Use of Web 2.0 Tools in Science Education: Examining Primary School Students' Perceptions on Self-Regulation

Hacer Efe✉[1], **Rabia Gül**[2] **& Ünsal Umdu Topsakal**[3]

[1,2,3] Education Faculty of Yıldız Technical University, Istanbul, Turkey

✉ hacerefe94@gmail.com

Abstract: The aim of this research is to examine the effects of Web 2.0 tools used in online education on the self-regulation perceptions of primary school fifth-grade students. For this purpose, the Sun, Earth and Moon units we processed online using Web 2.0 tools. The study was implemented in a public primary school over six weeks. The sample of the study consisted of 12 students (seven female and five male students) in the 10-11 age group. The mixed research method was used in the study. The "Perceived Self-Regulation Scale" developed by Arslan & Gelişli (2015) was used as a quantitative data for collecting information, and the "Semi-structured Telephone Interview on Self-regulation Perceptions" was used as a qualitative data collection tool. The quantitative data were analyzed using the SPSS program, and the qualitative data were analyzed using the content analysis method. The results of the study revealed that online education supported by Web 2.0 tools within the scope of the Sun, Earth, and Moon units had a positive effect on students' self-regulation perceptions.

Keywords: Sun, earth, and moon units, Web 2.0 tools, self-regulation, perception, online education

1. Introduction

Astronomy is a science that deals with space and celestial bodies and is one of the oldest known sciences. Astronomy is a branch of science that studies the mystery of the sky, which has an important place in popular culture, especially among young people. The interdisciplinary character of astronomy provides an interesting context for those learning it (Antoniou et al., 2008).

From the past to the present, it has progressed in the accumulation with various observations and investigations. Although astronomy education is newer than science, educational context and teaching methods can be modified to meet the conditions of the age (Bailey et al., 2004). The National Science Education Standards recommend understanding the movements of celestial bodies by the end of primary school (Plummer, 2009).

In the past and in the present, astronomy education could be given in an observatory when necessary, with a model in the classroom when appropriate, or with a vehicle in a museum. In today's education conditions, physical education environments have been moved to the online environment. Astronomy education was also affected by this situation. Teaching environments and tools that provide opportunities for continuous participation should be provided for students to understand the practices related to astronomy in depth (Plummer & Tanış Özçelik, 2015).

Hu et al. (2021) conducted an intervention study entitled "Once Upon A Star" based on personification storytelling, which was presented to 24 children (4-5 years old) as a science program that included comprehensive concepts of astronomy. The study found that children significantly improved their understanding of astronomy concepts. The study, conducted by Shen & Confrey (2010), found that astronomy education was insufficient and teachers had alternative concepts in solar models. In addition, Plummer et al. (2011) conducted a study by giving astronomy training, including applied computer simulations, to 16 gifted third-year students.

1.1. Problem Statement

In today's age, technology is a part of human life, as well as a factor that helps learning, communication and development. In other words, the development of technology parallels the development of humanity (Haenssgen & Ariana, 2018; Sahay & Walsham, 2017).

With the development of technology, a new generation of students spend a lot of time in front of the computer in their academic and social lives and use the internet and technology extensively. Today's students are closely related to technology, and most of them are technology literate (Julia et al., 2018). For this reason, online platforms should be used for students with an interesting content presentation, easy to use, where they can interact with the content and allow them to observe (Ricci et al., 2013).

1.2. Related Research

Barnard et al. (2009) emphasize the importance of self-regulation to obtain efficiency in online education environments. They conducted a scale development study to evaluate how much the use of online educational environments improves self-regulation skills. In addition, self-regulation skill increases the academic success of the student, and this skill can improve with the educational environment.

Andersen & Jo Matkins (2011) explored the effect of Web 2.0 tools on pre-service teachers' critical thinking. In their study, pre-service teachers used blogs, which are reflective diaries, and they found that blogging had a positive effect on pre-service teachers' critical thinking. Meanwhile, Korulkar & Lobo (2017) revealed that a virtual hologram that the student can interact with in online education can be used to explain the concept in more detail, make it more fascinating, and increase the interaction between the student and the content. The interaction of a virtual hologram character with the user enhances concept learning.

