YEDITEPE UNIVERSITY
GRADUATE SCHOOL OF EDUCATIONAL SCIENCES

AN INVESTIGATION OF PHYSICS TEACHERS' COMPETENCIES IN USING WEB 2.0 TOOLS

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ABSTRACT

AN INVESTIGATION OF PHYSICS TEACHERS' COMPETENCIES IN USING WEB 2.0 TOOLS

In this study, it is aimed to determine Physics teachers' competencies in using Web 2.0 tools and to examine their competencies in terms of various demographic variables. The study was conducted in correlational research design. The research was carried out with 213 participants selected by convenient sampling method among Physics teachers working in Istanbul. Research data were collected using an online questionnaire containing demographic questions and the Web 2.0 Tools Usage Competency Scale. Within the scope of the research, frequency analysis, reliability analysis, normal distribution analysis, descriptive statistical analysis, t-test and ANOVA analysis were performed. Analysis results showed that Physics teachers' competencies in using Web 2.0 tools were at a low level. On the other hand, it was determined that while the competencies of physics teachers to use Web 2.0 tools did not differ significantly according to gender and professional seniority, it differed significantly according to age, education, and receiving training on Web 2.0 tools.

Keywords: Physics Teachers, Web 2.0 Tools, Competency.

ÖZET

FİZİK ÖĞRETMENLERİNİN WEB 2.0 ARAÇLARINI KULLANMA YETKİNLİKLERİNİN İNCELENMESİ

Bu çalışmada Fizik öğretmenlerinin Web 2.0 araçlarını kullanma yetkinliklerinin belirlenmesi ve çeşitli demografik değişkenler açısından incelenmesi amaçlanmıştır. Araştırma ilişkisel tarama modelinde gerçekleştirilmiştir. Araştırma, İstanbul ilinde görev yapan Fizik öğretmenleri arasından uygun örnekleme yöntemiyle seçilen 213 katılımcı ile yürütülmüştür. Araştırma verileri, demografik sorular ve Web 2.0 Araçları Kullanımı Yetkinliği Ölçeğini içeren çevrimiçi bir anket formu kullanılarak toplanmıştır. Araştırma kapsamında frekans analizi, güvenirlik analizi, normal dağılım analizi, betimsel istatistiksel analiz, t-testi ve ANOVA analizi yapılmıştır. Analiz sonuçları, Fizik öğretmenlerinin Web 2.0 araçlarını kullanma yetkinliklerinin düşük düzeyde olduğunu göstermiştir. Öte yandan, Fizik öğretmenlerinin Web 2.0 araçlarını kullanma yetkinliklerinin cinsiyete ve mesleki kıdeme göre anlamlı bir farklılık göstermezken; yaş, eğitim ve Web 2.0 araçları hakkında eğitim alma durumlarına göre anlamlı farklılaştığı tespit edilmiştir.

Anahtar Kelimeler: Fizik Öğretmenleri, Web 2.0 Araçları, Yetkinlik.

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LIST OF ABBREVIATIONS

ICT	information and communication technology
IWB	interactive whiteboard
Max.	maximum
Min.	minimum
sd	standard deviation
WAKYÖ	Web 2.0 Tools Competency Scale (Web 2.0 Araçları Kullanımı Yetkinliği Ölçeği)

1. INTRODUCTION

1.1. Problem Statement

Keeping pace with the swift advancements in technology and science, technology has made its presence felt in every aspect of life (Özpınar, 2020). Thus, information and communication technologies (ICT) have permeated every aspect of life. As a result of this situation, many practices and procedures in daily life have fundamentally changed, especially in the last two decades, by utilizing ICT (Thakur and Yadav, 2022). The effects of these changes, which emerged with technological developments, were also seen in the field of education. Considering the new educational requirements, the necessity of making radical revisions in the education system has emerged (Özpınar, 2020). As a matter of fact, Ghadian(2007) reported that internet applications and computers have become crucial components of individuals' everyday routines. Educational institutions not only aim to promote the widespread adoption of modern technologies but also prioritize teaching the skills required to effectively use and integrate them.

With the integration of technology into the realm of education, it has been possible to implement innovative arrangements that include new understandings and techniques in learning environments. The extensive adoption of ICT in the realm of education has necessitated the use of technological tools (Irving, 2015). Thus, innovative technological applications have enabled teaching to gain a more interactive and collaborative quality (Tuncer & Şimşek, 2019). Terms such as computer use and collaboration with computers are terms used to describe collaborative learning processes through the use of ICT in teaching processes. Collaborative learning systems are applications designed primarily for students to enable and support remote

collaboration via the Internet during uniform activities such as text creation and data analysis (Kuswara, Cram, & Richards, 2008).

The integration of ICT in education has increased the interest in the use of the World Wide Web (www) in the field of education, with the implementation of activities that support collaborative learning (Garofalakis, Lagiou, & Plessas, 2013). As a result of the use of the www in educational processes, traditional media has experienced a decline in popularity, gradually being supplanted by emerging Web 2.0 technologies (Ahmed, AbdelAlmuniem, & Almabhouh, 2016). Web 2.0 is recognized as a diverse range of web-based applications that facilitate collaborative content creation and global communication among users (Butler, 2012).

The term Web 2.0 denotes "next-generation" Internet technologies that enhance user interaction (Velagapudi, 2013). The term Web 2.0 signifies the shift from a predominantly static www, where most websites served as online brochures passively consumed by users, to the contemporary web, where websites are generated dynamically and content is actively created and shared by end users (Ahmed et al., 2016). In other words, Web 2.0 sites are systems that allow social interaction and encourage collaboration to create virtual communities related to the content created by users (Richardson, 2009). Social bookmarks, blogs, wikis and social networking sites stand out as the most frequently employed Web 2.0 technologies (Sadaf, Newby, & Ertmer, 2012).

Thanks to Web 2.0 technologies, students can become knowledge producers, knowledge organizers and evaluators, and capacity to foster more engaging and robust learning environments (Richardson, 2009). The use of such technologies in education has proven useful as platforms for the seamless transfer of knowledge, providing tools for the engagement and interaction of active class members, and the co-creation of

knowledge and platforms for both collaborative and individualized learning (Greenhow et al., 2009; Bower, 2012; Hartshorne et al., 2009; Shihab, 2008 Ajjan, 2009). In addition, these emerging technologies have the capacity to foster students' interest and engagement in the learning process, encouraging them to become active and enthusiastic learners (Shihab, 2008).

The importance of science process skills in science education and the strategy of learning by living and doing, which plays an essential role in the development of these competence, is an indisputable fact. These two elements form the basis of continuous learning, questioning, discovery, creation and sense of achievement, development of analytical thinking skills, development of scientific knowledge acquisition and use skills, and development of science literacy skills in science education (Bilgin & Toksoy, 2014). Web 2.0 applications, on the other hand, are effective in spreading science research such as physics, chemistry and biology to a wider range with the opportunities it offers not only to present but also to model and analyze a phenomenon with interactive simulation environments, virtual laboratories, modeling applications and interactive whiteboard applications. used way. In other words, Web 2.0 applications encourage students to do science by providing a variety of tools to help students produce creative activities in science education and by providing a context for students to create, collaborate and communicate. 21st century teachers need to have sufficient proficiency in digital technology and pedagogical knowledge to make the most of these tools. This enables them to establish socially interactive learning environments that encourage collaborative interactions among students (Sadaf et al., 2012). Nonetheless, there is an argument that while contemporary educators are skilled in utilizing social and communication technologies, they lack adequate preparation to effectively employ Web 2.0 technologies for teaching and learning purposes (Lei, 2009)

emerges as a necessary issue. In this context, this study covers the extent of Physics teachers' competencies in using Web 2.0 tools; It will be carried out in order to examine in terms of various variables according to gender, educational background, years in the profession, place of duty, as well as following technology and receiving training on Web 2.0 tools.

1.2. Aim of the Study

Advances in technology have led to a rapid transformation in the lives of countries, societies and individuals. While this transformation is effective in many fields such as industry, economy and tourism, it also leads to significant changes in the field of education, which trains personnel for these fields. As a matter of fact, it is not possible for the technological tools used in every field not to affect the field of education. Web technologies are one of the areas where technology shows itself the most in education.

The aim of this study is to assess Physics teachers' competencies in using Web 2.0 tools and to examine their competencies in terms of various demographic variables.

1.3. Research Questions

Considering the main purpose of the research, the following questions will be answered in the study.

- What is the level of Physics teachers' competencies in using Web 2.0 tools?
- Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to gender?
- Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to age?
- Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to professional seniority?

- Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to education level?

- Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to their status of receiving training on Web 2.0 tools?

1.4. Significance of Study

In order to keep up with technology advancements in education and to improve educational quality, it is crucial to assess the Web 2.0 tool proficiency of physics teachers. This effort can benefit physics educators' professional growth and improve the educational experience for students.

Technology now has a significant impact on schooling. With the use of Web 2.0 tools, teachers may engage with their students and improve learning outcomes. In order for physics teachers to keep up with educational technology advancements, it is crucial that they understand how to use these tools successfully.

Web 2.0 solutions can improve student involvement more effectively and increase their enjoyment of studying. The ability of physics teachers to use these tools effectively may boost student engagement and promote active involvement in class. In addition teachers have the opportunity to reach more pupils more effectively thanks to Web 2.0 tools. With the use of these tools, interactive information can be created and shared that can improve student comprehension and learning chances. Therefore, the effectiveness and quality of education can be increased by physics teachers' adept use of these technologies. Technology is still evolving quickly, and this evolution has an impact on education as well. The use of Web 2.0 tools by physics professors can help them better prepare for forthcoming educational demands.

In this context, it is believeed that assessing the level of teachers' ability to use web 2.0 tools and revealing the facilitators and restrictions will contribute to the

strategies to be developed to facilitate teachers' use of technology. On the other hand, it is seen in the literature that studies on the use of Web 2.0 tools by Physics teachers within the scope of educational activities are very limited. With further research, it is thought that the use of Web 2.0 tools in Physics lessons, the efficiency of using them, or the reasons why they are not used can be revealed, and it is thought that these technologies can be integrated into the lessons correctly.

1.5. Assumptions

- The sample participating in this study, which was conducted to examine the competencies of physics teachers in using Web 2.0 tools in terms of various variables, will be considered to have the competence to represent the universe.
- It will be accepted that the teachers participating in the study answered the questions sincerely and honestly.

1.6. Limitations

The study is limited to 200 teachers working as physics teachers in Istanbul in the 2022-2023 academic year. In addition, the data are limited with the literature and the data obtained from the measurement tool developed as a data collection tool.

