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## Classroom Teachers' Competencies in Using Web 2.0 Tools: Predictive Roles of Individual Innovative Characteristics and Socio-demographic Variables

## ABSTRACT

This study aims to examine the level of competence in using Web 2.0 tools and individual innovativeness of classroom teachers and to determine the relationship between these variables. The sample of this relational survey-type study consisted of 309 classroom teachers working in two districts of Şırnak province in the 2023-24 academic year. Individual Innovation Scale and Web 2.0 Tools Usage Competence Scale were used as data collection instruments. In the data analysis, classroom teachers' Web 2.0 Tools Usage Competence and Individual innovativeness levels were examined using descriptive statistics, also the total Web 2.0 Tools Usage Competence scores were modeled in a linear regression equation. The study revealed that both the classroom teachers' competency levels in using Web 2.0 tools and their individual innovativeness levels were at a moderate level. While male teachers had a higher average in terms of competence in using Web 2.0 tools, female teachers had a higher average in terms of individual innovativeness levels. Another noteworthy finding is that both of the average scores of the competency levels in using Web 2.0 tools and individual innovativeness levels for teachers with postgraduate education were higher than all other categories. As a result of the regression analysis, it was concluded that individual innovativeness was not a significant predictor affecting the Web 2.0 tools usage competence score. However, having postgraduate education, teaching 4th grade, and receiving in-service training were significant predictors that positively affected the Web 2.0 tools usage competence. Some suggestions were made in the context of the findings.

Keywords: Web 2.0 tools, individual innovativeness, classroom teachers.

## Introduction

Emerging technologies such as blockchain, artificial intelligence, 5G networks, the internet of things, augmented reality, quantum computing, and virtual reality are expected to significantly impact society in the near future. Currently, rapid technological developments have led to rapid transformations in education and training. This causes rapid transformation of societies and individuals. With these changes and developments, the effective use of technology, one of the basic skills of the 21st century, in educational environments has become indispensible. Competent teachers are essential for the effective integration of technology in education. It is claimed that a teaching approach that is not reflected in the educational environment and lacks technology negatively affects success (Nurzhanova et al., 2024). Raising well-equipped and successful individuals in their fields is possible using effective, accurate, and active classroom education practices in education and training environments. It can be said that, especially with technology integration in education, many applications have begun to be used in the learning-teaching process. Many emerging applications facilitate access to information and make both learning and the learning process enjoyable. For these reasons, it has become inevitable for teachers to include technological opportunities in their educational processes effectively and efficiently (Burmabiyik, 2014).

Recent educational trends have introduced new responsibilities for teachers. It is important for teachers to follow the developments in technology and to what extent they ensure the integration of technology into lessons. In other words, teachers need to adapt to technological developments and for students to benefit from technology effectively in terms of learning-teaching processes (Safa & Arabacioğlu, 2021).

Recently, Web 2.0 tools have become one of the frequently mentioned phenomena in education. Web 2.0 tools are websites, online software, and applications where users

share data, improve their ability to interact in education and training activities, increase collaboration and sharing, and enable them to produce content (Kavasoğlu, 2020). It is known that when the integration of Web 2.0 tools into the learning-teaching process is carried out effectively, it contributes to the development of students' basic skills as well as higher-order thinking skills (Fidan, 2012). Web 2.0 tools support students in providing permanent learning by enabling them to be active with interactive applications. In order to introduce the production of new information and raise the individuals since primary school who will be able to develop technology in the future, Web 2.0 tools are thought to be the most suitable technology (Akbaş & Yünkül, 2024). Therefore, it can also be said that Web 2.0 tools have an important place in making lessons more interactive.

Teachers' individual innovativeness is as important as their ability to integrate Web 2.0 tools in educational environments. In addition, teachers must have individual innovative gualities in addition to their many roles in terms of various activities employed in the learning-teaching process (Gökbulut, 2019). Teachers need to benefit from technological tools for the learning-teaching process to proceed more effectively and efficiently. Rawlins and Kehrwald (2013) stated in their study that using technology in the teaching context is effective in increasing cooperation and facilitating learning. It has become increasingly important for teachers to use the knowledge and experience they have gained in innovative and contemporary education in lessons and other teaching processes in terms of skills (Xu & Chen, 2010). An innovative teacher is someone who improves himself professionally, can transfer new information through new approaches, changes habits for new skills, and puts these new skills into practice (Ritchhart, 2004). Accordingly, it is important for teachers to be innovative individuals who are competent in using Web 2.0 tools and technology to facilitate the progress of learning in classroom and out-ofclass learning environments.