Minocha et al. (2018) examined the courses conducted with Google Expeditions, which offers students an out-of-school field trip experience within the scope of Geography and Science courses. In addition, Pierce (2018) conducts a study on the use of Web 2.0 tools in online education, which will guide teachers in order to reveal the convenience and difficulties of web 2.0 tools for teachers and students. The study was conducted for online environment design by making phone calls with lecturers who provide online education using Web 2.0 tools.

Muhaimin et al. (2019) examined the pre-service science teachers' perspectives on using Web 2.0 technologies. The study involved 705 teacher candidates from five universities. The results revealed that the ease of use and perceived usefulness significantly affected the intentions of pre-service teachers to use Web 2.0 tools. Furthermore, Ogirima et al. (2021) examined teacher candidates' perceptions of the use of YouTube, one of the Web 2.0 tools, in teaching and learning. The study involved 200 pre-service teachers, and a descriptive survey method was used. The study found that teachers' perceptions of YouTube used in education were high. In other words, there was no significant difference based on gender.

In the study conducted by Dewi et al. (2022), action research was conducted in distance education with the participation of 20 teachers in several primary schools. The study aims to improve the creativity and understanding of teachers. In this direction, a digital learning environment with conversational content was applied. As a result of the study, the participating teachers' creativity and understanding improved significantly.

1.3. Research Objectives

The aim of this study is to examine the effect of the Sun, Earth, and Moon units processed with Web 2.0 tools on students' self-regulation perceptions. In this direction, the research problem of the study is as follows:

- Is there a significant difference between students' self-regulation perceptions before and after the implementation?

The sub-problems of the study are as follows:

a. Is there a significant difference between the self-regulation perceptions of the students before and after the implementation?
b. What are the students' perceptions of self-regulation before and after the implementation?

2. Theoretical Framework

Technology has become a part of modern life currently, and is preferred in many educational institutions (Chen et al., 2010). For this reason, the number of students benefiting from online education is increasing (Henrie et al., 2015). Today, distance education is an essential topic of discussion for every grade level. It is critical not only for cost-effectiveness and student control, but also for meaningful learning (Annetta & Shymansky, 2006). Simultaneous online platforms, especially those used in distance education, allow students for meaningful and real-time interactions and offer the opportunity for enhanced communication despite the spatial distance. These platforms allow verbal and written communication, presentation and video sharing between students and teachers, and in-class interaction such as browsing websites simultaneously. Thus, since it is not one-way but two-way, it increases the dialogue and facilitates understanding (McBrien et al., 2009). On the other hand, in online lessons, students may encounter problems such as group assignments, peer bullying, and discrimination. It has been determined that collaborative strategies will be used for this (Rahayu et al., 2021). In a study by Wang (2019), a technology-supported learning model was developed for primary school students. In the developed model, the behavioral, emotional, and cognitive participation of the students was aimed.

Self-regulation is a person's setting goals for obtaining information for self-improvement, and directing and regulating actions towards these goals. In other words, it is the individual's autonomy and control to carry out his learning process (Paris & Paris, 2001). Students with self-regulation are aware of their academic strengths and weaknesses and plan and implement a strategy according to the difficulties of academic tasks. These students have competencies such as undertaking challenging tasks in the academic world and developing an understanding of what they have learned, and they are aware of their role in the success (Perry et al., 2006). In addition, students may associate their success or failure with the effectiveness of the strategy they developed with their efforts (Dweck, 2008).

Self-regulation refers to students' active and controlled behaviors in order to fulfill their learning (Woolfolk & Hoy, 2018). In addition, it helps to explain the student success differences and increase their success (Schunk, 2005).

Self-regulated learning skills are as follows:

*   Goal setting: It is the setting of short or long goals for oneself in anticipation of learning.
*   Time management: It is the process of scheduling, allocating, and allocating time for learning according to one's priorities.
*   Task strategies: It includes learning activities such as taking notes, reading aloud, preparing questions, and doing extra work to increase one's success.
*   Environmental configuration: It is the arrangement of physical conditions that will improve one's learning (Barnard-Brak et al., 2010).

The concept of self-regulation refers to how individuals plan their learning, and manage and evaluate their learning processes. Self-regulated learning is an active learning process in which students set and manage goals based on their learning experiences and the characteristics of the learning environment (Pintrich, 2003). In this respect, Web 2.0 tools have a significant potential to support the self-regulation process of students" (Schmidt, 2007).

