classical journalism and the media, removing the media from the monopoly of the press organs. However, the fact that the content can be served and spread very quickly means that biased or false information can be spread in the same way. While the journalist is the assurance of the accuracy of the information he/she provides in the classical media, such responsible behavior may not be in question in the internet environment. Most of the posts on the internet do not show a source, and the task of testing the accuracy of the information encountered is left to the user. The mentioned reasons bring forward two important concepts. These are Media Literacy (ML) and Online Information Searching Strategies (OISS).

The International Society for Technology Education (ISTE) (ISTE, 2019a) indicated the characteristics of 21st-century students in the student standards document it published. In this document, it was stated that students should be individuals with high *media literacy* and *information searching skills* under the titles of competent learners, information makers, and digital citizenship. It was indicated that students should be able to evaluate the reliability, precision, point of view, and relevance of the information they would obtain from the media, data, or other sources. Furthermore, in the teacher standards document published by ISTE, problem-solving and critical thinking skills were mentioned under teacher competencies (ISTE, 2019b). When the sub-dimensions of problem-solving and critical thinking skills of ML and OISS are considered, it can be clearly observed that the subjects examined in this study are among the 21st-century teaching skills.

a. Media Literacy

Thoman (2009) expressed ML as the ability to make a personal meaning from the auditory and visual messages we receive from television, radio, computers, newspapers, magazines, and advertisements. ML is explained as the ability to choose and distinguish, ask and question, be aware of what is happening, and not be passive and vulnerable. The skills required for ML are stated as analysis, evaluation, grouping, induction, deduction, and inference (Potter, 2005). In the ML process, it is not only important to make sense by reading but also to reproduce it. All of these stages complement each other (Tanrıkulu, 2014). Considering the stages, it is observed that various processes are defined in the literature. Accordingly, Jolls and Thoman (2005) defined the ML process as *access*, *analysis*, *evaluation*, and *product creation*. *Access* is expressed as finding and sharing the relevant and appropriate information, using media messages; *analysis* is expressed as understanding messages and analyzing the essence, accuracy, and reliability of messages using critical thinking, and developing a perspective in the context of the hidden effects of messages; *evaluation* is expressed as making judgments by making comparisons about the value of a piece

according to some criteria, and *product creation* is expressed as revealing its own product by using compilation methods with self-confidence and being aware of the purpose (Hobbs, 2011; Potter, 2005; Tanrıkulu, 2014).

b. Online Information Searching Strategies

Since the information on the web increases every day and there is a lot of false information in this environment, individuals are required to develop some strategies to reach information. Tsai and Tsai (2003) propose a theoretical framework to explain these strategies. Accordingly, OISS consist of three main domains. These are *behavioral, methodical,* and *metacognitive* domains. There are *control* and *disorientation* strategies under the behavioral domain, *trial-error* and *problem-solving* strategies under the methodological domain, and finally, *purposeful thinking*, *selecting main ideas,* and *knowledge evaluation* strategies under the metacognitive domain. The seven strategies specified are described below:

- Control: Comfort and convenience observed when using the computer and the internet.
- Disorientation: The state of getting lost and confused when searching online.
- Trial-error: The user uses thinking skills while doing research and tries different possibilities when he hesitates about the search.
- Problem-solving: The user solves problems by himself or asks others for help while doing research.
- Purposeful thinking: The user keeps the search purpose in mind.
- Selecting the main idea: The user captures or summarizes the main thoughts on the web page.
- Information evaluation: The user directly accepts or criticizes the information on the web page

In line with the explanations about ML and OISS, it is concluded that these two concepts may be related to each other. The access, analysis, evaluation, and product creation steps included in ML are also included in the subject area of OISS. Furthermore, it is observed that both concepts are based on critical thinking (Heins & Cho, 2003; Kuiper, Volman & Terwell, 2005; Kurt & Kürüm, 2010). Developing skepticism about media messages, including online information, is at the center of many ML programs (Van de Vord, 2010). Moreover, participating in an ML program is associated with increased motivation for seeking information (Martens & Hobbs, 2015). Therefore, determining how much OISS can be explained by ML is one of the aims of this study.