Another issue addressed within the scope of this study is the individual innovativeness characteristics of teachers. Innovativeness has also been defined as an individual's ability to adopt new ideas and adapt to innovation (Rogers, 2003), or willingness to change (Hurt et al., 1977). However, Kılıçer and Odabaşı (2010) emphasized that the concept of innovation is a comprehensive concept such as risk-taking, openness to experience, creativity, and thought leadership. Rogers (2003) divides individuals into five different categories in terms of the characteristics they possess, depending on their acceptance of the innovation in the process. They are, "innovators", "pioneers", "questioners", "skeptics" and "traditionalists". The study was also discussed in this context.

The competencies of classroom teachers regarding the use of Web 2.0 tools in their lessons, in meeting the learning needs of the individual, increasing the permanence of learning, ensuring meaningful learning, and developing different skills in many areas, creating and enriching learning environments, producing different contents, have increased their importance with technological developments. With this increasing importance, the individual characteristics that classroom teachers should have to manage learning-teaching processes more effectively and efficiently have become one of the issues that need to be emphasized.

It can be said that the relationship between the competencies in using Web 2.0 tools and individual innovativeness characteristics contributes to classroom teachers' creative thinking, collaboration, revealing innovative ideas, and sharing these ideas. In this regard, it becomes important to examine the relationship between classroom teachers' Web 2.0 tools usage competencies and their individual innovativeness characteristics. Although prior research has addressed teachers' Web 2.0 tool competencies and their innovativeness, this study uniquely contributes by exploring the predictive roles of socio-demographic variables.

## Purpose of the Study

This study was conducted to examine classroom teachers' proficiency levels in using Web 2.0 tools and their individual innovativeness levels and to reveal the relationship between these variables. Within the framework of this general purpose, answers to the following questions were sought in the study.

- 1. What are the classroom teachers' proficiency levels in using Web 2.0 tools?
- 2. What are the classroom teachers' innovativeness levels?
- 3. Do individual innovativeness levels and gender, age, graduated level of education, professional seniority, grade level taught and previous in-service training on the use of Web 2.0 tools predict the proficiency levels of using Web 2.0 tools?

#### Methods

## Research Model

This relational survey-type study examines the relationship between classroom teachers' competencies in using Web 2.0 tools and their innovativeness characteristics, gender, age, graduated level of education, professional seniority, grade level taught, and previous in-service training (Fraenkel et al., 2012). Such research studies are characterized to identify relationships between two or more variables and to gather insights into cause-and-effect connections. (Büyüköztürk, et al., 2023).

#### **Population and Sample**

1066 primary school teachers employed at Ministry of National Education (MoNE)-affiliated public schools in the Silopi and Cizre districts of Şırnak province during the 2023-2024 school year made up the study's population. 309 teachers made up the research sample, which was chosen from this population using convenience sampling among non-probability sampling techniques. In this method, which adds speed and practicality to the research, the researcher selects a situation that is nearby and easily accessible and continues until the number of participants in the sample reaches the desired sample size (Büyüköztürk et al., 2023). In this research, a power-based sampling calculation was made to determine the sample size to be studied. G-Power (Faul et al., 2009) software was used for this calculation. Since regression analysis was planned, the G-Power program was used to estimate the required sample size, assuming a medium effect size (0.15), at least 95% power at the p < .05 error level, and 6 predictive variables will be used in the regression equation. Accordingly, the program recommended working with a sample of at least 146 participants. In line with this, the number of participants reached with 309 primary school teachers within the scope of the research exceeds the sample size suggested by the program.

#### Table 1.

Demographic	Properties c	of Participants
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Variables	s Category		
Candar	Female	201	65.05
Gender	Male	108	34.95
	25 years & under	68	22.01
A.g.o.	26-30 years	135	43.69
Age	31-35 years	52	16.83
	36-40 years	54	17.48
	Bachelor's	273	88.35
Graduation	Degree	36	11.65
	Postgraduate		
Soniority/Professional	1-5 years	142	45.95
Experience	6-10 years	103	33.33
Experience	11-15 years	64	20.71
	1st grade	60	19.42
Grade Lovel of Teaching	2nd grade	86	27.83
Grade Level of Teaching	3rd grade	93	30.10
	4th grade	70	22.65
	Yes, I've attended	143	46.28
In-service Training	No, I haven't	166	53.72
	attended		
Total		309	100