Web 2.0 is the general name for community-based and collaborative internet tools that provide interactive learning (Yen et al., 2013). In Web 1.0 technology, while viewing the web page only; in Web 2.0 technology, it provides the opportunity to interact with comments and web content on the web page. Web 2.0 technologies are popular in the society and education world, thanks to their advantages such as being free, providing access to the same application from more than one device (smartphone, tablet, netbook, etc.) and from

anywhere in the world, and not requiring a high level of hardware. Examples of Web 2.0 tools are YouTube, Skype, Facebook, Google Docs, Zoom, Blogger, Wikipedia, Canva, Eba, digital games (Educandy, genially, Word wall), and Padlet (Weller, 2013).

Educators draw attention to the social, open, and wide distribution characteristics of Web 2.0 technologies. The integration and interconnectedness of Web 2.0 tools also facilitate their use as teaching tools (Dede, 2008). Web 2.0 tools, one of the most common types of these platforms in education; is an economic and social technology trend that lays the foundations of the next generation internet, which is characterized by user participation, openness to everyone, and the effects of communication network (Musser & O'Reilly, 2007). The focus of technology, which facilitates and accelerates people's lives and provides advantages in some matters, has approached people as it should with Web 2.0 (Liu & Kwangjo, 2017).

The following are some of the benefits of using Web 2.0 tools in education:

- Delivering diverse and enjoyable learning experiences
- Keeping up-to-date in teaching with original content
- Enabling real-time communication and collaboration between students
- Designing an interactive and social learning environment
- Providing the opportunity to produce and share personal information
- Developing cognitive skills (Rahimi et al., 2014).

Web 2.0 tools also support collaborative learning with their social interaction and communication features. It has been found that when they are used as learning tools, they improve and contribute to the learning experience (Bharucha, 2018). Web 2.0 enables teachers and students to discover new teaching and learning resources. These tools have significant potential for learning (Torres Kompen et al., 2019; Zheng et al., 2015).

Hilton (2009) has found that Web 2.0 technologies have a significant impact on students' responsibility for their learning. Similarly, in a study conducted by Kitsantas & Dabbagh (2011), it was found that three social software tools among Web 2.0 tools brought innovations in supporting students' self-regulation.

3. Method

3.1. Research Design

In this study, a mixed method was used. A mixed method is a research approach that gives a general and comparative perspective, rather than a single application approach, in which data collection tools and qualitative and quantitative methods are used together in data analysis (Creswell & Clark, 2011).

3.2. Participants

The study group consisted of 12 students (seven female and five students) studying in the fifth-grade of a public school. A convenience sample model was used to determine the study group of the study. Convenience sampling is one of the non-random sampling methods, and a method frequently used in pilot studies such as this study. Although convenience and cost are the points to be considered in the easily accessible sample, the researcher determines a sufficient number of items as a sample from the available items (Singleton & Straits, 2018).

3.3. Data Collection

In the mixed method study, both qualitative and quantitative data were collected. A Semi-structured Telephone Interview on Self-regulation Perceptions was used to collect qualitative data. In this direction, a semi-structured interview form was applied. As a quantitative data collection tool, the Perceived Self-Regulation Scale, developed by Arslan & Gelişli (2015), was used. The Perceived Self-Regulation Scale, developed by Arslan & Gelişli (2015), was prepared to measure the perceived self-regulation of primary school students. The scale consists of 16 items in the 5-Likert type.
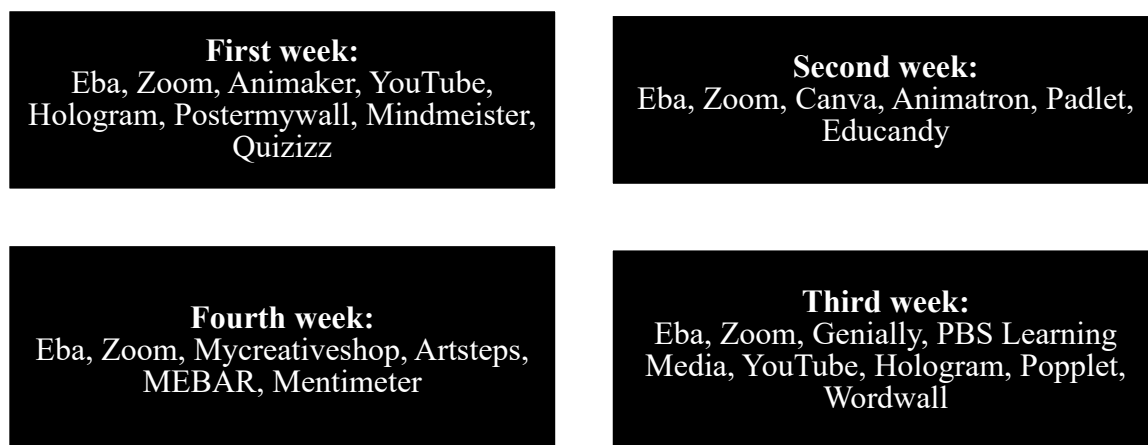
| **First week:** Eba, Zoom, Animaker, YouTube, Hologram, Postermywall, Mindmeister, Quizizz | **Second week:** Eba, Zoom, Canva, Animatron, Padlet, Educandy |
| **Fourth week:** Eba, Zoom, Mycreativeshop, Artsteps, MEBAR, Mentimeter | **Third week:** Eba, Zoom, Genially, PBS Learning Media, YouTube, Hologram, Popplet, Wordwall |