2. LITERATURE REVIEW

2.1. History of Web Technologies

In the last two decades, there have been great advances in semantic web technologies. Web technologies were used as Web 1.0, Web 2.0, Web 3.0 and Web 4.0 technologies, respectively. Web 1.0 is characterized as an informational web, Web 2.0 as a platform for communication and interaction, Web 3.0 as a collaborative and interactive network and Web 4.0 is recognized as an integration network (Aghaei et al., 2012). This process is briefly explained below.

2.1.1. Web 1.0

In Web 1.0, a limited number of developers create web pages intended for a vast audience of readers. Intercommunication between these web pages is limited to the web user navigating only through links between web pages. Here, users are in a position that can only receive information, in other words, consume information (Naik & Shivalingaiah, 2008).

2.1.2. Web 2.0

Web 2.0 offers environments where everyone can be an active participant and develop content with reading and writing activities. Web 2.0 is associated with collaborative work, sharing ideas, interoperability, user-centered design, and web applications that enable easy interaction. It encourages teachers and learners to share their ideas and to learn and work collaboratively to develop those ideas. As they use these technologies, teachers rethink their way of teaching and learning. Thus, differences will be obtained in the direction of more active and meaningful learning paths (Kenchakkanavar, 2015).

2.1.3. Web 3.0

Web 3.0, or semantic web, includes the methods used to express the mutual communication between machines that occur outside the user. It aims to ensure that web contents can be expressed in a way that can be understood, interpreted and used not only by people but also by related software (agents), so that these software can easily find, share and combine information (Hassanzadeh & Keyvanpour, 2011). The development of intelligent web systems through the semantic web holds the promise of offering educators, teachers, and learners more comprehensible, interpretable, and user-friendly content. As a result, user roles, goals, needs, and responsibilities will undergo redefinition within e-learning environments (Şendağ, 2008).

2.1.4. Web 4.0

Web 4.0 is a new revolution in education and technology. The virtualization process is important in Web 4.0 definition. Web 4.0 applications are expected to benefit from artificial intelligence technology as well as augmented reality technology (Kurulgan, 2013). While today's technology slides are made using applications such as prezi and powerpoint, thanks to web 4.0, students can make 3D presentations and students' visual memory can improve, their motivation and interest in the lesson increase. In addition, teachers will use smart artificial intelligence robots to increase their teaching efficiency even more (Fensel et al., 2016).

2.2. Web 2.0 General Features

The notion of Web 2.0 was introduced by Tim O'Reilly in 2004, which encompasses applications that empower users to generate and consume information, collaborate and modify shared content, and express their own ideas without relying solely on pre-existing information. These applications are designed to be user-friendly and accessible to individuals without extensive computer literacy skills. (O' Reilly,

2007). Web 2.0 is a system created jointly and collaboratively by users, including communication tools, social communication sites, second generation internet services and wikis (Erkul, 2009). Dawson (2007) has compiled the fundamental characteristics that Web 2.0 applications should possess, categorizing them into seven key aspects:

- Participation: The paramount characteristic of Web 2.0 applications is that they allow sharing by creating content easily. The user can participate in the applications individually or collectively (Albion, 2008; Odabaşı et al., 2012).
- Standards: There are common standards used in data processing, application and sharing in Web 2.0 applications. Interfaces in internet-based applications seamlessly integrate all elements together and allow for the easy integration of new technologies into the system (Odabaşı et al., 2012).
- Distributed Structure: Content and applications are shared through different systems and computers instead of collecting them in a single authority. In this way, it ensures the continuation of applications by providing data security (Odabaşı et al., 2012).
- Openness: The open and transparent access granted to participants in these applications ensures an increase in both the number of participants and the shared content (Franklin and Van Harmelen, 2007; Odabaşı et al., 2012).
- Modularity: Web 2.0 technologies, which consist of many components and modules that work in harmony with each other, enable applications to work together within the framework of determined standards (Odabaşı et al., 2012).
- User control: In Web 2.0 technologies, users can edit, control or change their own or existing content. Each of the participants is a manager and also an editor (Franklin & Van Harmelen, 2007; Odabaşı et al., 2012).

- Identity: Participants can introduce themselves in Web 2.0 softwares and especially in social media platforms. Individuals can communicate in any way they wish using their real identity information (Odabaşı et al., 2012).

It is a concept that includes many applications under the term Web 2.0. The primary objective of the new services in this application is to enable users to produce and share content and to improve interpersonal communication and engagement in a social setting within the framework of cooperation. Web 2.0, which is expressed as social software, is an important step in the transition from web reading to web literacy (Horzum, 2010).

Supporting interaction and sharing among users of Web 2.0 applications is considered to be one of the most crucial steps that will enable the development of the learning and teaching environment in the field of education and training, thanks to the active production and sharing of information with groups (Wright and Akgüngüz, 2018). According to Smaldino, Lowther, Mims, and Russell (2015) the gains from Web 2.0 softwares are:

- Information is easily accessible and can be carried easily with many devices such as mobile phones, tablets and computers.
- Thanks to the easy learning of the applications, it allows everyone to prepare designs such as webcasts and online videos, graphics.
- In addition to developing a real readership, users get opportunities to receive feedback on their shares through interactive tools such as blogs, wikis, etc.
- It makes communication easier and faster by supporting cooperation between individuals.
- By increasing social awareness, users become more sensitive to other users through social networking sites that provide access to information.

- Due to the availability of numerous free Web 2.0 tools, they can be readily utilized in an educational context as well.

2.2.1. Web 1.0 vs. 2.0

The "www", which is expressed as the wide world network, is a channel on the Internet. The users of Web 1.0, which is the first generation of this channel, are passive, only receiving information. Users cannot make any changes on the content, they can read and use the information about the content as it is (Ergenç, 2011; Horzum, 2010).

Web 1.0, as the original version of the Web, ensures that the information shared by users with the necessary technical knowledge is delivered to all users via static web pages. But the concept of Web 2.0 includes much more than just an application that allows the active participation of users. The concept of Web 2.0 is expressed as the general title of many applications with extended functionality (Caladine, 2008).

The key distinction between Web 1.0 and Web 2.0 lies in the fact that, in Web 1.0, users primarily consume content, whereas in Web 2.0 applications, users actively produce content. The basic structure of Web 2.0 is that it allows changes that can be made in all kinds of audio, text and video content (Cormode and Krishnamurthy, 2008). According to Solomon and Schrum (2007), the main difference between the characteristics of Web 1.0 and Web 2.0 concepts is given in Table 1:

Table 1

Distinguishing Features of Web 1.0 and Web 2.0 Concepts

Web 1.0	Web 2.0
Application-based	Web-based
Isolated	Collaborative
Offline	Online
Licensed or purchasable applications	Free apps

A single creator	Multiple collaborative partners
Personal code	Open source
Content with copyrights	Shared content

Source: Solomon and Schrum (2007)

2.3. Web 2.0 Tools

Considering the technological tools used in education, technologies such as radio, television, one-way video-conferences, e-mail, and discussion forums provide communication between students, but they remain weak in terms of active interaction and cooperation (Koçak-Usluel & Mazman, 2009). These technologies, in which students are mostly passive participants, are defined as Web 1.0 and ways to use blogs, wikis, podcasts and social media more effectively in education have begun to be explored in order to provide more active interaction and cooperation. The primary attribute of what are known as Web 2.0 tools is the active involvement of users in the content creation process. In learning and teaching studies, the importance of active participation, critical thinking, social readiness, cooperative learning and two-way communication is underlined as well as the efficiency of technological advancement for the realization of quality learning (Beldarrain, 2006). The word Web 2.0 was first used in a brainstorming meeting organized by MediaLive International and O'Reilly Media in 2004, leading to new discussion topics and ideas (Erben & Balaban-Salı, 2015).

The primary distinction between Web 1.0 and Web 2.0 lies in the fact that in Web 1.0, content creators constitute a small fraction of the large population of content consumers, whereas any contributor in Web 2.0 can be content creators. According to O'Reilly (2007), Web 2.0 signifies a business revolution within the computer industry, propelled by the Internet's advancement as a platform, and endeavors to comprehend

the rules governing this platform to achieve success. One of the primary rules is as follows: establishing programs in a manner that allows a greater number of people to benefit from network effects (O'Reilly, 2007).

The first examples that come to mind when Web 2.0 is mentioned are Wikipedia, Youtube, flickr, del.icio.us and Facebook. Students can create blogs on these platforms and access lessons from their smart phones. In the background of the image sharing used, there are Web 2.0 tools such as RSS and Blackboard. For example, with Del.icio.us, frequently used links, articles, blogs, music can be stored and these contents can be accessed from any computer. It is possible to share the research assignments given to the students with the whole class. Facebook can be used as an inter-curricular medium among distance education students. You can give links to videos related to the content of the course on Youtube. Many universities have campuses in Second Life. How such a 3-dimensional reality environment can be used in education and what kind of features should be found in the infrastructure of the learners are also among the researched topics.

Grosseck (2009) listed the pros and cons of Web 2.0 tools. According to Grosseck (2009) Advantages of Web 2.0 are:

- Cost reduction
- Flexibility in choosing technology
- Quicker and more convenient access to information on demand
- Incorporation of diverse Web 2.0 tools in educational activities
- Wide chances for information and collaboration through social bookmarking services
- Keeping access to resources under control thanks to authentication
- Sharing of accumulated experiences and resources

- Being independent of the place
- Compatibility with elements in the field of education and existing conceptual dynamics
- Ease of use

According to Grosseck (2009) disadvantages of Web 2.0 are:

- Requires internet connection
- It still hides some under-defined technologies and concepts behind it.
- Inability to reach the page when the user cannot activate Java because it is built on Ajax based on JavaScript
- Variety of comments according to browser types
- Promote free open-source structures whose relevance is highly uncertain.
- It has the potential to cause a drop in the content's overall standard
- Increasing amateurism through user-generated content with no value
- Ability to create an unruly community by offering everyone the opportunity to complain
- Being mediocre for people with low numeracy skills
- Limited security

2.4. Web 2.0 Applications

Web 2.0 softwares that permit users to produce and distribute different content with their simple interfaces can be classified as blogs, wikis, podcasts, RSS (Rich Site Summary), social networks and instant messaging.