When Table 1 is examined, 201 (65.05%) of the participants in the research were female and 108 (34.95%) were male. Considered by age, 68 (22.01%) of the participants in the study are 25 years old and under, 135 (43.69%) are between 26 and 30 years old, 52 (16.83%) are between 31 and 35 years old, and 54 (17.48%) are between 36 to 40 years old. In terms of education level, 273 of them (88.35%) have a bachelor's degree and 36 of them (11.65%) have a postgraduate education. When examined according to professional seniority, 142 (45.95%) of the participants in the study have professional seniority between 1 and 5 years, 103 (33.33%) have seniority between 6 and 10 years, and 64 (20.71%) have professional seniority between 11 and 15 years. In terms of the grade level they are teaching, 60 (19.42%) of the participants are teachers of 1st grade, 86 (27.83%) 2nd grade, 93 (30.10%) 3rd grade, and 70 (22.65%) are teaching the 4th graders. When the classroom teachers were examined in terms of receiving in-service training on Web 2.0 tools, it was seen that 143 (46.28%) received in-service training and 166 (53.72%) did not receive in-service training.

#### **Data Collection Tools**

Permission for use was obtained from the researchers who carried out development and adaptation studies for the scales to be used in the study. With the permission of the ethics committee, a research request was presented to the Silopi District Directorate of National Education, and data collection, and scale forms were prepared to be applied after the necessary approval was obtained. Data collection tools were delivered electronically to the teachers who would participate in the research and the data were collected in this way.

#### Web 2.0 Tools Usage Competency Scale (WTUCS)

The first of the data collection tools is the Web 2.0 Tools Usage Competency Scale (WTUCS), developed by Çelik (2021). The scale has a one-factor structure, is prepared in a 5-point Likert type, and consists of 39 items. The highest score on the scale is 195 and the lowest is 39 points. Within the scope of the development study, the Cronbach Alpha coefficient was found to be .98. This value was obtained from 160 teachers in the study group, and it is a scale with high reliability. At the same time, it has been determined that it distinguishes the sample in terms of the behaviors to be measured and that the items in the scales are items intended to measure the same behavior within the scale (Çelik, 2021, p.19).

#### Individual Innovativeness Scale (IIS)

In collecting data, the Individual Innovativeness Scale (IIS), developed by Hurt et al. (1977) and adapted into Turkish culture by Kılıçer and Odabaşı (2010), was used to determine the innovativeness characteristics of classroom

teachers. The scale consists of a total of 20 items. It consists of 12 positively worded items and 8 negatively worded items. It was rated on a 5-point Likert scale. The innovativeness score is calculated by adding 42 points to the score obtained by subtracting the negative items' score from the positive items' score. The lowest score can be 14, while the highest score can be 94. If the total scores obtained from the scale are below 46 points, the individual is called a "Laggard/Traditionalist"; if the score is between 46 and 56 points, the individual is called a "Late Majority"; if the scores are between 57 and 68 points, the individual is called an "Early Majority"; if the scores are between 69 and 80 points, the individual is called an "Early Adopters"; and if the score is above 80 points, the individual is called an "Innovator". According to the calculated scores of individuals' innovativeness levels, individuals below 64 were considered low in innovativeness, while individuals above 68 were considered highly innovative. Test-retest reliability was found to be 0.87 and the internal consistency coefficient was 0.82 as a result of the adaption study. The study's ethical procedure was as follows:

- Şırnak University Scientific Research Ethics Committee gave its consent for this study to be carried out on 08/12/2023 with the document issue number: 605.01-87070
- Informed consent has been obtained from the participants.

#### **Data Analysis**

Classroom teachers' Web 2.0 Tools Usage Competence and Individual innovativeness levels were analyzed using descriptive statistics (mean, standard deviation, and minimum-maximum scores). The effect of individual innovativeness level, gender, graduated level of education, taught grade level, and previous in-service training on using Web 2.0 tools on the proficiency levels of using Web 2.0 tools was determined by multiple linear regression analysis. In line with the aim of the study, together with a continuous variable such as the individual innovativeness level on the Web 2.0 Tools Usage Competence of classroom teachers; The effects of categorical variables such as gender, level of education graduated, grade level taught, and previous inservice training on the use of Web 2.0 tools were also examined. A dependent (outcome) variable is examined by means of multiple independent (explanatory, predictive) variables through the use of multiple linear regression modeling. Both continuous and categorical variables can be used as independent variables; however, only continuous variables should be considered as a dependent variable. (Cohen et al., 2003; Field, 2018; Pedhazur, 1997).