Figure 1. Data collection process and used Web 2.0 tools

3.4. Data Analysis

As a data collection tool in the study, the quantitative data obtained from the "Perceived Self-Regulation Scale" pre-test and post-test applications were analyzed using the SPSS program and Wilcoxon analysis, one of the non-parametric tests. The Wilcoxon signed-rank test takes into account the direction of the differences between the pre-test and the post-test, as well as the number of differences.

As a qualitative data collection tool, the content analysis method was used for the qualitative data analysis obtained by Self-Organization Perceptions Semi-Structured Telephone Interview. Content analysis is a data analysis method that examines the general trends on the researched subject, which reveals and defines the results by systematically examining the data obtained. In this method, sentences or texts consisting of many words were systematically converted into content categories depending on certain rules (Stemler, 2001). In the study, semi-structured telephone interviews, the data obtained by reflecting open-ended questions to the participants was organized by transferring it to the computer environment. The collected data was classified and tabulated as codes and frequencies.

3.5. Validity and Reliability

In the quantitative data collection tool, the chi-square value of the scale is significant ($x2= 147.60$; SD= 95; p=0.00); Cronbach's alpha reliability coefficient was 0.90 for the whole scale; 0.84 for the openness subscale; and 0.82 for the seeking subscale. The scale was valid and reliable. In order to use the scales determined by the researcher during the application process of the test, the necessary permissions were obtained from the scale developers and the forms were transferred to the digital environment. Data were collected by delivering these scales in the digital environment via the link addresses shared with the students.

In the qualitative data collection tool, in order to increase the reliability of the study, the data were examined by two researchers, and the tables were finalized. Some of the students' opinions are given under the tables as direct quotations, increasing the validity and reliability.

4. Findings

The findings obtained from the study are as follows:

4.1. Quantitative findings

The quantitative findings obtained from the study are as follows:

Table 1. Comparison of pretest-posttest mean and standard deviation

Group	X	SD
Pre-test	4.0833	1.01876
Post-test	4.4583	0.78214

Based on Table 1, the pretest mean score of the study group was X=4.08; its standard deviation was S=1.02. The post-test mean score of the study group was X=4.46; its standard deviation was S=0.78.

Table 2. Comparison of Pre-Test-Post-Test Scores with Wilcoxon Signed Ranks

Group	N	Rank Average	Rank Sum	Z	p
Negative rank	0	0.00	0.00		
Positive rank	5	3.00	15.00	-2.041	0,041
Equal rank	7				

Based on Table 2, the study's data analysis showed positive (Z=-2.041) and significant (p=.041.05) results in terms of attitudes toward self-regulation perceptions.

As a quantitative data collection tool "Perceived Self-Regulation Scale" (Arslan & Gelişli, 2015), the results were positive (Z=-2.041) and significant (Z=-2.041) according to the academic achievement test statistics as a result of the Wilcoxon signed-rank test performed with the SPSS program of the pre-test and post-test data (p=.041<.05).

4.2. Qualitative Findings

An increase in student responses was observed as a result of the content analysis of the pre-test and post-test data of the "Self-Regulation Perceptions Semi-Structured Telephone Interview," a qualitative data collection tool.