The research findings demonstrate that individuals with more internet experience are more likely to verify the reliability of the information they find and their OISS levels are higher (Flanagin & Metzger, 2000, Flanagin & Metzger, 2007; Kim, 2001; Monchaux et al., 2015). Accordingly, it can be concluded that OISS may vary depending on the online experience, in other words, the frequency of the use of websites. Likewise, it is stated that the frequency of internet use is also effective on ML (Ata & Yıldırım, 2020; Karaman & Karataş, 2009). Furthermore, it is indicated that individuals who use the internet for learning purposes have a lower OISS level than those who use it for daily work (Tsai et al., 2012). However, there is no study on which websites lead to this differentiation. Therefore, determining the differentiation status of OISS and ML according to the frequency of the use of various websites constitutes another purpose of the study. In line with the purposes specified, answers to the following research questions were sought.

1. How are pre-service teachers' OISS and ML levels distributed?

2. Do pre-service teachers' OISS and ML levels differ significantly according to the frequency of using
    a. news-oriented websites,
    b. information-oriented websites and
    c. social media sites?
3. What is the role of the dimensions that make up ML in OISS?

II. Method

a. Research design

In this research, a survey study was used to determine the distribution of pre-service teachers' OISS and ML levels, a causal-comparative study was used to determine whether OISS and ML levels differed according to demographic variables, and a correlational study was used to determine which OISS dimensions predicted ML (Büyüköztürk et al., 2013; Creswell, 2012, Fraenkel, Wallen & Hyun, 2012).

b. Participants

One thousand nine hundred seventy-three pre-service teachers reached through convenience sampling constitute the participant group of the study. After completing the data collection tool incompletely and removing the extreme values, 164 participants were excluded from the study, and 1809 participants were included in the data analysis process. There are 1221 female (67.5%) and 588 male (32.5%) pre-service teachers in the participant group. Of these pre-service teachers, 559 are first-grade (30.9%), 653 are second-grade (36.1%), 474 are third-grade (26.2%), and 123 are fourth-grade (6.8%) students. In terms of departments, it was determined that 134 of the pre-service teachers received education at the department of Mentally Handicapped Teaching (7.4%), 133 at the department of Computer and Instructional Technology Education (7.4%), 216 at the department of Primary School Teaching (11.9%), 117 at the department of Social Studies Teaching (6.5%), 105 at the department of Art Teaching (5.08%), 142 at the department of Preschool Teaching (7.8%), 77 at the department of French Teaching (4.3%), 132 at the department of German Teaching (7.3%), 108 at the department of Psychological Counseling and Guidance (6.0%), 191 at the department of Hearing Impaired Education (10.6%), 254 at the department of English Teaching (14.0%), and 200 received education at the department of Elementary Mathematics Education (11.1%).

In addition to the demographic information given, it is also important to indicate how often pre-service teachers use various websites because one of the aims of the study is to determine the change in the OISS and ML levels according to the frequency of using these websites. To this end, information on how often pre-service teachers use various websites is presented in Table 1.

Mass Media	Frequency of use											
	Never		Once per month		Once per week		Several times per week		Every day		Total	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
News websites	72	4.0	187	10.3	309	17.1	648	35.8	593	32.8	1809	100
Information websites	40	2.2	127	7.0	231	12.8	665	36.8	746	41.2	1809	100
Social media	57	3.2	21	1.2	41	2.3	146	8.1	1544	85.4	1809	100

Table 1. *Pre-service teachers' frequency of using various websites*

When Table 1 is examined, it is observed that 593 pre-service teachers use news-oriented websites (32.8%), 746 pre-service teachers use information-oriented news sites (41.2%), and 1544 pre-service teachers use social media (85.4%) every day. Here, it can be said that social media is by far the most used web environment. Furthermore, it is observed that most of the pre-service teachers (f_{news}=1550, $f_{information}$=1642) use news (85.7%) and information (90.8%)-oriented websites at least once a week.

c. Data Collection Tools

The research data were collected using the personal information form, Online Information Searching Strategies Inventory (OISSI), and the Media Literacy Level Determination Scale (MLLDS).