The regression model in regression analysis typically incorporates data gathered from several groups as

variables that explain or predict the outcome. However, the variables included in the model need to be continuous or categorical with two categories. Simple regression relies on Pearson correlation. The Pearson correlation between a continuous variable and a dichotomous variable, where the two categories are denoted by 1/0, is called point-biserial correlation. Therefore, in multiple linear regression analysis, if a categorical variable is used as an explanatory or predictive variable, It should be mentioned that only explanatory/predictive variables with two categories can be used to build the model (Field, 2018). After being transformed into two-level variables, discrete variables with qualitatively distinct categories are examined. Dummy coding is the technique of categorizing a discrete variable to produce a dichotomous variable. Limiting the relation between binary variables and other variables to linear relationships is the goal. A discrete variable with more than two categories can be related to another variable in some way, and the relationship may arbitrarily change when the numbers given to the categories are varied. However, binary variables, having only two points, can only have linear relationships with other variables; thus, they are appropriately analyzed using methods that utilize correlation and focus solely on linear relationships (Tabachnick & Fidell, 2013). The categorical variables included in the analysis of this study were converted into dummy variables, and one of the categories in each variable was selected as the reference group. The number of dummy variables created for each variable is one less than the number of its categories (k-1). The category of interest is coded as 1, while other categories are coded as 0. The goal is to exclude the impacts of other categories by only analyzing one category of a variable at a time. This allows for the interpretation of the impact of the category that is part of the analysis in relation to the reference category that is kept outside (Büyüköztürk et al., 2023; Xie & Powers, 2000).

Web 2.0 Tools Usage Competency Scale (WTUCS) is a measurement tool consisting of one dimension. WTUCS total scores of the participants were obtained for Web 2.0 Tools Usage Competence, which was used as the outcome variable in the study. This total score obtained is a continuous variable. In order to be subjected to regression analysis, it was tested whether the total scores of the scale were distributed normally and it was seen that the scores were normally distributed.

WTUCS total scores were modeled in a linear regression equation. In this model, the explanatory/predictor variables are the "individual innovativeness level" determined by the IIS and "gender, the level of education graduated (undergraduate or graduate), the grade level taught (1st, 2nd, 3rd and 4th grade) and previous in-service training on the use of Web 2.0 tools." However, among the predictive variables, gender, graduated level of education, grade level taught and previous in-service training are categorical variables measured at the nominal scale level.

These categorical variables were therefore added as dummy variables to the regression model. Categorical variables can be included as dummy variables in regression models (Keith, 2019; Warner, 2008). Multicollinearity between the explanatory and predictive variables was investigated in the regression analysis. The calculated VIF (Variance Inflation Factor) values were found to be near 1. Consequently, it was determined that the explanatory and predictive factors did not exhibit autocorrelation (Demaris, 2004; Pedhazur, 1997).

#### Results

## Findings on the Levels of Web 2.0 Tools Usage Competency and Individual Innovativeness (1st and 2nd questions of the study)

Regarding the 1st and 2nd research questions of the study, teachers' Web 2.0 Tools Usage Competency and Individual Innovativeness levels are given in Tables 2 and 3.

#### Table 2.

Web 2.0 Tools Usage Competence Levels of Classroom Teachers

reachers							
Variables	Category	n	%	Mean	Sd	Min	Max
Condor	Woman	201	65.05	90.54	41.49	39	195
Genuer	Man	108	34.95	94.00	42.59	39	184
	25 years and	68	22.01	85.49	41.18	39	170
	under	135	43.69	91.33	41.76	39	192
Age	26-30 years	52	16.83	94.40	37.16	39	15
	31-35 years	54	17.48	98.11	46.83	39	195
	36-40 years						
	Bachelor's	273	88.35	86.73	40.03	39	192
Graduation	Degree	36	11.65	129.83	35.58	39	195
	Postgraduate						
	1-5 years	142	45.95	85.73	38.40	39	170
Professional Seniority	6-10 years	103	33.33	95.76	44.45	39	192
,	11-15 years	64	20.71	98.63	43.62	39	195
	1st grade	60	19.42	79.22	39.95	39	192
Grade Level	2nd grade	86	27.83	96.23	44.45	39	184
of Teaching	3rd grade	93	30.10	90.42	39.74	39	17
	4th grade	70	22.65	98.74	41.92	39	19
	Yes, l've	143	46.28	115.97	37.44	39	195
In-service	attended	166	53.72	70.87	33.37	39	160
11 alfillig	No, I haven't attended						
Total		309	100	91.75	41.84	39	195