While most of the students could not answer the theme of the "Definition of Self-Regulation" before the implementation, various definition examples came from the students after the implementation. It is seen that the number of codes in the "Planning" and "Organization" categories increased after the implementation of the "Definition of Self-Regulation Theme". Correct answers were added to the previous answers in the post-implementation answers of the students on the theme of the "Characteristics of a Self-Regulated Person". It was found that there was a significant positive increase in the "Motivation" and "First reaction" categories in the answers of the students in the "Goal Determine" theme. Similarly, it was found that there was a significant increase in the answers of the students "Planning", "Environment Configuration", "Implementation" and "Call for help" categories in the theme of "Mission Strategies". In the "Environment Structuring" category, a significant increase was observed in codes and frequencies after the application compared to the pre-implementation. Similarly, after the implementation, it is seen that the "Internet Research" code increased at a significant frequency compared to the pre-implementation in the theme of "Help searching". In the "Time Management" theme, while the working time was 15-30 minutes before the implementation, it was seen that they commonly expressed the code between 30-60 minutes after the implementation. It was found that there was an increase in the answers of the students in the "Personal assessment" and "Social assessment" in the theme of the "Self-assessment" category. It was found that there was an increase in the answers of the students after the application compared to before the theme of the "Retargeting".

The qualitative findings obtained from the research are given in detail in the tables below in the form of categories, codes, and frequencies:

4.2.1. Theme 1: Definition of Self-Regulation

Table 3. Theme of Definition of Self-Regulation

Category	Codes	Before	After
Planning	Organized studying	1	-
	Living with a plan	-	1
	Planning your day	-	1
	Planning by yourself	-	1
	Comply with their plans	-	1
Organizing	Personal order	1	1
	Regular course of the lesson	1	-
	To be regular	-	3
	Organizing our ideas	-	1
	Love the order	-	1
Other	Freedom	1	-
	Do it yourself	2	-
	Something good	1	-
	I don't know	6	-
	Prepare yourself	-	1
	Trust yourself	-	1
	To explain himself	-	1

Looking at Table 3, the most common pre-implementation "I don't know" was the most common "Definition of Self-Regulation" theme.

An example of student responses related to the "Definition of Self-Regulation" theme after the implementation was presented.

S5: It is when a person decides what to do from morning to night and makes a plan.

4.2.2. Theme 2: Characteristics of a Self-Regulated Person

Table 4. Theme of Characteristics of a Self-Regulated Person

Category	Codes	Before	After
Planning	The day is planned	1	-
	Makes good planning	-	1
	She/He's the one who fits his plans	-	2
Organization	She/he is regular	4	3
	She/he is disciplined	1	1
Time management	Uses time efficiently	2	1
Responsibility	Does his homework	1	-
	Follows his lessons	1	1
	She/he is responsible	-	1
Other	She/he is a self-developing person.	1	-

Category	Codes	Before	After
	She/he is hardworking	-	1
	She/he is smart	1	1
	She/he is knowledgeable	1	-
	She/he is clean	1	-
	She/he is a respectful person	1	-
	She/he is a happy person	1	1
	She/he is a loving person	1	1
	She/he is a normal person	1	-
	She/he does everything himself	-	1
	I do not know	1	-

In Table 4, the students were "She/he is regular" and "Uses time efficiently" codes are the most common codes before implementation. "She/he is the one who fits his plans" and "She/he is regular" codes are the most common codes after implementation.

4.2.3. Theme 3: Goal Determine Theme

Table 5. Theme of Goal Determine

Category	Codes	Before	After
Motivation	It interests me	1	-
	I get excited	1	-
	I wonder	1	5
	I listen carefully	2	1
First reaction	I search	8	8
	I'm trying to learn about it	4	-
	I write in the back of my notebook	1	-
	I'm trying to find a solution for that issue	1	-
	I ask the people around me	-	3
	I ask my teacher	-	6

Based on Table 5, the students' "I'm curious" the code shows a significant increase after the implementation compared to the pre implementation in the "Motivation" category in the "Goal Determine" theme. In the "First Response" category, "I Ask People Around Me" and "I Ask My Teacher." codes, although the codes were not used before the implementation, it is one of the most common answers after the implementation.

A sample of the students' responses to the "Goal Setting" theme after the application was presented.