Online Information Searching Strategies Inventory

The OISSI developed by Tsai (2009) was adapted to Turkish by Aşkar and Mazman (2013). The scale, which is used to determine the information searching strategies of individuals in online environments and responses to which are listed in the range of "It does not suit me at all" and "It completely suits me," is a 6-point Likert-type scale. The total variance explained by the scale consisting of 25 items and seven factors (Disorientation, Evaluation, Purposeful Thinking, Trial and Error, Selecting Main Ideas, Control, Problem Solving) is 68%. Moreover, Cronbach's alpha coefficient calculated by Aşkar and Mazman (2013) is .910. Cronbach's alpha coefficient obtained from the data collected in this study is .868 for the overall scale.

Media Literacy Level Determination Scale

The MLLDS developed by Karaman and Karataş (2009) to determine the media literacy levels of individuals is a 5-point Likert-type scale with responses ranging from 1 (Never) to 5 (Always). There are 17 items in the scale consisting of 3 factors: "Having knowledge," "Being able to analyze and react," and "Being able to judge-see implicit messages," and these items explain 42.5% of the variance. The Cronbach's alpha coefficients calculated by the researchers who developed the scale are .840 for the overall scale, .721 for the factor of having knowledge, .705 for the factor of being able to analyze and react, and .680 for the factor of being able to judge/see implicit messages. The Cronbach's alpha coefficients obtained from the data collected in this study are .908 for the overall scale, .870, .742, and .801 for the factors of having knowledge, being able to analyze and react, and being able to judge/see implicit messages, respectively.

d. Validity Studies of the Data Collection Tools

The rapid change of web environments and media understanding brings to mind that information searching strategies and media literacy are also changing. To this end, confirmatory factor analysis (CFA) was conducted to determine whether the relatively old measurement tools OISSI (2013) and MLLDS (2009) are still valid (Table 2).

Fit index	Fit value MLLDS	Fit value OISSI	Fit Value Criterion	Source
χ^2/sd	5.196	7.212	0≤ χ^2/sd≤5	Sümer (2000)
RMSEA	.048	.059	0≤RMSEA≤.06	Thompson (2004)
SRMR	.031	.042	0≤SRMR≤.05	Kenny (2010)
NFI	.953	.913	.95≤NFI≤1	Thompson (2004)
CFI	.961	.924	.90≤CFI≤1	Huck (2012)
TLI	.953	.907	.90≤TLI≤1	Schumacker and Lomax (1996)
GFI	.962	.925	.90≤GFI≤1	Schumacker and Lomax (1996)
AGFI	.948	.900	.90≤AGFI≤1	Schumacker and Lomax (1996)

Table 2. *CFA fit values for the OISSI and MLLDS*

According to Table 2, all fit value criteria are provided for both data collection tools except for the χ^2/sd value. Brown (2015) states that the value of χ^2/sd is very sensitive to the sample size. However, it may be negligence not to report since this value is frequently used due to the current reporting ethics. Therefore, to minimize this hypersensitivity to the sample size, it should generally be reported with other fit values (Kyriazos, 2018). As a result, it can be said that both measurement tools preserve their validity.