According to the total points that can be obtained from WTUCS, and Table 2 is examined, the average total score was found to be 91.75 and it was determined that the classroom teachers' competency in using Web 2.0 tools was moderate level. When the total scores were examined according to the variables discussed in the study, the most striking results were observed in the subcategories of the variables of teachers' graduation levels and their status of receiving in-service training on the use of Web 2.0 tools. Regarding graduation, the average of teachers with a postgraduate degree (129.83) is significantly higher than the average of teachers with a bachelor's degree (88.35); Regarding the status of receiving in-service training, those who received training scored considerably higher (115.97) than the average of those who did not receive training (70.87). When other variables are examined, it is determined that the average scores obtained according to the subcategories of the variables are generally close to each other; According to gender, male teachers (94.00) have a higher average score than female teachers (90.54), and as age and professional seniority increase in parallel with each other, older and more experienced tend to score higher. It was observed that 4th-grade teachers had the highest average score according to the grade level taught.

According to the item-by-item examinations, the answers given by the classroom teachers to all items were below the scale's average item score, and considering the response categories of the scale (1-Never, 2-Rarely, 3-Occasionally, 4-Frequently and 5-Always), the use of the tools in question increased. It is seen that the levels are stuck between "Rarely" and "Occasionally". The findings determined to be more important and the statements in the relevant items were shared, and for copyright reasons, the findings for all items in the scale were not reported. Accordingly, from the answers given, "I can make the lesson fun with Web 2.0 tools." (Item 19)" and "I can ensure student participation in lessons with Web 2.0 tools. It was determined that the level of agreement with the statements "(Item 34)" was slightly higher than the other items. On the other hand, the statements with the lowest participation were "I can prepare cartoons with Web 2.0 tools." (such as Make Beliefs Comix, Toondoo...) (Item 7)" and "I can design augmented reality events with Web 2.0 tools (such as Quiver, Morpho, Urasma...) (Item 22)".

Tabl	e 3.
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Variables	Category	n	%	Mean	Sd	Min	Max
Gender	nder Woman		65.05	67.71	10.29	46	94
	Man	108	34.95	64.76	10.58	43	89
Age	25 years and under	68	22.01	67.01	9.90	47	89
	26-30 years	135	43.69	67.40	10.02	46	89
	31-35 years	52	16.83	64.13	10.34	47	90
	36-40 years	54	17.48	66.91	12.21	43	94
Graduation	Bachelor's Degree	273	88.35	66.23	10.16	43	90
	Postgraduate	36	11.65	70.08	12.26	46	94
Professional Seniority	1-5 years	142	45.95	67.49	9.82	46	89
	6-10 years	103	33.33	66.07	10.26	43	89
	11-15 years	64	20.71	65.86	12.12	46	94
Grade Level of Teaching	1st grade	60	19.42	67.80	11.88	46	89
	2nd grade	86	27.83	66.11	9.72	46	86
	3rd grade	93	30.10	66.37	10.09	43	90
	4th grade	70	22.65	66.83	10.73	47	94
In-service Training	Yes, I've attended	143	46.28	67.38	10.53	46	94
	No, I haven't attended	166	53.72	66.08	10.42	43	89
Total		309	100	66.68	10.47	43	94

According to the total scores obtained from the Individual Innovativeness Scale. the innovativeness levels of individuals are considered to be low in innovativeness for those who score below 64. while those who score above 68 are considered to be highly innovative. As shown in Table 3, the total score average of IIS obtained from the classroom teachers (n=309) was determined as 66.68, indicating a moderate level of innovativeness. This correspondes to the "questioning" category defined by scores from 57 to 68. Similarly, all groups-except those with postgraduate education—were also found to fall within the "questioning" category of innovativeness. It was determined that the average IIS score (70.08) of classroom teachers with postgraduate education was higher than all other categories and that teachers in this category were at an innovative level and were in the "pioneering" individual category. According to the item level analysis, the answers given by the classroom teachers to all items were below the average, and considering the response categories of the scale (1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Agree and 5-Strongly Agree), the individual innovativeness levels in question are " It seems that he is stuck between "I disagree", "I am in the middle" and "I agree". Among the answers given, "Before I consider innovations, I must see that other people are using that innovation." (Item 17)" and "I like trying new ideas. It was determined that the level of agreement with the statements "(Item 2)" was slightly higher than the other items. On the other hand, the statements with the lowest agreement were "I am mostly skeptical of new ideas." (Item 20)" and "I do not give much credence to new ideas until I see that the majority of people around me accept them. (Item 7)". Regarding IIS, only the findings that are considered to be of critical importance have been shared above along with the expressions in the items in question; due to copyright reasons, the findings for all items in the scale have not been reported.