S1: When I come across a new subject that I am not familiar with, I am curious and write it in the back of my notebook. After my classes are over, I rest a bit first. Then I researched this subject that I am curious about.

4.2.4. Theme 4: Mission Strategies Theme

Table 6. Theme of Mission Strategies

Category	Codes	Before	After
Planning	I do plan	1	3
	I prepare myself	-	1
	I prepare work plan	-	1
	I prepare	4	-
Determine goal	I determine subjects	1	-
	I determine sources	1	-
Time management	I set my time	1	1
Environment configuration	I prepare place	5	7
	I adjust my sitting position	-	1
	I prepare materials	6	11
Implementation	I focus	2	2
	I use the book	9	6
	I use the notebook	2	-
	I use the internet	4	5
	I search	2	5
	I read several times	1	6
	I think about it	1	-
	I think about the subject from different angles	-	3
	I watch the lecture video	4	4
	I take notes	3	5
	I review my notes	-	2
	I take a test	3	6
	I will do it again	2	7
	I highlight important points	-	1
	I prepare molds according to myself	-	1
	I try to practice and find my own style	-	1
Self-assessment	I evaluate myself	2	1
	I prepare questions on small papers	-	1
Call for help	I get help from my family	-	4
	I will listen to the teacher	-	3

Based on Table 6, the students said "I Prepare" code in the "Planning" category before the implementation in the "Task Strategies" theme and after the implementation "My Plans" widely used code. The most common pre-implementation code in the "Implementation" category is "I benefit from the book" and "I will do it again" codes have been found after the

implementation. Again, in the "Application" category, more code and frequency outputs were obtained after the application than before the application. Although there was no code output in the "Searching for Help" category before the application, there is a significant frequency of code output after the application. When the expressions of the students in the semi-structured telephone interview were examined, it was seen that more students determined and expressed task strategies after the implementation than before the implementation.

Examples of student responses to the theme of " Mission Strategies" before the implementation were presented.

S3: When I am not studying, I think about the newly learned subjects without a notebook and pen. This is my special working technique.

S11: I play games before studying. It makes me feel better while working.

Examples of student responses related to the "Mission Strategies" theme after the application were presented.

S6: Before I start studying, I prepare a schedule for myself. So, I determine what I will work on and when. While working, I watch lecture videos on the internet and take tests. If necessary, I get help from my brother.

S10: I prepare my environment and course materials before studying. While working, I benefit from various sources such as books, notebooks, and the internet. At the end of my work, I take tests and check my mistakes. I'll try again depending on the situation. If I decide that I have learned, I will still repeat what I have learned so that it will be permanent.

4.2.5. Theme 5: Environment Structuring Theme

Table 7. Theme of Environment Structuring

Category	Codes	Before	After
The required environment	Silent	11	12
	Alone	2	-
	Regular	2	2
	Little furniture	-	1
	I can work anywhere	1	-
Action	I turn down the sounds in the room	2	2
	I move to a quiet room	5	5
	I ask people around me to leave me alone	1	1
	I work in my room	5	4
	I tidy up the environment before studying	-	1
	I work at my desk	-	1
	I remove unnecessary items from my desk	-	1

Based on Table 7, the students used the most common "Silent" code before and after the application and " I move to a quiet room ". They gave the code as an answer.

A sample of the students' responses to the "Environment Structuring" theme after the implementation is given below.

S11: Before studying, I tidy my room, prepare my desk, and ask my family to be quiet. It is important for me not to be distracted while working.

4.2.6. Theme 6: Help Searching Theme

Table 8. Theme of Help Searching

Category	Codes	Before	After
Electronic environment	I search online	1	5
Social environment	I want help from my family	11	10
	I want help from my teacher	5	4
	I want help from my friends	1	1

Based on Table 8, the most common code for students both before and after the implementation was "I Want Help From My Family" code has been found. After the implementation, it is seen that the "Internet Research" code increased at a significant frequency compared to the pre-implementation.

4.2.7. Theme 7: Time Management Theme

Table 9. Theme of Time Management

Category	Codes	Before	After
Studying time	After breakfast	2	3
	Afternoon	2	6
	After school classes are over	6	1
	In the evening	2	3
	In my free time	2	-
Studying duration	Between 15-30 minute	4	-
	Between 30-45 minute	1	-
	Between 30-60 minute	-	8
	Between 60-90 minute	-	4
	Between 1-2 hours	3	1
	Between 2-3 hours	2	-

Based on Table 9, it was seen that the most common frequency before the application was the "After School Classes" code in the "Study Time" category in the "Time Management" theme and the "Afternoon" code after the application. In the "Working Time" category, the most common code before the application was "Between 15-30 Minutes", while the code was "Between 30-60 Minutes" after the application.