e. Data Analysis

In the analysis of the first question, in which the OISS and ML levels of pre-service teachers were tried to be determined, the mean and standard deviations of the scales and the scores obtained from the factors of these scales were calculated, and a general description was made. The Multiple Analysis of Variance (MANOVA) was used in the analysis of the second research question in which the OISS and ML levels of pre-service teachers were compared according to the frequency of using news-oriented websites, information-oriented websites, and social media sites. In MANOVA, the power of the analysis increases since the possible error is reduced by including the interaction between the dependent variables in the analysis (Can, 2014). Finally, multiple regression analysis was used in the third research question in which the predictive status was determined by the dimensions of Having knowledge, Being able to analyze and react, and Being able to judge/see implicit messages, which constitute the ML of OISS. In the second research question, since the dependent variables of the study were compared according to three different independent variables (the frequency of use of news-oriented websites, information-oriented websites, and social media sites), the Bonferroni correction was performed to reduce the possibility of making the type one error (Tabachnick & Fidell, 2012), and a new level of significance was determined by dividing p-values by the number of independent variables (p= .05/3 = .017). Furthermore, all prerequisites of MANOVA and multiple regression analysis used in analyses were provided.

III. Results

a. Findings Regarding the Distribution of the OISS and ML Levels of Pre-Service Teachers

The total scores of the OISSI and MLLDS tools are obtained by adding the points from each item in a standard way to each other (Aşkar & Mazman, 2013; Karaman & Karataş, 2009). Accordingly, the average score and standard deviation obtained from each scale and the sub-dimensions of the scales were calculated, and a general description was made about the OISS and ML levels of the pre-service teachers (Table 3).

Score	n	$\bar{x}$	sd
OISS Level	1809	4.09	.697
Disorientation	1809	2.16	.970
Evaluation	1809	4.44	1.065
Purposeful thinking	1809	4.40	1.060
Trial and error	1809	4.62	1.164
Selecting main ideas	1809	4.61	1.129
Control	1809	4.68	1.081
Problem solving	1809	4.00	.838
ML Level	1809	3.88	.628
Having knowledge	1809	4.06	.689
Being able to analyze and react	1809	3.68	.705
Being able to judge, see implicit messages	1809	3.86	.775

Table 3. *Descriptive statistics regarding OISS and ML levels*

When Table 3 is examined, the scores of the pre-service teachers obtained from the factors of the OISSI are ranked from higher to lower; control, trial and error, selecting main ideas, evaluation, purposeful thinking, problem-solving, and disorientation. It is observed that the OISS levels of the pre-service teachers were above the average but not very close to 6, which is the highest average score that can be obtained ($\bar{x}_{OISS}$= 4.09). Accordingly, it can be said that pre-service teachers can use the seven strategies, which are the sub-dimensions, at an average level. The "control" strategy ($\bar{x}_{control}$= 4.68), which is used by pre-service teachers in the best way, is also above average. Based on this, it can be concluded that pre-service teachers use the hardware and software resources of the computer adequately and behave relatively comfortably while using internet tools. It was determined that the "disorientation" strategy had the lowest average ($\bar{x}_{disorientation}$= 2.16) and remained at a very low level. However, since this factor indicates a negative situation, it is desirable to have a low average score. Accordingly, it can be said that pre-service teachers generally have a low level of confusion in the mass of information they encounter, having problems in navigating web pages, having difficulty in coping with the complexity of the internet.

Since the ML score is calculated by standardizing, it is known that a pre-service teacher can score between 1 and 5. Accordingly, it is observed that the ML levels of pre-service teachers are above the average score that can be obtained ($\bar{x}_{ML}$= 3.88). Therefore, it can be said that pre-service teachers are generally individuals who can use media tools effectively and interactively, analyze and criticize the messages given in mass media correctly. When the factors of the scale are

examined, it is observed that the highest average score is in the "Having knowledge" factor ($\bar{x}_{knowledge}$= 4.06). Accordingly, it can be concluded that pre-service teachers have a high level of discussing and criticizing the content, accuracy, and purpose of the information presented in the media. The fact that pre-service teachers' average scores obtained from the factor of "being able to judge, see implicit messages" are above the average but not very close to the highest score ($\bar{x}_{judgement}$=3.86) can be interpreted as they need improvement in recognizing the advertising and sponsor activities and hidden meanings offered in mass media. It is observed that the pre-service teachers' scores obtained from the factor of "being able to analyze and create reaction" are also above the average ($\bar{x}_{analysis}$= 3.68). Therefore, it can be inferred that pre-service teachers' skills of recognizing the negative effects of mass media, analyzing the presented information based on ethical rules, recognizing whether mass media are biased or not are at a good level, but they need to be improved.