2.4.1. Blog

Blogs, which is the abbreviation of the term weblog, are Web 2.0 applications where they can express their opinions and propositions and collaborate with different users (O'Reilly, 2007). Blogs are Web 2.0 technologies that are generally created for

self-promotion, expressing thoughts, can be written individually or as a group, and contain audio files, links, pictures and texts. Participants can comment on the articles on the blogs or share the links on the subject, thus gaining the feature of being open to cooperation and enabling interaction (Horzum, 2010).

Blog pages containing links to websites, text, images and multimedia allow students to share their knowledge with their friends, teachers and many participants (Smaldıno et al., 2015). In addition to opportunities such as sharing information and discussing shared information, blogs, which are generally based on personal opinions, are websites that are listed chronologically (Kolari, Finin, & Joshi, 2006).

According to Murugesan (2007), the features of web-based blogs, which are a strong two-way communication network, are as follows:

- Blog posts are presented in a descending chronological sequence
- Blogs often contain text as well as photos (photoblog or photolog), videos (videoblog or vlog) and audio (podcast).
- While the logs written by a pocket computer or mobile phone are expressed as mblogs, blogging in real time is called liveblogging.
- Thanks to the web interface, users and readers have the opportunity to access any blog post easily and cheaply.
- One of the important features of blogs is that the user can link to other blogs in any blog post. Thanks to this feature, people and communities with the same interests can easily communicate.
- Many different blog posts, including subject and author, can be found easily using search engines (Technorat or Feedster).

Blogs are an important part of online culture. It provides the development of blogging skills that provide the recent information on the web from a primary source.

Encourages and develops students in writing under the guidance of their teachers. It allows individuals to see their own development and provides the opportunity to get opinions from their peers and teachers (Godwin, 2007).

2.4.2. Wiki

Wikis are areas where users can share information on certain topics, edit and discuss content without the need for any authorization. It is the environment known as WikiWikiWeb, which was first established by Cunningham in 1994 (West and West, 2009). Wikis offer their users the ability to write or edit collaborative information by giving them the ability to interact with writing written or edited by others (Smaldıno et al. , 2015).

Wikis are a Web 2.0 tool that offers many authors the opportunity to share, edit and change content collaboratively. Wikipedia stands out as the most renowned illustration, which is translated into every language of every country. Wikis have been one of the important steps in the transition of users from being readers to being literate (Horzum, 2010).

One of the most important features of wikis is that they offer equal conditions to their users. Motivation of students can be increased by providing the opportunity to make necessary changes on wiki information (Çekinmez, 2009).

According to Murugesan (2007), the general characteristics of wikis are as follows:

- Wikis provide shortcuts for formatting information and linking content.
- Offers a simple site structure and creates easy links for users from one site to another.
- It creates links between the contents in order to provide a common view to all its users.

- Allows more than one user.
- It offers users the opportunity to write, edit and publish as they wish.

2.4.3. Podcast

Podcasts are audio recordings that allow voices, speeches, voices to be recorded and listened to in the computer environment or with the help of different technological devices (Fahser-Herro and Steinkuehler, 2009). Podcast is the download of audio and media files over the internet via RSS. Podcast offers the opportunity to listen to the computer, phone and tablet at any time. Podcast applications provide the opportunity to obtain information by offering a wide range of fields such as news and education (Kargozari and Zarinkamar, 2014).

Podcast applications can be used in the remote education process and library education. It allows students to save time by listening to podcast content at different times (Godwin, 2007). Podcasts allowed the broadcasting of different content such as music, news and educational topics, both audio and video. The opportunity to create, share and watch short-term content is provided. Podcasts, which are the stages of creating content, sharing and listening to the created content, can also be used in the field of education for students participate in the lesson equipped, to cover the lessons they missed, and to repeat the subject (Karaman, Yıldırım, & Kaban, 2008).

2.4.4. RSS Feeds

Web-based RSS aggregators emerged in 1997 with the use of Dave Winer's phrases "Really Simple Syndication" and "Rich Site Summary". RSS allows users to be aware of new content by changing the topics they are interested in according to their interests (O' Reilly, 2007; Swettenham, 2006). The file format of RSS feeds, which makes it easy to follow the updated content of news providers, has rss and xml extensions. The content presented in the RSS feed may contain all or a summary of the

information. It is a very fast Web 2.0 application because it is text-based (Çekinmez, 2009). It provides the collection of content that changes according to the interests of users, such as articles and news, on a page with XML codes (Horzum, 2010).

RSS feeds are an internet application that allows users to more easily follow the innovations on the Web site about the topics they follow. Users can easily follow the updates of the relevant content by becoming a member of the RSS website (Deperlioğlu and Köse, 2010, p. 340). Besides being used in informative web pages such as RSS news feeds and announcements, it can also be used in many Web 2.0 softwares such as blogs and podcasts (Karaman et al., 2008). With RSS feeds, students can access the most up-to-date information on any subject more easily and see the updates on the sites in a short time (Horzum, 2010).

2.4.5. Social Networks

Social networks are expressed as software that facilitates interaction between users and offers alternative ways for interaction. Social networks support the user when they achieve their goals by including them in the process in line with their wishes (Onat & Aşman Alikılıç, 2008).

According to another definition, it is the areas where social network users can share content by communicating via the internet (Akgündüz, 2013). According to Boyd and Ellison (2007), for an application to be a social networking site, access and interaction between users should be easy, the profile should be visible to everyone, and the connection should be easy.

It is the name given to the general social networking web sites that have many users in the world and in our country. With the concept of social networking, people first think of websites such as Facebook, Twitter, Myspace, Youtube that reach many users. Social networks, where users can share personal information such as pictures and

videos for their purposes, increase the number of users day by day thanks to their ease of use (Ergenç, 2011).

2.4.6. Instant Messaging

Instant messaging is a computer-based, simultaneous communication network. Users create a certain list of friends and allow them to communicate instantly or at certain time intervals. Instant messaging applications allow users to chat at any time by providing information about the current status of the person they are communicating with, such as online and active. Applications have a positive effect on social network learning by increasing collaboration among users. Skype, Google Talk, Whatsapp, Facebook Messenger, Yahoo Messenger are some of the instant messaging applications. Instant messaging applications are among the most preferred applications for interpersonal communication(Nardi, Whittaker & Bradner, 2000).

According to Rennecker and Godwin (2013), the reasons why instant messaging applications are preferred are;

- providing the opportunity to communicate in groups,
- being able to check whether the people to be contacted are visible or not,
- being able to get instant information about what individuals are doing,
- the user can communicate in a closed way whenever he/she wants.

The fact that instant messaging applications provide written and voice communication opportunities to their users and that the applications are free at the same time have made it widespread. Applications that allow file sharing and sending additional materials also improve cooperation among users (Horzum, 2010).

2.5. Use of Web 2.0 Tools in the Learning-Teaching Process

In the 2000s, which is known as the digital age, teacher-student roles have also gained different dimensions. Today's children are born into technology. Therefore, they

can integrate technology into every aspect of their daily lives. That's why we need to call 21st century children digital natives. Digital natives can easily adapt to the changing world order and take an active role in this order. It is necessary to teach them how to find information, how to use it, and how to increase their digital competence level so that digital natives are not lost in the unlimited information on the Internet. Throughout this process, educators need to guide students correctly and interact well with them (Bilgiç, Duman, & Seferoğlu, 2011). When digital native students learn to use technology as a tool, not a goal, and digital immigrant educators learn about interactive, e-content enriched course methods, a bridge between two generations will be established and an efficient educational environment will be provided (Geçgel, Kana, & Eren, 2020).

Digital contents are highly interactive materials with a strong pedagogical approach, prioritizing conceptual depth, and subject integrity. These contents related to real life, interactive experiments that are difficult to perform in the physical environment, animations in which abstract concepts are visualized, simulations, games containing large projects that require the blending of multiple disciplines, are new generation measurement materials where all these are used for evaluation (MEB, 2018). According to Karaca and Aktaş (2019), with the widespread use of Web2.0 technology-based applications, the idea that these applications should be used more effectively in education and training processes has been accepted by many researchers. In order for teachers to use these applications effectively, they need to be knowledgeable about how these applications are used for educational purposes.

When we look at Web 2.0 tools, it seems appropriate to use them in teaching because they include the user in the system, that is, they also offer the student the right to speak and reason (Aldır, 2014). Because technology's independence from time and

space, significant time savings, and easy access to many information means an excellent opportunity for the education-teaching community. It is possible to reach resources in different fields and branches related to the adoption of Web 2.0 tools in lessons. For example, Almalı (2020) examined the effect of teaching geography subjects on students' attitudes and academic achievement by using Web 2.0 applications in the Social Studies course and stated that the use of Web 2.0 applications had a positive influence on educational achievement and approaches towards Social Studies course (Çoban & Adıgüzel, 2022). Hamlı and Hamlı (2021), in their study titled "The influence of web tools in lessons on academic success", stated that today's education has turned its course towards technology and that education now expects learners to be individuals who can research, question, criticize, think critically, and analyze. They also stated that, as a requirement of the century we live in, the aim of education is for individuals to be open to innovations, to follow scientific developments and to catch up with the era. For this reason, what is expected from the learners in the teaching process is to be an active participant in the process and to engage in content creation. Today, Web 2.0 tools are at the forefront of the technological development that offers many possibilities such as content creation, content control and sharing. It is thought that these tools, which are increasing in number and variety, will be tools that can be used continuously throughout the teaching process (Hamlı and Hamlı, 2021). Fan, Radford, and Fabian (2016) stated in their studies that traditional methods are no longer accepted by students at any level of education, and it would be more accurate to employ technological applications as required by the age. They also added that Web 2.0 applications and various web-based softwares should be included in the programs that enable individual learning, enable students to keep their own learning under control and prepare them for the lesson in a more motivated way. Batıbay (2019), on the other hand, investigated the effect of

Kahoot, a Web2.0 application, on motivation and success in Turkish lessons, and stated that Kahoot Web2.0 application had a beneficial impact on students' motivation, but a significant increase in success scores could not be achieved.

The primary benefit of Web 2.0 applications is that the participants, namely students and teachers, go out of the classroom and become world-wide information sharers. The key elements shared are projects, environments, ideas, and connections. Web literacy, personal and collaborative active participation, social interaction, integrated content and folksonomy can be counted as the main features of Web2.0 applications. With Web2.0 tools, users have become web readers and writers. The materials to be created with Web2.0 tools are open source and accessible to everyone. Such materials are becoming reusable and the material being developed around the world or country is increasing. As the materials can be developed collaboratively with different people, they will become teaching aids to which text, images and videos are added and shared on social networks(Horzum, 2010).