# Findings Regarding the Third Sub Question of the Research

The predictive level of individual innovativeness level, gender, graduated level of education, grade level taught, and in-service training status on the total Web 2.0 tools usage competency score was modeled with a linear regression model and the results are given in Table 4.

## Table 4.

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Explanatory / Predictive Variables	B (95% CI)	t	p	R	R <sup>2</sup>	Model ANOVA F (p)
Individual	0.237 (-0.129/0.602)	1.272	.204			
Innovativeness						
Postgraduate	29.064 (16.895/41.232)	4.700	.000			
2nd Grade	9.079 (-2.222/20.380)	1581	.115	599	359	28,219 (.000)
3rd Grade	7.450 (-3.618/18.518)	1325	.186	.000	.000	201210 (1000)
4rd Grade	13.934 (2.169/25.699)	2331	.020			
Received In-service training	40.642 (32.861/48.422)	10279	.000			

The Predictive Level of Individual Innovativeness Level, Gender, Graduated Education Level, Grade Level taught, and In-Service Training Receiving the Total Web 2.0 Tools Usage Competency Score

The model is a significant fit model (F=28.219, p < .05). Individual innovativeness, and teaching 2nd and 3rd grades are not significant predictors of the total Web 2.0 tools usage competency score (p > .05). Having a postgraduate education is a significant predictor that positively affects the total Web 2.0 tools usage proficiency compared to having a bachelor's degree (p < .05). Teaching 4th grade, receiving in-service training compared to teaching 1st grade, and not receiving it are significant predictors that positively affect the ability to use Web 2.0 tools (p < .05).

#### Discussion

As a result of the research conducted to examine the participants' competency levels in using Web 2.0 tools and their innovativeness levels and to reveal the relationship between these variables, classroom teachers' competency in using Web 2.0 tools was found to be at moderate level. While Yıldırım (2023) determined the teachers' competency in using Web 2.0 tools as low in his study, Şenel (2023) determined the competency in using Web 2.0 tools as moderate in his study.

According to the findings, the competencies of classroom teachers in using Web 2.0 tools were examined separately in terms of age, gender, graduation status, Professional seniority, grade level taught and in-service training. It has been determined that classroom teachers' competencies in using Web 2.0 tools vary by gender. Accordingly, it was determined that male teachers had a higher average than female teachers. This difference may be attributed to male teachers' higher awareness of or interest in technology, enabling more effective use of Web 2.0 tools. In the research conducted by Geçim and Çetin (2023), it was concluded that there was no significant difference in the proficiency of teacher candidates in using Web 2.0 tools by gender variable. On the other hand, studies conducted by Atalmış and Şimşek (2022) and Selvi (2022) found that male teachers had a higher average than female teachers.

When the findings related to age and professional seniority variables were examined, it was determined that as these variables increased, the participants' competency in using Web 2.0 tools increased and they had higher averages. The observed increase in competency levels with age and professional seniority may be attributed to in-service training received, cumulative experience and/or repeated exposure to technologies such as smart boards. In the research conducted by Yıldırım (2023), it was determined that the competence level of geography teachers in using Web 2.0 tools increased as age increased. On the other hand, in the research conducted by Eyüp (2022), it was concluded that the participants' competence in using Web 2.0 tools did not vary according to professional seniority.

When the findings regarding the graduation levels of classroom teachers and the variables of receiving in-service training on the use of Web 2.0 tools were examined, it was found that the averages of in-service teachers and teachers who completed their postgraduate education were higher on the Web 2.0 tools usage competency scale. In a similar vein, Keskin and Uğraş (2022) determined that the Web 2.0 tool usage competencies of physical education and sports teachers were higher, and the Web 2.0 rapid content development self-efficacy beliefs of teachers who completed their postgraduate education were higher. In addition, Akbaş and Yünkül (2024) concluded that teachers who received in-service training had higher competency in using Web 2.0 tools. However, Yıldırım (2023) found no significant difference in the proficiency level of geography teachers in using Web 2.0 tools between undergraduate and graduate teachers.