b. Findings Regarding the Investigation of the OISS and ML Levels of Pre-service Teachers in Terms of Various Variables

The OISS and ML levels of pre-service teachers were examined in terms of the variables of the frequency of use of news-oriented web sites, information-oriented web sites, and social media sites, and one-way MANOVA was used accordingly. The reason why two-way MANOVA was not used, although the number of independent variables was more than one, is that there were not enough participants in each group to meet the MANOVA prerequisites. Therefore, the Bonferroni correction was performed because more than one analysis was conducted on the same data set, and the results were evaluated at the significance level of .017 (.05 / 3) accordingly. The MANOVA results on the comparison of the OISS and ML levels according to the independent variables are presented in Table 4.

Independent variable	Wilks' λ	F	Hypothesis	Error df	p	η^2	Observed Power
News	.956	10.305	8	3606.000	.000	.022	1.000
Information	.955	10.599	8	3606.000	.000	.023	1.000
Social media	.989	2.579	8	3606.000	.008	.006	.925

Table 4. *The differentiation status of the OISS and ML levels according to the frequency of use of various websites*

According to Table 4, it is observed that the pre-service teachers' OISS and ML levels differ significantly according to the frequency of using news-oriented websites (Wilks' λ=.956, F(8,3606)=10.305, η^2=.022, p<.017), the frequency of using information-oriented websites (Wilks' λ=.955, F(8,3606)=10.599, η^2=.023, p<.017), and the frequency of using social media (Wilks' λ=.989, F(8,3606)=2.579, η^2=.006, p<.017). When the power values for all three independent variables are examined, it is observed that a sufficient sample size has been reached to make the related comparisons, but the effect sizes (η^2<.06) of the independent variables on OISS and ML levels are small (Cohen, 1988). According to this result, it can be said that the independent variables significantly differentiate OISS and ML levels, but there are other variables that are effective on OISS and ML levels. ANOVA results should be examined to determine from which dependent variable the significant difference occurred according to the MANOVA result (Table 5).

Independent variable	Dependent variable	Sum of Squares	df	Mean Square	F	p	η^2	Observed Power
News	OISS	23.579	4	5.895	12.430	.000	.027	1.000
	ML	27.355	4	6.839	18.008	.000	.038	1.000
Information	OISS	24.701	4	6.175	13.038	.000	.028	1.000
	ML	27.765	4	6.941	18.289	.000	.039	1.000
Social media	OISS	8.440	4	2.110	4.372	.002	.010	.936
	ML	3.792	4	.948	2.413	.047	.005	.697

Table 5. *ANOVA results of OISS and ML levels according to the independent*

Upon examing Table 5, it is observed that the frequency of use of news-oriented websites ($F_{OISS}(4,1804)=12.430$, $p<.017$; $F_{ML}(4,1804)=18.008$, $p<.017$) and the frequency of use of information-oriented websites ($F_{OISS}(4,1804)=13.038$, $p<.017$, $F_{ML}(4,1804)=18.289$, $p<.017$) differentiate OISS and ML separately. However, while the frequency of social media use significantly differentiates the level of OISS ($F_{OISS}(4,1804)=4.372$, $p<.017$), it does not create a significant difference in the ML level $F_{ML}(4,1804)=2.413$, $p>.017$). Although the power value is large enough in all variables in which there is a significant difference, the effect size is small. To determine among which groups of independent variables this difference was, multiple comparison tests were used (Akbulut, 2010), and Scheffe's test results are presented in Table 6.