In the literature, the contributions of Web2.0 applications to educational environments are listed as follows (Karaman et al., 2008):

- Habit of working in groups
- Efficient learning
- Advanced cognitive abilities
- Ability to navigate and evaluate information
- Constructivist approach to solving problems
- Student eligibility (attraction)
- Individual development
- Taking responsibility.

Web-based applications have gained more importance in the last ten years, when traditional methods have been abandoned to keep up with the processes and go beyond the acquisition-participation dilemma, and students learn to learn by doing. In current views of learning, students are now taking control of themselves. They connect with their peers and generate new ideas through inquiry and insight. Hence the training, content creation provided by Web2.0 tools. Web2.0 tools provide the opportunity to perform constructivist learning activities in education (McLoughlin & Lee, 2007).

Through these tools, students can work collaboratively, control their individual learning and develop their creativity. This highlights the utilization of these tools to fully achieve the purpose of the constructivist understanding, which is a part of the information age (McLoughlin & Lee, 2007). In learning using these tools, the teacher can see the whole process of how students understand, construct and solve a concept, event or problem. Being able to see the whole process will enable to master all aspects of learning. In learning, which is known in all its aspects, the teacher will easily make up for the deficiencies and make corrections (Horzum, 2010).

According to Shank (2008), Web 2.0 tools changed old learning ways and introduced new ones. First, when people want to learn about a topic, their online searches increase. In other words, web resources are now becoming primary resources, while previously printed resources were looked at encyclopedias. Second, there is an increase in informal learning approaches in addition to formal learning approaches such as courses or special tutorial software. Information seekers can obtain information by reaching experts via e-mail, instant messaging, wikis or blogs. Third, since there are easy-to-use tools that provide online content sharing, people take on the role of both students and teachers (as cited in Horzum, 2010).

Teachers must possess the skill to incorporate the features of Web 2.0 tools into their educational processes, effectively utilize them, and, above all, seamlessly integrate them into their respective disciplines. Therefore, in order to be productive for their students in both face-to-face and digital education environments, the necessity for teachers to be competent and equipped digitally, as in many subjects, makes itself felt (Çelik, 2020).

As a result, the benefits of Web 2.0 tools for both students and teachers can be listed as follows (Eğitim Teknoloji, 2022):

- Teachers can add vitality and movement to their classrooms.
- Teachers have the opportunity to evaluate their students beyond their written papers.
- Lessons become up-to-date and functional.
- Thanks to its flexible working hours for students, it can be used at any time, even outside the classroom.
- Students become technology literate.
- Information is accessed in the most up-to-date and functional way.
- Students have the opportunity to work collectively by going beyond the textbooks.
- Students can receive criticism about the product they have prepared and they can easily develop the product they have put forward according to these criticisms. In this way, students become more involved with the academic subjects they are working on and increase their control over their own learning.

- Students engage in the learning environment using multiple senses, facilitating the acquisition of more memorable information and fostering cognitive development.

Some Web 2.0 applications used in education are described below.

- Padlet: A teacher may make digital boards using it. On these bulletin boards, students can post their thoughts and content. It can be used by teachers to improve student engagement and promote idea sharing (Zainuddin et al., 2017)
- Kahoot!: You are able to build interactive tests and surveys using this platform. Through competitive activities, students can make learning enjoyable (Sabandar et al., 2018).
- Quizlet: Helps students learn by creating flash cards. It can be used for vocabulary learning, math questions and other learning materials (Bueno-Alastuey and Nemeth, 2022).
- Socrative: Teachers can keep an eye on and assess students' responses in real time. It is useful for making quizzes and surveys (Balta et al., 2018).
- Seesaw: It is a communication and portfolio site created specifically for elementary school pupils. Students can share their lessons and projects (Deleon, 2018).
- Flipgrid: With video answers, it enables students to practice speaking in an interactive setting. Teachers can assist pupils in developing their communication and speaking abilities (Syahrizal and Pamungkas, 2019).
- Trello: It is especially useful for project management. It can be used to easily organize and monitor group work (johnson, 2017).

2.6. Advantages and Disadvantages of Web 2.0 Technologies in Education

Byrne (2009) classified the benefits of using Web 2.0 technologies in education under four headings as learning, motivation, productivity and learning to learn and listed these benefits. Elmas and Geban (2012) gathered and analyzed the positive

outcome of Web 2.0 technologies in three classes, namely teacher, student and classroom environment, using these topics. The positive outcomes of Web 2.0 technologies to teachers are as follows (Deperlioğlu & Köse, 2010):

- It adds movement and vitality to the classroom with the different activities, applications and products it brings to the classroom.
- They present variety for teacher assessment and evaluate student-produced products alongside traditional assessment.
- The teacher can provide students with daily life, up-to-date and high-functioning content and news in a more comfortable way.
- The teacher can observe the products produced by the students throughout the whole process, as the places cited and the materials used in the activities prepared with Web 2.0 tools are indicated with a link link,
- The teacher can provide active participation in the lesson by teaching the lessons in a student-oriented manner.
- Through the utilization of various Web 2.0 tools, it can ensure that the students who are shy and less involved in the lesson participate in the lesson, so that all students engage in the lesson equally.
- It greatly contributes to the continuation of the learning-teaching process of teachers in epidemic and disaster situations as in the pandemic process.

According to Byrne's (2009) research, Web 2.0 tools greatly contribute not only to teachers but also to students (Deperlioğlu & Köse, 2010). The positive outcomes of utilizing Web 2.0 applications in the course are as follows (Elmas & Geban, 2012):

- The student, who constantly uses a different Web 2.0 tool, becomes more active in the lesson by constantly having to exercise his mind.

- Students' teaching with Web 2.0 tools contributes to their being more active and enterprising individuals in the future and to be a good information and technology literate. This situation prepares students for professional life.
- While preparing a product, flexible and out-of-class environments can also be used as a working area, supporting the achievement of students with diverse learning preferences
- Thanks to web links, students can find the source of the information they have learned and get the right information by researching in depth from different sources.
- Students can participate in an educational environment that appeals to more senses. Thus, it contributes to structuring the information in a more memorable way.
- Can receive criticism about the products they have prepared with Web 2.0 tools. By taking these criticisms into account and rearranging their product, they are provided to improve their product and themselves.
- Web 2.0 tool-integrated platforms are not just for individual work. Students can work in groups while implementing activities or designing products. Thus, it contributes to their becoming social individuals.
- It offers students the opportunity to study, produce content and edit the content produced from different sources other than textbooks. Thus, it contributes to the development of students' self-confidence and creativity.

According to Byrne's (2009) research, Web 2.0 tools also have a positive influence on educational settings (Geban & Elmas, 2012). The positive outcomes of utilizing Web 2.0 technologies in the course are as follows (Geban & Elmas, 2012; Gül, 2022):

- By creating a dynamic environment, it provides more opportunity to participate in the lesson.
- It is ensured that students develop positive attitudes towards each other by allowing them to work collaboratively.
- It enables online education to make the learning environment more effective.
- It facilitates the transfer of the obtained information to daily life.

It is not possible for every Web 2.0 tool to provide the above-mentioned benefits. These benefits depend on the incorporation of teachers in the procedure according to the characteristics of the learning-teaching environment and students (Geban & Elmas, 2012). Especially during the pandemic period when everyone is sitting at home and schools are closed, students have been constantly intertwined with the phone and computer and have distanced themselves from sociality. By utilizing Web 2.0 tools effectively, students can use their interest in technology in a way that will benefit them. In this process, it contributes to their socialization in the virtual environment.

There are some disadvantages as well as advantages in utilizing web 2.0 tools in educational environments. If the applications made with Web 2.0 tools are not prepared in accordance with their purpose and are not used correctly, some negativities may be encountered (Akbaba, 2019). For the purpose of increasing the lesson's efficiency, the things that teachers should pay attention to when using the web 2.0 tool are as follows (Deperlioğlu & Köse, 2010; Elmas & Geban, 2012; Gül, 2022):

- Web 2.0 tools are beneficial to utilize, but mastering their usage will require some time. Students need to possess adequate knowledge and skills in using computers and Web 2.0 tools.

- Students should be instructed not to plagiarize while creating content or producing products.
- If the student receives the information on the internet directly instead of adding his own thoughts while creating the content, his creativity and cognitive development may be negatively affected. The teacher should be careful at this point.
- The possibility of students misusing web tools during the lesson should always be considered.

2.7. Studies on the Use of Web 2.0 Tools in Education

A master's thesis study (Durusoy, 2011) investigating the impacts of Web 2.0 technologies and the utilization of digital videos on pre-service teachers' self-efficacy was carried out with 10 students studying at Balıkesir University CEIT. During the Teaching Practice course, the lectures of every student were recorded thrice, spaced at regular intervals, and these recorded videos were then shared on Facebook, a social network based on Web 2.0 technology. The shared videos were watched by students, practice teachers and instructors, and comments were written on the videos. According to the results of the research, it was found that there was a statistically significant positive change ($p=0.009$) in the teaching self-efficacy of the prospective teachers and the qualitative data supported this change. As a result, it was stated in the research results that the use of Web 2.0 applications together with the use of digital videos in the training of teachers is an effective tool in improving pre-service teachers' self-efficacy (Durusoy, 2011).

In the master's thesis study (Mıcık, 2011), which investigates the utilizing of Web 2.0-based environments for professional improvement objectives by the Information Technologies teacher candidates, the participants of the study were

included in the Department of Computer Education and Instructional Technologies at Ege University in the 2010-2011 academic year fall semester of the Professional Development of Information Technologies Teachers-I course. It consisted of 4th grade students (n=43). It has been observed that the information technology teacher candidates found this study very useful and they wanted to use what they learned in their professional lives. It has been observed that the Web 2.0 environments of the participants contributed to the professional development of teacher candidates (Mıcık, 2011).

In the study conducted by Ata (2011), the relational survey model was employed to investigate the correlation between university students' utilization of Web 2.0 technologies and their perceptions of information literacy self-efficacy. The research group comprised 2776 university students enrolled in different faculties of Dokuz Eylül University during the 2010 - 2011 academic year. Questionnaire and information literacy self-efficacy perception scale for the utilizing of Web 2.0 softwares and applications were served as instruments for data collection of the research. As a consequence of the research, it is stated in the research results that there are significant differences between information literacy self-efficacy perceptions and computer ownership, Internet usage frequencies, foreign language level, Web 2.0 applications (Wiki, Blog, video sharing sites, podcast, Facebook and MSN) usage frequencies (Ata, 2011).