It was also observed that 4th-grade teachers had the highest average score in terms of the grade level taught. It can be said that the grade level taught by classroom teachers has an impact on the competencies in question. However Akbaş and Yünkül (2024) found that the competency levels in question did not show a significant difference according to the variable of the grade level taught. The results also showed that classroom teachers could make the lesson fun with Web 2.0 tools and ensure student participation in the lessons with Web 2.0 tools, while their competence in preparing cartoons with Web 2.0 tools and preparing lessons with augmented reality applications was low. Likewise Selvi (2022)'s findings which show that the majority of teachers were not able to prepare cartoons and design activities related to augmented reality applications, their competence in this regard was very low, and they were also able to make the lesson fun with Web 2.0 tools and to attract students to the lessons with Web 2.0 tools. In another study by Yalçın and Temur (2023), it was determined that teachers were at a high level in making the lesson fun with Web 2.0 tools, and that they were at the lowest level of competency in preparing cartoons with Web 2.0 tools.

The study also revealed that classroom teachers demonstrated а moderate level of individual innovativeness, placing them in the "questioning" category. This finding aligns with Baki (2023) who classsified Turkish teacher candidates similarly, describing them as noninnovators despite being in the questioning group. Similarly, in the study conducted by Demir and Demir (2023), the individual innovativeness characteristics of classroom teachers were found to be within the boundaries of the "questioning" category, and it was determined that the level of openness to experience was high in the subdimension and their innovativeness levels were at a medium level.

As a result of the average scores of all variables and subcategories included in the study, it was determined that all groups, except those who graduated from postgraduate education, were at the moderate level, that is, in the "questioning" individual category, in terms of age, gender, professional seniority, in-service training status, and grade levels taught. Teachers with postgraduate education were included in the category of "highly innovative" and "pioneering" individuals. Pioneering individuals take an active role in accelerating and spreading change by creating models for change in society. Inquirers, in a subcategory, learn and consult new ideas from pioneers. In the research conducted by Demir and Demir (2023), they determined that teachers remained within the boundaries of the questioning category. While there is no significant difference in individual innovativeness characteristics by gender and graduation variables, it has been concluded that teachers with higher professional seniority are at a higher level than those who are at the beginning of the profession. On the other hand, Abbak and Erdamar (2024) determined in their research that teachers' innovativeness levels were lower than the general averages and that most of the teachers were in the "questioning" category. According to the gender variable, they found that the averages of both male and female teachers were close to each other and that they were at a low level of innovation. According to the professional seniority variable, the highest average individual innovativeness level belongs to teachers in the 16-20 years seniority group, the lowest averages belong to teachers in the 11-15 years seniority group, and according to the individual innovativeness education level variable; They found that the number of participants with postgraduate education was higher than those with undergraduate education. In the study conducted by Gökbulut (2021), it was determined that teachers took their individual innovativeness characteristics into two values that are close to each other: "pioneering" and "questioning". It was found that there was no significant difference in individual innovativeness characteristics according to educational status and professional seniority variables, but men's innovativeness characteristics by gender variable were higher than women's innovativeness characteristics. In the research conducted by Yapıcı and Kaya (2020), it was concluded that the majority of the participants were in the "questioning" category and that the majority were highly innovative in terms of individual innovativeness levels. It was concluded that the results of the research conducted in the relevant literature are similar to the findings of this research. There is no difference in individual innovativeness levels between classroom teachers teaching different classes and that they are in the category of moderately innovative, that is, "questioning" individuals, with values between 57-68.

Among the answers given, "Before I consider innovations, I must see that other people are using that innovation." (Item 17)" and "I like trying new ideas. It was determined that the level of agreement with the statement "(Item 2)" was slightly higher than the other items. According to Item 17, to adopt innovations, a safer decision-making process can be followed by first observing the experiences of others. It can be said that this situation causes individual innovativeness characteristics to be in the "questioning" category, as they can affect the level of innovation, reduce the tendency to take risks, and reflect a more cautious approach. According to Item 2, considering that the individual enjoys trying new ideas, has a high level of innovation, is not afraid to take risks, and has a high innovation potential, this may have had an impact on the individual innovation level.