Dependent variable	(I) News	(J) News	$\Delta\bar{x}_{(I-J)}$	Sh	p
OISS	Several times a week	Once a week	.1826*	.04761	.005
	Every day	Once a month	.2109*	.05776	.010
		Once a week	.3182*	.04832	.000
ML	Every day	Never	.2889*	.07691	.007
		Once a month	.2744*	.05168	.000
		Once a week	.3158*	.04324	.000
		Several times a	.2011*	.03502	.000
	(I) Information	**(J) Information**	$\Delta\bar{x}_{(I-J)}$	**Sh**	**p**
OISS	Every day	Never	.4084*	.11169	.010
		Once a month	.2862*	.06606	.001
		Once a week	.2915*	.05182	.000
		Several times a	.1422*	.03670	.005
ML	Several times a week	Once a week	.1923	.04705	.002
		Once a month	.2430	.05914	.002

	Every day	Once a week	.3566	.04639	.000
		Several times a	.1643	.03286	.000
	(I) Social media	**(J) Social media**	**$\Delta\bar{x}_{(I-J)}$**	**Sh**	**p**
OISS	Every day	Once a week	.4223	.10993	.005

Table 6. *Multiple comparison results of OISS and ML levels according to the independent variables*

According to Table 6, when the OISS level is compared according to the frequency of using news-oriented websites, the highest difference is between those who use them once a week and those who use them daily ($\Delta\bar{x}_{(\text{every day-once a week})}$= .3182; p<0.017), when it is compared according to the frequency of using information-oriented websites, the highest difference is between those who never use them and who use them daily ($\Delta\bar{x}_{(\text{every day-never})}$= .4084; p<0.017), when it is compared according to the frequency of using social media, the difference is only between those who use it once a week and those who use it daily ($\Delta\bar{x}_{(\text{every day-once a week})}$= .4223; p<0.017). Likewise, when the ML level is compared according to the frequency of use of news-oriented websites ($\Delta\bar{x}_{(\text{every day-once a week})}$= .3158; p<0.017) and the frequency of use of information-oriented websites ($\Delta\bar{x}_{(\text{every day-once a week})}$= .3566; p<0.017), it is observed that the highest difference between the groups is between those using them once a week and those using them every day. Since the ML level does not change according to the frequency of social media use, no significant difference is observed in the multiple comparison tests.

c. Findings Regarding the Role of the ML Dimensions on the OISS Level

Multiple regression analysis was used to determine the role of the dimensions of having information, being able to analyze and react, and judge, see implicit messages, which constitute ML, in the OISS level. The results of this analysis are presented in Table 7.

Variable	**B**	**S.E.**	**β**	**t**	**p**	**VIF**	**Tolerance**
Constant	1.597	.085		18.873	.000		
Having knowledge	.384	.028	.380	13.616	.000	2.101	.476
Being able to analyze and react	.141	.027	.142	5.206	.000	2.021	.495
Being able to judge, see implicit messages	.108	.025	.120	4.370	.000	2.040	.490

Table 7. *Multiple regression analysis results*

Upon examining Table 7, it is observed that all variables predict the OISS level significantly (R^2=.332, F(3,1805)=298.472, p=.000). The role of the ML dimensions in the OISS level can be ranked from large to small, as having knowledge (β=.380), being able to analyze and react (β=.142), and being able to judge, see implicit messages (β=.120). The aforementioned three ML dimensions explain 33.2% of the variance related to the OISS level.

IV. Conclusion and Discussion

In this study, the distribution of the OISS and ML levels of pre-service teachers, how they differed according to various variables, and the role of ML dimensions in OISS were examined. To this end, 1809 pre-service teachers were reached, the OISSI and MLLDS were used as data collection tools, and the data were analyzed with descriptive statistics, MANOVA, and multiple regression analysis. Various researchers have studied the role of variables such as information literacy, digital nativity, digital citizenship, awareness, digital literacy, and web experience (Atoy Jr et al., 2020; Çebi & Özdemir, 2019; Çoklar, Yaman & Yurdakul, 2017; Tu, Shih & Tsai, 2008) in OISS. This study contributes to the explanation of OISS by considering ML as a predictor variable.