In the doctoral thesis study (Arat, 2011) investigating the use of communication technologies for teaching purposes in higher education institutions, a questionnaire was applied to the academicians and students of Selçuk University regarding the use of communication technologies in higher education. According to the findings, it is stated that while there exists a notable disparity in the utilization of communication

technologies, there is no significant difference in their use for course purposes, and the use of communication technologies decreases as the seniority increases(Arat, 2011).

In the master's thesis titled "Application of Mobile Information Technology in Electrical and Electronics Engineering courses" (Taş, 2011), mobile technology applications developed for Solid State Electronics course, which is one of the second year electrical and electronic engineering courses, are presented. In the study, the narrated films that were prepared beforehand and that help the students to learn the lessons were arranged so that they could be used in mobile technologies. The student admission percentage, which was 16% in the first application, increased to 72.4% by the conclusion of the semester. 77.8% of the students stated that the video/audio features used were at an acceptable level. It is stated in the results of the research that dynamic education methods increase the motivation and experience of the students (Taş, 2011).

2.8. ICT Based Physics Learning

In the field of Physics, teachers utilize various means such as words, equations, graphs, and diagrams to depict and explain physical systems. However, numerous students encounter challenges in generating these depictions and struggle to grasp how they convey information about the system and their interconnections (Aravind & Heard, 2010). This poses a significant pedagogical issue from high school to university, as students face considerable difficulties in applying physics theory and equations to the phenomena they observe in the laboratory or in their everyday surroundings (Scheucher et al., 2009).

It is important to acknowledge that numerous experiments, which aid learners in comprehending physics concepts, cannot be carried out in actual laboratories due to

their inherent impossibility, such as being extremely hazardous, excessively intricate, time-consuming, or financially prohibitive (Kroothkaew & Srisawasdi, 2013).

Consequently, it is essential to offer students motivation and encouragement throughout the teaching and learning journey to facilitate conceptual transformation (Kroothkaew & Srisawasdi, 2013). Thus, there is a need for an engaging and captivating experience to enhance their educational process (Carr & Bossomaier, 2011).

As the youth gravitate towards computers as their preferred tool, employing them for educational purposes is an extremely beneficial move (Carr & Bossomaier, 2011). In recent times, the utilization of ICT for science education has witnessed a notable rise, proving to be an efficient resource for teaching, practical tasks, and research (Logofatu, Munteanu & Logofatu, 2004).

2.8.1. The use of ICT in teaching physics

The integration of ICT in the teaching and learning process enhances the effectiveness of education. Various ICT tools can be utilized to teach Physics, whether it be in the traditional classroom setting, laboratory environment, or online platforms. In the classroom, commonly employed technologies for teaching Physics include the overhead projector and interactive whiteboard. Online teaching can make use of web whiteboards and digital whiteboards. The introduction of computer-based technology has revolutionized the approach to teaching sciences in educational institutions (Shih et al., 2012).

ICT can be utilized to teach Physics through various methods, including the delivery of content via PowerPoint presentations, interactive tutorials, problem-solving exercises, simulations, engaging in active learning approaches, and demonstrating objects in two or three dimensions.

By incorporating ICT into the teaching of Physics, the learning experience becomes more captivating, appealing, and comprehensive. This is made possible through the multimedia capabilities of ICT. The multimedia features commonly utilized in ICT include audio, video, audio-video integration, colorful text, and interactive elements, which can be employed to enhance lesson presentations.

2.8.2. Types of ICTs tools used for teaching physics

ICT tools used in physics teaching can be used in a variety of ways to help students better understand and learn about physics. A range of ICT tools is employed for the objective of teaching and learning. The specific tools utilized in teaching Physics are outlined below:

2.8.2.1. Interactive whiteboard (IWB)

An interactive whiteboard, affixed to the front of the classroom and linked to a computer and projector, serves as a valuable resource for teaching Physics. The Interactive Whiteboard (IWB) is widely acknowledged as a tool that enriches the teaching process and facilitates learning. (Smith et al., 2005).

The physics teacher has the ability to construct captivating lessons that incorporate videos, images, and recorded explanations. The interactive whiteboard serves as a medium for presenting ideas and explanations in a visible and easily understandable format. During the teaching and learning process, both the teacher and the students can utilize the interactive whiteboard to record themselves while jotting down relevant details and addressing problems related to the topics at hand. Furthermore, lessons taught using the interactive whiteboard can be recorded and played back later for review purposes at the convenience of the learners.

2.8.2.2. Overhead projector

The overhead projector is a helpful visual tool employed to display lesson concepts and content on a screen within the classroom. Lessons conducted with projectors commonly utilize PowerPoint presentations, which consist of topic slides and their respective contents. The use of PowerPoint presentations has proven to be an effective teaching method, enhancing students' understanding, comprehension, and motivation in the learning process (Tang & Austin 2009).

The teacher assumes the role of a facilitator, allowing the students to actively engage in the learning process. Various features are frequently employed alongside the overhead projector, such as animation, audio, video, and the presentation of images in two or three dimensions.

2.8.2.3. Digital whiteboard

This particular ICT tool can be utilized for teaching purposes, both in a physical classroom setting and in an online environment. The digital whiteboard is connected to the internet, enabling the conversion of written content into digital form on the online board. Consequently, any lessons delivered in the classroom can be digitized and made available online.

When utilizing the digital whiteboard, the teacher gains immediate access to online teaching materials, including YouTube videos and various learning resources. Any content written on the digital board is digitized and stored in the cloud. The digital lessons stored in the cloud can be retrieved by the teacher for improvement or accessed by the students for further use. By making lessons available online, students can conveniently access them from any location.

2.8.2.4. Web whiteboard

The web whiteboard, also known as a web board, facilitates online interaction between teachers and students, enabling them to engage in teaching sessions on a webpage at any time and from any location. The teacher can access it using a laptop, while students can access it using their smartphones. This tool is particularly useful for distance learning purposes.

This aligns with Poole's (2000) perspective, which suggests that the emergence of the www and the internet has introduced a novel technological avenue that enables distance learning possibilities.

The teacher possesses full authority over the internet webpage, granting them control over class attendance, whiteboard activities, and student participation. As Van Gorp (1998) emphasized, the web serves not only as an information repository but also as an interactive platform for communication and collaborative knowledge building. Anything written on the web whiteboard is visible to both parties involved. Lesson materials, including video, audio, and text pages, are digitized, saved, and shared with all students following the online class.

2.8.3. Use of ICT Tools to Increase the Productivity of Physics Lesson

Technology has an impact on education today, and the use of ICT tools, particularly in physics lectures, modifies and enhances the educational process. Students' comprehension of the material, engagement in the learning process, and interest in the course can all be improved by using ICT resources into physics lessons.

ICT tools offer the chance to visually and interactively convey difficult physics ideas. Simulators, animations, and images help students comprehend abstract ideas. For instance, a simulation that graphically demonstrates the principles of motion might give students the chance to comprehend physical phenomena better. The impact of

interactive computer simulation on students' understanding of physics concepts was investigated by Rehman et al. in 2021 using a quasi-experimental design. The study investigated students' enthusiasm for simulation as a means of fostering higher-order thinking abilities. The control group received training using the conventional teaching method, while the experimental group received training using an interactive computer simulation program. The research produced a Pearson correlation coefficient of 0.97 and revealed a very significant influence. In addition to the quantitative data, interviews and focus groups with teachers were held to ascertain their opinions and those of the children. According to the qualitative data, teachers and students both valued the simulation program's ability to teach challenging physics ideas while students shown an enthusiasm in its use.

Students have the option to submit immediate feedback thanks to ICT tools. Through online tests or experiment simulations, students can instantly examine their responses. Students can learn from their errors thanks to this. Gorghiu and Gorghiu (2012) looked at the opinions of teachers and students regarding the application of ICT in science education. As part of science education, teaching nanoscience and nanotechnology can motivate students and present associated science and technological concepts in multimedia ways. The pupils in this situation were split into two groups: an experimental group and a control group. It was shown that students who received instruction using ICT technologies responded right away.

The necessity of distance learning has recently raised the significance of ICT tools. Students may attend physics classes from any location thanks to video conferencing, virtual classrooms, and online collaboration tools, and teachers can better organize their sessions thanks to these tools as well. Especially during the pandemic period, it has been determined that the lessons can be carried out successfully with

distance education method when necessary, and that both students and teachers can attend classes by using ICT tools from their environment (Azlan et al., 2020).

On the other hand, teachers and students have access to a wealth of information thanks to ICT tools. On the Internet, it's simple to find simulations, books, movies, and articles about physics. In this way, students can improve themselves in the physics subjects they are lacking outside of class, and teachers can watch videos to explain the subjects they will teach students more interactively (Lim and Khine, 2006).

2.8.4. Studies on the Use of ICT in Physics Teaching

Briones (2018) carried out a research to assess students' performance in the Physics-8 course as well as teachers' proficiency levels in the use of ICT in physics instruction. The participants in this study included 920 Grade 8 students from 23 sections taught by the 23 Physics instructors, together with 10 direct supervisors and 23 Physics teachers. The data from the instructors were used to punish the teacher tri's immediate supervisor and a colleague. The research's findings indicate that 8th Grade Physics Teachers have a decent degree of ICT competency. The degree of teachers' organizational and management skills is at the entry-level. The three themes of ICT-based novel applications used by teachers in the teaching of physics are (1) lesson planning, (2) lesson implementation, and (3) cooperation. The performance of pupils in physics and teachers' ICT competency are moderately positively correlated. It was determined that the link was significant.

Qosimjonovna (2021) investigated the use of information technology tools to increase the effectiveness of physics teaching in secondary schools. The following points were emphasized in the study; Digital learning opportunities in regular secondary schools are the topic of this essay. Utilizing digital technology's capabilities fosters kids' enthusiasm in science and physics education. It creates transferable skills.

It demonstrates how crucial physics is to everyday life. These articles describe how an information communication system was used to plan a physics lecture for seventh graders in general education classrooms. All of the graphical representations of mass and acceleration processes used to represent force and velocity in Newton's law are included in the Grade 7 Physics Curriculum. The topic addressed by this technique was tested in 2 schools in Fergana City: the 8th secondary school in Fergana City and the 21st secondary school in the Fergana region's Besharik district. All of the participating schools came to a consensus that the classes' effectiveness had increased by 27%.