On the other hand, the statements with the lowest participation were "I am mostly skeptical of new ideas." (Item 20)" and "I do not give much credence to new ideas until I see that the majority of people around me accept

them. (Item 7)". This can be said that teachers can take a more cautious approach to innovation and seek more evidence to accept new ideas.

When the findings regarding the third sub-objective of the research were examined, it was concluded that teaching 2nd and 3rd grades in the context of individual innovation was not a significant predictor affecting the total Web 2.0 tools usage competency score. The intense content of the subjects to be taught at these grade levels, their resistance to the use of Web 2.0 tools, their inability to adapt to innovation easily, their lack of knowledge and experience about Web 2.0 tool usage competence, and their negative attitudes about similar issues and the adoption of new ideas between classes may be effective. However, individual innovativeness level, being a 4th-grade teacher, was found to be a significant predictor that positively affects the proficiency in using Web 2.0 tools compared to being a 1stgrade teacher. The fact that more emphasis was placed on teaching reading and writing in the first grade that it was more difficult to control writing skills in the digital environment and that children in this period were not at a level to use Web 2.0 tools may have been effective. There may be an increase in the use of Web 2.0 tools due to the development characteristics of 4th-grade students as well as their greater knowledge, experience, and experience. The fact that children in this period are more competent in using technology, their level of interaction with their environment increases, and their learning needs may be effective. In addition, classroom teachers' more effective use of these tools at this grade level may have affected individual innovativeness characteristics. The fact that 4thgrade teachers have a lot of experience and use Web 2.0 tools for various course activities may have increased this level of competence. When the literature was examined, it was concluded that the teaching processes applied in the study conducted by Uysal (2020) on the use of Web 2.0 animation tools in the science lesson of 4th-grade primary school students did not make any difference in the students' basic skills, attitudes and motivation towards science.

Another finding obtained as a result of the research is that individual innovativeness level, having a postgraduate education was found to be a significant predictor that positively affects the total Web 2.0 tools usage competence compared to having a bachelor's degree. Having a postgraduate education may have increased the teachers' innovativeness level, improved the researcher identity of classroom teachers, adopted innovations more easily and increased their competence in using Web 2.0 tools. In this respect, it makes it easier for teachers who follow technology to easily transfer it to their learning environments using Web 2.0 tools (Eyüp, 2022). Increasing pedagogical knowledge through postgraduate education, it has contributed to the motivation to use technology effectively and increase the competence of using Web 2.0 tools in terms of providing in-depth technical and scientific knowledge. In a similar vein, Gökbulut (2021) found no significant difference between teachers' innovativeness characteristics and their educational status. Moreover, in the research conducted by Beşkaya (2017), it was concluded that there was no significant difference between the participants' innovation scores in terms of their education level.

#### **Conclusion and Recommendations**

The results of the study indicated that individual innovativeness level, receiving in-service training was found to be a significant predictor that positively affects the total Web 2.0 tools usage competence compared to not receiving in-service training. In-service training activities may increase the level of individual innovation as well as the proficiency in using Web 2.0 tools. The fact that they developed creative ideas to create new content within the scope of the curriculum may increase the level of individual innovation. Considering the changes in technological developments, it can be said that in-service training activities have supported the individual innovativeness of classroom teachers. Akbaş and Yünkül (2024) found that classroom teachers' competency in using Web 2.0 tools creates a significant difference in favor of those receiving in-service training shows that it coincides with the results of this research. In addition, in the studies conducted by Akbaş (2023) and Eyüp (2022), they found that teachers' use of Web 2.0 tools differed significantly depending on their education level. As a result of the data obtained from the study, the following recommendations can be made:

• More attention should be given to in-service training activities of classroom teachers to increase their competency in using Web 2.0 tools, and teachers should be supported to receive this training.

- Classroom teachers should receive postgraduate education and their individual innovation characteristics and technology use competencies should be developed through various postgraduate training.
- Within the scope of the curriculum, various platforms should be created to produce content regarding Web 2.0 tools and share these experiences, and the motivation of classroom teachers should be increased with their innovative features by sharing application examples.
- Research should be conducted in terms of different variables regarding the effects of classroom teachers' innovativeness characteristics on their competencies in using Web 2.0 tools.

• Within the scope of this research, whether classroom teachers' individual innovativeness characteristics predict their competency in using Web 2.0 tools should be addressed with different variables.

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