The results obtained show that the OISS levels ($\bar{x}$=4.09) of the pre-service teachers are slightly above the average. When the strategies were examined one by one, the level below the average was determined for the disorientation strategy ($\bar{x}$=2.16), and the level above the average was determined for the evaluation ($\bar{x}$=4.44), purposeful thinking ($\bar{x}$=4.40), trial and error ($\bar{x}$=4.62), selecting main ideas ($\bar{x}$=4.61), control ($\bar{x}$=4.68), and problem-solving strategies ($\bar{x}$=4.00). The fact that the disorientation strategy has an average below average indicates that the pre-service teachers do not experience much confusion while searching and do not get lost in information pollution. It is known that the information pollution encountered while trying to access information on the internet has a positive linear relationship with OISS (Kurt & Emiroğlu, 2018). Based on this, it is possible to associate the low disorientation level with a low level of information pollution. In other words, it can be interpreted that encountering too much unrelated and incorrect information on the internet will increase disorientation, i.e. confusion, forgetting what you are looking for. Epistemological beliefs are one of the factors that shape information searching behavior (Whitmire, 2003). Demiraslan Çevik (2015) concluded that students with effort-based learning beliefs have high OISS levels, while those with innate ability learning beliefs have low OISS levels. Moreover, it is stated that those with advanced epistemological beliefs use more effective and established strategies (Hsu et al., 2014). From this point of view, the fact that strategies other than disorientation show a level above the average can be interpreted as the fact that pre-service teachers' beliefs about learning by making efforts are high at the same rate. The findings of other studies examining the level of OISS for pre-service teachers show both similarity and difference with the results of this study. In the study carried out by Çaka, Doğan & Şahin (2016) with pre-service teachers, it was concluded that the averages of the control, evaluation, purposeful thinking, trial and error, selecting main ideas, and problem-solving strategies were medium and above, and the average of the disorientation strategy was at a low level. However, the study performed by Karaoğlan Yılmaz and Kılıç Çakmak (2016) differs considerably in terms of the disorientation strategy. The mentioned study shows that the level of the disorientation strategy is above average. Based on this, it can be inferred that even if studies are conducted with similar samples, different results can be obtained, and there are other factors that affect the strategies.

Another finding of the analyses conducted to answer the first research question is that the ML levels of pre-service teachers are above the average ($\bar{x}$=3.88). Accordingly, it can be said that pre-service teachers generally perform well in using media tools effectively and interactively, in analyzing and criticizing messages given in mass media. There is a relationship between self-efficacy demonstrated during online information searching and information literacy, information literacy and awareness of the effects of media (Van de Vord, 2010). Based on this, the ML levels of the pre-service teachers can be interpreted as being information literate at a sufficient and good level in information searching. The stated result again supports the view that ML and OISS are related. The scores obtained by the pre-service teachers from the factors in the MLLDS are ranked from high to low as having knowledge ($\bar{x}$=4.06), being able to judge-see implicit messages ($\bar{x}$=3.68), and being able to analyze-react ($\bar{x}$=3.86). In the study performed by Shahsavari and Dastjerdi (2016), a relationship between the skills of individuals to judge, criticize and analyze the

implicit messages of the media and social skills was revealed. The fact that the level in the related factors of ML is above the average can also be associated with the social skills of pre-service teachers. Moreover, it is known that the critical thinking skill is one of the variables that predict ML (Erişti & Erdem, 2018). Therefore, the pre-service teachers' ML level may originate from the fact that their critical thinking skills are above average. In the study conducted by Durak and Sarıtepeci (2019), the average scores obtained from the ML level and its factors are ranked similarly but are farther from the highest score. High school students constitute the sample of the related study. Based on this, it can be concluded that age and educational level may have an effect on ML.