In order to use information and communication technologies to the teaching of general physics in schools, Khudayberganovich and Kuronboyevich (2020) set out to create a technology. In the article, the following issues are taken into account: Based on the study of general physics employing computer technology and resources, this significant educational problem examines how students' understanding develops. It is true that if information and communication technologies are used to teach physics to high school students, students' interest in science will rise and the quality of their physics education will improve. It is also true that teachers' interest in incorporating ICTs into their physics lessons will rise. The following tasks were carried out to ensure that the study's objectives were met: to analyze the current state of the issue of using information and communication technologies in the educational process in general and in teaching physics in particular; to develop recommendations on the use of information and communication technologies in teaching physics; and to provide teachers with useful guidance on how to use ICT-related technologies in the classroom. The work on the theory, methodology, and practice of teaching physics, as well as the production of recommendations for their implementation in the educational process, served as the methodological basis for the study. The paper examines the fundamental ideas behind

the computerization and informationization of the educational process, makes suggestions, and draws conclusions.

Adeyemo (2012) looked into how information and communication technology has affected physics instruction and student learning. One hundred fifty-seven physics students, and two physics teachers were chosen at random from two senior secondary schools in each of the six educational districts in Lagos State, five of which were available. Three null hypotheses were proposed and assessed for significance at the 0.05 level. Information and communication technology impact on teaching and learning questionnaires (ICTIT LQ) were the instruments employed in the study. Chi-square and basic percentages were used to examine the data that was gathered. The results of the study showed that ICT has a significant impact on physics teaching and learning. Additionally, the introduction of ICT has made teaching physics to pupils much more engaging. Suggestions and recommendations were given in light of the findings.

3. METHODOLOGY

3.1. Research Model and Questions

In this study, it is aimed to determine Physics teachers' competencies in using Web 2.0 tools and to examine their competencies in terms of various demographic variables. For this purpose, this study was carried out in the correlational research design, which examines the existence and level of co-variation between two variables (Karasar, 2022).

The dependent variable of the study is Physics teachers' proficiency in using Web 2.0 tools. On the other hand, gender, age, educational status, professional seniority and previous training in Web 2.0 tools constitute the independent variables of the research. The following research questions were tested within the scope of the research.

Q_1: Physics teachers' proficiency in using Web 2.0 tools differs significantly according to their gender.

Q_2: Physics teachers' proficiency in using Web 2.0 tools differs significantly according to their age.

Q_3: Physics teachers' proficiency in using Web 2.0 tools differs significantly according to their professional seniority.

Q_4: Physics teachers' proficiency in using Web 2.0 tools differs significantly according to their education levels.

Q_5: Physics teachers' competencies in using Web 2.0 tools differ significantly according to their status of receiving training on Web 2.0 tools.

3.2. Population and Research Sample

The population of the study consists of physics teachers employed in both private and public schools affiliated with the Ministry of National Education in Istanbul.

A total of 1745 teachers work in Istanbul in private and public schools. To determine the appropriate sample size, Power Analysis was conducted using the G*Power computer program. The analysis considered a medium effect size ($\eta 2=0.25$), 80% power (Faul et al., 2007), and an alpha error probability level of 0.05 for a one-way variance test (ANOVA). Based on these criteria, a minimum sample size of 200 physics teachers was determined. To account for potential survey errors, a total of 213 teachers were surveyed. The survey form prepared online was delivered to the participants via e-mail, social media, WhatsApp, etc. The sample for this study was selected using a convenient sampling method that aligned with the research objectives. Convenience sampling involves selecting participants who are easily accessible, suitable for the research, and willing to participate.

Overall, the research focuses on physics teachers in Istanbul, with a sample size of 213 participants selected through convenient sampling.

3.3. Data Collection Tools

The use of an online survey methodology allows for efficient data collection and analysis. The surveys for this research were administered online to ensure ease and convenience for the participants. By utilizing an online survey platform, data collection was streamlined and accessible to a wider range of physics teachers.

A questionnaire form was used to collect the data of this study. The questionnaire form consists of two parts. In the first part, there is a preliminary information form to determine the demographic information of the participants. In the second part, there is the Competency Scale for Using Web 2.0 Tools (WAKYÖ).

To gather demographic information for the research, a preliminary information form was administered to the participants. This form included multiple-choice questions regarding participants' demographics, and education status for Web 2.0

tools. These questions were prepared by the researcher based on similar studies (Atalmış & Şimşek, 2022; Bircan, 2022; Can & Kerkez, 2022; Şenel,2023; Türkben & Alptekin, 2023) in the literature.

The Web 2.0 Tools Usage Competency Scale (WAKYÖ), developed by Çelik (2020), was utilized in this study to assess the competence of teachers and prospective teachers across various subject areas in using Web 2.0 tools. The scale demonstrates a single-factor structure, as outlined in Appendix A.

Comprising 39 items, the scale adopts a five-point Likert-type scoring system. Participants were asked to rate their responses on a scale ranging from 1 (Never) to 5 (Always). For instance, items such as "I can design learning environments independent of time and space with Web 2.0 tools" and "I can present knowledge and concepts on a subject in the form of a mind map using Web 2.0 tools" represent examples of the scale's items.The Cronbach's Alpha coefficient for the WAKYÖ scale was reported as .98, indicating high internal consistency. Additionally, the total inter-item correlations of the scale range from .69 to .83.The high Cronbach's Alpha coefficient of .98 suggests that the items in the WAKYÖ scale are highly reliable and consistently measure the intended construct. This coefficient indicates that the scale items are strongly correlated with each other, demonstrating a high level of internal consistency

The WAKYÖ scale provides a comprehensive assessment of individuals' competency levels in utilizing Web 2.0 tools. It covers a range of skills and abilities essential for effective use of these tools in educational settings. The Likert-type scoring system allows participants to express the frequency of their engagement with Web 2.0 tools, providing valuable insights into their proficiency and comfort levels.

By employing the WAKYÖ scale, the study aimed to gain a deeper understanding of the participants' competence in using Web 2.0 tools across various subject domains. The scale's structure and item examples demonstrate its suitability for capturing the multifaceted aspects of utilizing Web 2.0 tools for teaching and learning purposes.

3.4. Analysis of Data

The collected data was analyzed using the SPSS 23.0 software package. In all analyses, $p<0.05$ was accepted as statistical significance level. Within the scope of analyzes;

- Frequency analysis was carried out to examine the demographic characteristics of the participants in the study.
- The Cronbach alpha coefficient was examined to determine the reliability of the Web 2.0 Tools Competency Scale used for data collection in the study.
- Parametric analyzes are used if the data are normally distributed, while non-parametric analyzes are used for data that are not normally distributed. In this context, normal distribution analysis was performed to determine which of the parametric or non-parametric analyzes would be used. Since the data showed a normal distribution, parametric analyzes were preferred in the continuation of the study.
- Descriptive statistical analysis was performed to determine the competency level of the participants in using Web 2.0 tools.
- In the analysis of the participants' competency to use Web 2.0 tools according to their demographic characteristics, t-test was performed for the variables including two categories such as gender and educational status, while

ANOVA analyzes were performed for the variables including more than two categories such as age and professional seniority.

3.4.1. Reliability Analysis

The reliability analysis results of the Web 2.0 Tools Usage Competency Scale used to collect data in the study are given in Table 2.

Table 2

Reliability Analysis Results

Scale	Cronbach Alpha
Web 2.0 Tools Usage Competency Scale (WAKYÖ)	,984

Cronbach alpha reliability coefficient can take values between 0 and 1. It is stated that the scale is accepted as highly reliable when the Cronbach alpha reliability coefficient is above 0.80 (Gürbüz & Şahin, 2014). In this context, it was concluded that the Web 2.0 Tools Usage Competency Scale used in the research was highly reliable (α=0,984).

3.4.2. Normal Distribution Analysis

Parametricaz are used if the data are normally distributed, while non-parametric analyzes are used for data that are not normally distributed. In this context, the normal distribution of the data was examined to determine which of the parametric or non-parametric analyzes would be used. Analysis results are given in Table 3.

Table 3

Normal Distribution Analysis Results

Groups		Skewness	Kurtosis
Total (Web 2.0 Tools Usage Competency)		,620	-,563
Gender	Female	,547	-,902

	Male	,664	-,231
Age	20-29	,675	,137
	30-39	,301	-1,065
	40 and over	1,053	,287
Professional seniority	1-5 years	,614	-,207
	6-10 years	,465	-,957
	11-15 years	,339	-,956
	16-20 years	,913	-,392
	20 years and over	,759	,634
Education	Bachelor's degree	,850	-,214
	Master/Ph.D.	,192	-,731
In-Service Education Status	Yes	,252	-,734
	No	1,006	,212

It is stated that the skewness and kurtosis coefficients should be between -1,5 and +1,5 in order for the data to be accepted as normally distributed (Gürbüz & Şahin, 2014). When Table 5 is examined, it is concluded that the data are normally distributed when it is seen that the skewness and kurtosis coefficients are within the specified range both in total and in the groups.

4. FINDINGS

4.1. Demographic Statistics

A total of 213 physics teachers participated in the study. Demographic statistics of the participants are given in Table 4.

Table 4

Demographic Statistics

Variable	Category	n	%
Gender	Female	94	44,1
	Male	119	55,9
Age	20-29	38	17,8
	30-39	105	49,3
	40 and over	70	32,9
Professional seniority	1-5 years	46	21,6
	6-10 years	63	29,6
	11-15 years	37	17,4
	16-20 years	30	14,1
	20 years and over	37	17,4
Education	Bachelor's degree	148	69,5
	Master's degree	59	27,7
	Doctorate/Ph.D.	6	2,8

As seen in Table 4, the sample was mostly male (n=119; 55.9%), aged 30-39 (n=105; 49.3%), with 6-10 years of professional seniority (n=63; 29%). ,6) and undergraduate (n=148; 69.5%) participants (Figure 1).

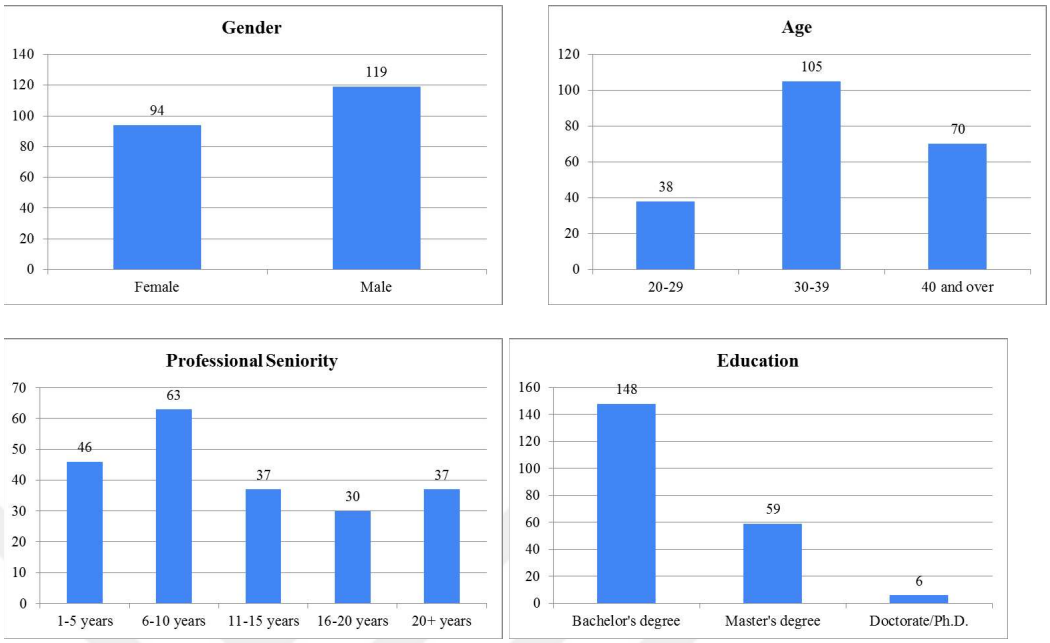

Figure 1. Demographic Statistics

The answers given by the participants to the questions about getting training on Web 2.0 tools are given in Table 5.

Table 5

Educational Status of Participants on Web 2.0 Tools

Variable	Category	n	%
Have you taken any in-service training or courses on the use of Web 2.0 tools?	Yes	84	39,4
	No	129	60,6
Would you like to receive training on Web 2.0 technology?	Yes	143	67,1
	No	70	32,9
Indicate your level of need for in-service training on Web 2.0 technology	None	48	22,5
	Few	52	24,4
	Moderate	87	40,8
	High	26	12,2

As seen in Table 5, the majority of the participants did not receive in-service training on Web 2.0 (n=129; 60.6%). The majority of the participants want to receive training on this subject (n=143; 67.1%) and state that they have a moderate need in this regard (n=87; 40.8%) (Figure 2).

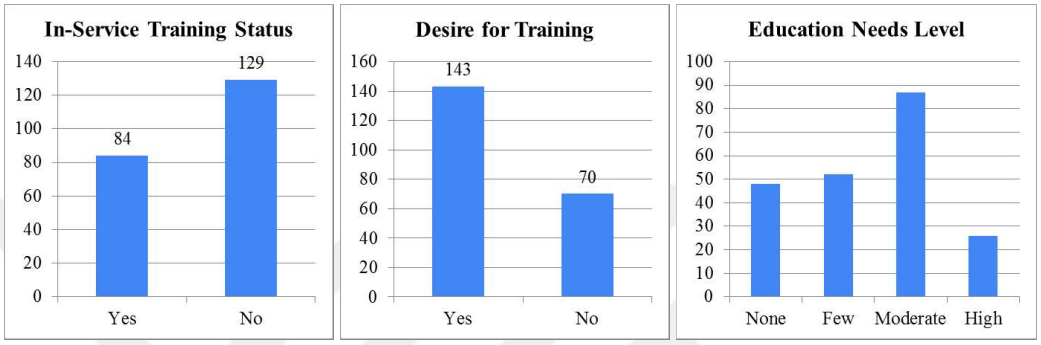

Figure 2. Educational Status of Participants on Web 2.0 Tools

4.2. Physics teachers' competencies level in using Web 2.0 tools

The first research question of the study is as follows: "What is the level of Physics teachers' competencies in using Web 2.0 tools?"

The results of the descriptive statistical analysis carried out to answer the first research question are given in Table 6.

Table 6

Physics Teachers' Competency Level in Using Web 2.0 Tools

Variable	Min.	Max.	Mean	sd
Web 2.0 Tools Usage Competency	1,00	5,00	2,37	1,18

Scale scores are divided into intervals of 0.80 units according to the formula (n-1)/n=(5-1)/5=4/5=0.80. Accordingly, scores between;

- 1.00-1.80 indicates very low level,
- 1.81-2.60 indicates low level,
- 2.61-3.40 indicates moderate level,
- 3.41-4.20 indicates high level,
- 4.21-5.00 indicates very high level.

As can be seen in Table 6, it was determined that physics teachers' competencies in using Web 2.0 tools were below the average ($\bar{x}$=2.37; sd=1.18). In other words, it was determined that the participants had a low level of competence in using Web 2.0 tools.

4.3. Analysis of Physics teachers' competencies in using Web 2.0 tools by Demographic Variables

The second research question of the study is as follows: "Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to their gender, age, professional seniority, and education?"

To answer the second research question, t-test was performed for the variables including two categories such as gender and educational status, while ANOVA analyzes were performed for the variables including more than two categories such as age and professional seniority. Analysis results are in Table 7.

Table 7

Competency by Gender, Age, Professional Seniority, and Education

Q	Variable	Category	n	Mean	sd	t[a]/F[b]	p	Difference
Q_1	Gender[a]	Female	94	2,42	1,30	,580	,562	-
		Male	119	2,32	1,09			
Q_2	Age[b]	20-29[1]	38	2,18	,99	4,713	,010*	2 > 3
		30-39[2]	105	2,61	1,29			
		40 and over[3]	70	2,10	1,05			
Q_3	Professional seniority[b]	1-5 years	46	2,21	1,06	1,609	,173	-
		6-10 years	63	2,59	1,30			
		11-15 years	37	2,56	1,29			
		16-20 years	30	2,14	1,18			
		20+ years	37	2,16	,94			
Q_4	Education[a]	Bachelor[1]	148	2,23	1,19	-2,511	,013*	2 > 1
		Master/Ph.D.[2]	65	2,67	1,13			

*p<0,05; [a]t-test; [b]ANOVA

As can be seen in Table 7, while the competencies of physics teachers to use Web 2.0 tools did not differ significantly according to gender and professional seniority ($p>0.05$), it was determined that there was a significant difference according to age ($F=4.713$; $p<0.05$) and education ($t=-2.511$; $p<0.05$). Accordingly, it was determined that the competencies of the participants aged 30-39 ($\bar{x}=2.61$; $sd=1.29$) were significantly higher than the participants aged 40 and over ($\bar{x}=2.10$; $sd=1.05$). In addition, it was determined that the competencies of the participants with a graduate education ($\bar{x}=2.67$; $sd=1.13$) were significantly higher than those of the undergraduated participants ($\bar{x}=2.23$; $sd=1.19$). According to these results, Q_2 and Q_4 were accepted, while Q_1 and Q_3 were rejected.

4.4. Findings Regarding the Third Research Question

The third research question of the study is as follows: "Do Physics teachers' competencies in using Web 2.0 tools differ significantly according to their status of receiving training on Web 2.0 tools?"

The t-test results performed to answer the third research question are given in Table 8.

Table 8

Competency by In-Service Education Status

Q	Variable	Category	n	Mean	sd	t	p	Difference
Q_5	In-Service Education Status	Yes[1]	84	2,88	1,14	5,446	,000**	1 > 2
		No[2]	129	2,03	1,09			

**p<0,01

As seen in Table 8, it was determined that the competence to use Web 2.0 tools differed significantly according to the in-service training status of the participants ($t=5.446$; $p<0.01$). It was determined that the competencies of the participants who received training on this subject ($\bar{x}=2.88$; $sd=1.14$) were significantly higher than those who did not receive training ($\bar{x}=2.03$; $sd=1.09$). According to these results, the Q_5 was accepted.

5. DISCUSSION

In this study, it is aimed to determine Physics teachers' competencies in using Web 2.0 tools and to examine their competencies in terms of various demographic variables.

Within the scope of the first research question of the study, the level of Physics teachers' competence in using Web 2.0 tools was examined. As a result of the descriptive statistical analyzes carried out in this direction, it was seen that the competencies of the participants were at a low level. This is in line with the statements of the majority of the participants that they need training in using Web 2.0 tools.

As a similar finding, in the study conducted by Eyüp (2022) with Turkish teachers, it was determined that the competencies of the participants in using Web 2.0 tools were at a low level. In the study conducted by Atalmış and Şimşek (2022) with social studies and science teachers, it was observed that the participants' competence in using Web 2.0 tools was at a low level. In addition, in similar studies conducted with Turkish teachers (Türkben & Alptekin, 2023), English teachers (Şenel, 2023), and physical education and sports teachers (Can & Kerkez, 2022) in the literature, it is seen that the participants have moderate level of competence in using Web 2.0 tools. It is evaluated that the findings reveal a need for teachers to increase their competence in using Web 2.0 tools.

Within the scope of the second research question of the study, it was examined whether the Physics teachers' competencies in using Web 2.0 tools differed significantly according to their demographic characteristics. In this context, t-test was performed for the variables including two categories such as gender and

educational status, while ANOVA analyzes were performed for the variables including more than two categories such as age and professional seniority. As a result of the analyzes, it was determined that while the competencies of physics teachers to use Web 2.0 tools did not differ significantly according to gender and professional seniority, it differed significantly according to age and education. Accordingly, it was determined that the competencies of the participants aged 30-39 were significantly higher than the participants aged 40 and over. In addition, it was determined that the competencies of the graduated participants were significantly higher than the undergraduated participants.

Studies in the literature show that different results are obtained in terms of demographic variables. For example, in the study conducted by Bircan (2022) with 156 Turkish teachers working in secondary schools in various provinces of Turkey, it was determined that the participants' competency to use Web 2.0 tools did not differ significantly according to gender, education and professional seniority.

In the study conducted by Atalmış and Şimşek (2022) with 160 social studies and science teachers currently working in secondary schools in Turkey, no significant difference was found in the competency of participants to use Web 2.0 tools according to their gender, while it was found that participants with a graduate degree and 10-15 years of professional experience had significantly higher levels of competency to use Web 2.0 tools.

In the study conducted by Türkben and Alptekin (2023) with 195 Turkish teachers working in 47 different provinces of Turkey, it was determined that the participants' competency to use Web 2.0 tools did not differ significantly according to gender, age and educational status.

In the study conducted by Can and Kerkez (2022), with 430 physical education and sports teachers working at secondary and high schools in Muğla province, it was found that the competencies of the participants in using Web 2.0 tools did not differ significantly according to gender and professional seniority, while the competency of using Web 2.0 tools of the postgraduate participants was found to be at a significantly higher level.

In the study carried out by Şenel (2023) with 125 English teacher candidates, it was determined that the competencies of the participants in using Web 2.0 tools did not differ significantly according to gender and age.