When the pre-service teachers' OISS and ML levels were examined in terms of the variables of the frequency of use of news-oriented websites, information-oriented websites, and social media sites, it was observed that all three independent variables significantly differentiated OISS and ML. In general, it is observed that those who use news and information-oriented websites every day have higher OISS and ML than those who use them less. However, while the frequency of social media use was observed in the same way in OISS, it did not make any difference in ML. In the literature, there is information that the density of social media use and the high frequency of visits indicate a low level of new media literacy (Durak & Sarıtepeci, 2019). Accordingly, although the ML levels of individuals with a low frequency of social media use should differ significantly from those with a high frequency of social media use, this information is not supported in this study. This may be due to the differences in the study samples. Likewise, it is stated that ML has a negative and indirect effect on social media addiction (Eskandari & Baratzadeh Ghahramanloo, 2020). In other words, a high level of ML ensures low social media addiction. Since social media addiction is associated with the frequency of use, it can be said that this finding in the literature was not verified in this study. It is indicated that the type of web activity affects OISS, and those who use the internet for daily work have a significantly higher OISS level than those who use the internet for learning (Tsai et al., 2012). Visiting news-oriented websites and social media sites is considered in the daily work category, while information-oriented websites are in the category of use for learning purposes. However, all three usage types made significant differences on the variables. The reason for this may be controlling experimental conditions in the study carried out by Tsai et al.

With the last research question, the effect of the dimensions of ML on OISS was examined, and it was observed that the dimensions of having knowledge, being able to analyze-react, judge-see implicit messages explained 33.2% of the variance related to OISS. Among the three dimensions, having knowledge is the one with the highest predictive power and the most important one. This dimension is related to being able to decide on the accuracy of messages in the media, being aware of the purpose, positive and negative aspects of messages and how they affect individuals and society, and being able to examine them critically. In his study on the classification of information and digital literacy, Bawden (2001) indicated the point at which media literacy differed from other literacy as critical thinking skills and stated that information searching and critical thinking skills were interdependent. Likewise, there are views that critical thinking constitutes the basis of both concepts (Erişti & Erdem, 2018; Heins & Cho, 2003; Kuiper, Volman & Terwell, 2005; Tuğtekin & Koç, 2019). Therefore, such a large common point may be the reason why OISS are explained more by the dimension of having knowledge. Furthermore, the process of searching information involves the activities of starting to search (knowing where and how to search), chaining (being able to follow quotations in the source), screening (identifying areas that may be relevant), parsing (filtering resources), monitoring (being aware of its progress), sorting (systematic research), verification (checking information), and ending the search (Robson & Robinson, 2013). As can be seen, the dimension of having knowledge of ML includes many activities that take place in this process. This information confirms that the most important predictor is the knowledge-having variable. The dimension of being able to analyze-react and judge-see implicit messages is related to being able to react positively or negatively to messages, being active at the point of protection from negativities, following the adherence of messages to

legal and ethical standards, knowing how to be involved in the message production process, analyzing implicit messages and their meanings. In these areas, there are more actions regarding the media writing part of ML. However, the information searching process is not related to the process of creating information. Therefore, it is an expected result that these two dimensions will contribute less to explaining OISS.

V. Recommendations

In this study, more than 33% of OISS could be explained with ML, but it is open to revealing which variables are in the unexplained part. It may be suggested to try to analyze OISS by conducting new studies with predictor variables used in previous research and other variables that may be related. To determine these variables, experimental studies should be performed, and their effects should be evaluated. For example, according to the results of this study, it was observed that the frequency of use of three types of websites (news, information, and social media) differentiated OISS and ML, and a variable that could be examined was presented to the literature. Furthermore, the structural equation modeling of all existing and relevant variables can be performed in order to address the structure of OISS more comprehensively.

The participant group of this study consists of pre-service teachers studying in Turkey. The fact that the study covers different age groups, educational levels, and cultures will enable the variables addressed to be explained better. Finally, when the findings obtained are examined, it is observed that ML and OISS are slightly above the medium level. Considering that the participant group consists of pre-service teachers and that these candidates will start their profession in a few years and train students, it can be said that these averages are below the expected level. Therefore, training should be provided to pre-service teachers for them to gain the relevant competencies before they start undergraduate education and during undergraduate education. While this training is given, it should be understood by researchers and practitioners that all information, including the media on the internet, is increasing every day, so ML and OISS are not static areas.

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