As can be seen, different results have been obtained in terms of demographic variables in the studies in the literature. It is considered that the differences between the study findings are due to the contextual differences such as the sample of the studies, the place where the research was conducted, and the branches of the participating teachers.

Within the scope of the third research question of the study, it was examined whether the Physics teachers' competencies in using Web 2.0 tools differed significantly according to their education on this subject. As a result of the t-test conducted in this context, it was determined that the competencies of the participants who received in-service training on the use of Web 2.0 tools were significantly higher than the participants who did not receive training on this subject. It is seen that this finding is compatible with similar studies in the literature (Atalmış & Şimşek, 2022; Bircan, 2022; Can & Kerkez, 2022). It is evaluated that this finding emphasizes the importance of education in developing the competence of teachers to use Web 2.0 tools.

6. CONCLUSION

6.1. Conclusion

In this study, it is aimed to determine Physics teachers' competencies in using Web 2.0 tools and to examine their competencies in terms of various demographic variables.

The study was conducted in correlational research design. The research was carried out with 213 participants selected by convenient sampling method among Physics teachers working in Istanbul. Research data were collected using an online questionnaire containing demographic questions and the Web 2.0 Tools Usage Competency Scale. Within the scope of the research, frequency analysis, reliability analysis, normal distribution analysis, descriptive statistical analysis, t-test and ANOVA analysis were performed.

Analysis results showed that Physics teachers' competencies in using Web 2.0 tools were at a low level. On the other hand, it was determined that while the competencies of physics teachers to use Web 2.0 tools did not differ significantly according to gender and professional seniority, it differed significantly according to age, education, and receiving training on Web 2.0 tools.

The results of the research show that teachers' competencies in using Web 2.0 tools are insufficient and their training on this subject contributes to their competency in using Web 2.0 tools. In this context, in order to improve teachers' competence in using Web 2.0 tools, it is recommended to give in-service trainings, courses and seminars to both current teachers and pre-service teachers at universities on using Web 2.0 tools. Thus, it can be ensured that teachers make technological tools a part of the teaching process.

6.2. Limitations

The study has some limitations. The competencies of the teachers participating in the study in using Web 2.0 tools were determined by a self-assessment scale. However, with this method, the participants may not have expressed their real proficiency levels.

On the other hand, in this study, teachers' competencies in using Web 2.0 tools were examined only in terms of socio-demographic variables. Other factors that may affect teachers' ability to use Web 2.0 tools (digital literacy, technological pedagogical content knowledge and technology acceptance, etc.) should not be ignored.

The study was conducted only with physics teachers. Generalization of results to different contexts should be avoided. More comprehensive results can be achieved through studies involving other branch teachers.

6.3. Suggestions for Further Research

As a result of the study, the following suggestions were made for future studies;

- In future studies, efforts can be made to determine participants' skills in using Web 2.0 tools more objectively. For example, practical studies on using Web 2.0 tools can be conducted to address the level of teachers' ability to perform the task assigned to them in these studies.
- In future research, the relationships between teachers' skills in using Web 2.0 tools and variables such as digital literacy, technological pedagogical content knowledge and technology acceptance can be examined.
- The current study examined how physics instructors make use of Web 2.0 resources. Future research can more thoroughly examine how

teachers with various degrees of expertise, geographical locations, and educational philosophies use Web 2.0 technologies by selecting a larger sample.

- In future studies, a contribution can be made to the literature by examining the students' physics teachers' views on their ability to use Web 2.0 tools and how these tools contribute to their course experiences. This can broaden the scope of research and include the student perspective.
- The study looked at how Web 2.0 tools affected teachers' skills. Future research can assess these technologies' impacts on motivation, engagement, and academic accomplishment in students.
- Based on the research's findings, workshops or training programs can create recommendations to help physics teachers use Web 2.0 tools more successfully. These apps can aid educators in more effectively integrating these resources.
- It is possible to compare the Web 2.0 tool proficiency of physics professors across various nations. Understanding cultural differences and educational systems can benefit from knowing this.
- In future studies, it could be examined whether academics who have trained candidate teachers at universities in the Faculty of Educational Sciences as using of Web 2.0 tools.
- In future research, the development and modification of the Web 2.0 tools in the Faculty of Educational Sciences curriculum can also be explored as a way of teaching.

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APPENDIX A : QUESTIONNAIRE FORM

BİRİNCİ BÖLÜM

1)Cinsiyetiniz:
( ) Kadın ( ) Erkek

2)Yaşınız:…

3) Mesleki Kıdeminiz (Yıl olarak) :
( ) 0-5 ( ) 6-10 ( ) 11-15 ( ) 16-20( ) 20 yıl ve üzeri

4) Eğitim Düzeyiniz:
( ) Lisans ( ) Yüksek Lisans ( ) Doktora

5) Web 2.0 araçlarının kullanımıyla ilgili hizmet içi eğitim, kurs aldınız mı?
( ) Evet ( ) Hayır

6) Web 2.0 teknolojisi konusunda eğitim almak ister misiniz?
( )Evet ( ) Hayır

7) Web 2.0 teknolojisi konusunda hizmet içi eğitim ihtiyaç düzeyinizi belirtiniz.
( ) Hiç ( ) Az ( ) Orta ( ) Çok

İKİNCİ BÖLÜM

No	**Web2,0 Araçları Kullanım Yetkinliği Ölçeği (WAKYÖ)**	1 Asla	2 Nadiren	3 Ara sıra	4 Sıklıkla	5 Her
1	Web 2,0 araçları ile zamandan ve mekândan bağımsız öğrenme ortamları tasarlayabilirim. (Örneğin Edmodo, Beyaz pano, Google Classroom… gibi)					
2	Web 2,0 araçları ile etkili sunumlar hazırlayabilirim. (Prezi, Powtoon, Buncee, Emaze… gibi)					
3	Web 2,0 araçları ile bir konudaki bilgi ve kavramları zihin haritası şeklinde sunabilirim. (Wisemapping, Pooplet, SpiderScribe, Gocongr… gibi)					
4	Web 2,0 araçları ile animasyon etkinlikleri hazırlayabilirim. (Vyond, Voki gibi)					
5	Web 2,0 araçları ile dijital panolar hazırlayabilirim. (Padlet, Bendspace, Linoti gibi)					
6	Web 2,0 araçları ile poster hazırlayabilirim. (Wordart, Sketch toy… gibi)					
7	Web 2,0 araçları ile karikatür hazırlayabilirim. (Make Beliefs Comix, Toondoo gibi)					

8	Web 2,0 araçları ile dijital hikâye oluşturabilirim. (Storyjumper, Storybird, Pixton gibi)					
9	Web 2,0 araçları ile sanal yazarlık yapabilirim. (Wattpad, Blogger gibi)					
10	Web 2,0 araçları ile yazdığım hikâyelere ses ekleyebilirim. (Storyjumper gibi)					
11	Web 2,0 araçları ile blog oluşturabilirim. (Blogger,Tumblr… gibi)					
12	Web 2,0 araçları ile dijital test hazırlayabilirim. (Kahoot, Plickers, Socrative… gibi					
13	Web 2,0 araçları ile bulmaca oluşturabilirim. (Mentimeter, Flipquiz… gibi)					
14	Web 2,0 araçları ile yapboz oluşturabilirim. (Pazıllmaker, LearningApss...gibi)					
15	Web 2,0 araçları ile alanımda eğitsel oyun tasarlayabilirim. (Kahoot, Plickers, Socrati, Thinklink, LearningApss…gibi)					
16	Web 2,0 araçları ile açık uçlu sınavlar hazırlayabilirim. (Kahoot, Socrative, Mentimeter, Quizziz… gibi)					
17	Web 2,0 araçları ile kısa cevaplı sınavlar hazırlayabilirim. (Kahoot,Socrative,Mentimeter, Quizziz… gibi)					
18	Web 2,0 araçları ile sınıf içi değerlendirme uygulamaları hazırlayabilirim. (Kahoot,Socrative, Mentimeter, Quizziz… gibi)					
19	Web 2,0 araçları ile dersi eğlenceli hale getirebilirim.					
20	Web 2,0 araçları ile bilgi afişi hazırlayabilirim. (Easelly, Visme, Creately… gibi..)					
21	Web 2,0 araçları ile infografik hazırlayabilirim. (Pictochart, Venngage… gibi)					
22	Web 2,0 araçları ile artırılmış gerçeklik etkinlikleri tasarlayabilirim. (Quiver, Morfo, Urasma… gibi)					
23	Web 2,0 araçları ile uzaktan öğrenme etkinliklerini yönetebilirim. (Moodle, Adobe Connect… gibi)					
24	Web 2,0 araçlarıyla fotoğraflarımı düzenleyebilirim. (Gimps, Photostory, OpenShot… gibi)					
25	Web 2,0 araçları ile filmler oluşturabilirim. (Mowimaker, Photostory… gibi)					
26	Web 2,0 araçları ile videolarımı düzenleyebilirim. (Mowimaker, Photostory, Safeshare, Filmora… gibi)					
27	Web 2,0 araçları ile videolarımı istenmeyen eklentilerden arındırabilirim. (Safeshare… gibi)					
28	Web 2,0 araçları ile ses kaydı yapabilirim. (Vocaro gibi)					
29	Web 2,0 araçları ile oluşturduğum zihin haritalarına video ekleyebilirim. (Wisemapping, Poplet… gibi)					

30	Web 2,0 araçları ile oluşturduğum zihin haritalarına ses ekleyebilirim. (Wisemapping, Poplet gibi)					
31	Web 2,0 araçları ile oluşturduğum zihin haritalarına resim ekleyebilirim. (Wisemapping, Poplet…gibi)					
32	Web 2,0 araçları ile oluşturduğum zihin haritalarına metin ekleyebilirim. (Wisemapping, Poplet…gibi)					
33	Web 2,0 araçları ile oluşturduğum uygulamaları derste kullanabilirim.					
34	Web 2,0 araçları ile derslere öğrenci katılımını sağlayabilirim.					
35	Web 2,0 araçları ile oluşturduğum uygulamalar sayesinde dersi eğlenceli hale getirebilirim.					
36	Web 2,0 araçları ile bir ders tasarlayabilirim.					
37	Web 2,0 araçları ile bilmece etkinlikleri hazırlayabilirim.(Riddle gibi)					
38	Web 2,0 araçları ile anket oluşturabilirim.(SurveyMonkey, Jetanket… gibi)					
39	Web 2,0 araçları ile bir tartışmaya katılabilirim.					