A sample of the students' responses to the "Time Management" theme after the application was presented.

S1: I start working around 17-18 in the evening and stop working around 20:00. I work with a break of 1-2 hours. The duration may vary depending on the amount of the course I need to study.

4.2.8. Theme 8: Self-Assessment Theme

Table 10. Theme of Self-Assessment

Category	Codes	Before	After
Personal assessment	I solve a test	5	7
	After reading the book, I close it and try to repeat	1	-

Category	Codes	Before	After
	I think about it	1	-
	I prepare myself tests	1	1
	I evaluate my test results	2	4
	I read a different source on the subject	-	1
Social assessment	I ask my family to prepare questions for me	4	3
	I try to answer my teacher's questions	1	1
	I will tell what I have learned to someone who knows the subject	-	1
	I explain and confirm to my teacher	-	1

From Table 10, the students stated that the most common code about the "Self-Assessment" theme both before and after the implementation was "I solve a test" code. After the implementation "I solve a test." It was also observed that the frequency of the code increased.

Examples of student responses to the theme of "Self-Assessment" before the implementation were presented.

S2: I write questions about the subject I study and test myself with them.

Examples of student responses related to the "Self-Assessment" theme after the implementation were presented.

S10: I talk to someone who knows what I know about the subject I just learned, and I share my ideas. Thus, I will be aware of my wrong information. Apart from that, I take a test on the subject and check the result.

4.2.9. *Theme 9: Retargeting Theme*

Table 11. Theme of Retargeting

Category	Codes	Before	After
Adaptation	I study harder	5	2
	I study again	4	9
	I try to focus	1	-
	I get help from my teacher	2	3
	I get help from my family	2	2

Looking at Table 11, the students were asked about the "Retargeting" theme before the application "I Study Harder" code, after the application "I study again." widely expressed their code.

A sample of the students' responses to the theme of "Retargeting" after the application is given below.

S1: When I realize that I cannot solve the questions of the subject I am studying, I watch lecture videos about the subject on the internet and try to solve the questions again.

5. Discussion

As a result of the study, it was seen that online education supported by Web 2.0 tools within the scope of the Sun, Earth, and Moon units had a positive effect on students' self-regulation perceptions.

The study found that after the implementation, the students had more ideas and gave more accurate and varied answers about self-regulation, self-organized person, goal setting, mission strategies, environment structuring, time management, asking for help when necessary and self-evaluation than before the implementation.

In the concepts of self-regulation and mission strategies, the most attention was drawn to the areas of planning and organization. The concept of motivation has come to the fore in goal determination. Online research is preferred more in helpful searching. There has been a significant improvement in both personal and social evaluation in self-evaluation. Particular emphasis was placed on restudy in retargeting. In the time method, it was found that the studying time was spread from certain hours to the day and the studying time increased.

Similarly, Harrison (2011) investigated the effect of Web 2.0 tools on self-regulation. The study revealed that university students wrote blogs and it was found that blogging had a positive effect on students' self-regulation. In another study conducted by Dabbagh & Kitsantas (2012), it was found that social media, one of the Web 2.0 tools, can help support students' self-regulated learning. The study of Zhao (2016)) regarding the effects of the e-learning 2.0 environment on self-regulation were investigated. A theoretical model was used in the study and it was concluded that system quality, information quality, service quality and user satisfaction affect self-regulation. Jena et al. (2018) examined the effects of individual and collaborative Web 2.0 technologies on primary school students' learning performance and self-regulation. In the study, 110 students were divided into three groups as non-Web 2.0, individual Web 2.0 group and collaborative Web 2.0 group. As a result of the study, it has been found that collaborative and individual Web 2.0 technologies had significant effects on students' learning performance and self-regulation compared to the traditional approach.

6. Conclusion

Based on these results, there was a positive and significant difference in the self-regulation perceptions of the students before and after the implementation within the scope of the Sun, Earth, and Moon units, and both qualitative and quantitative data were studied in accordance with mixed method models. In addition, as a result, these data were found to support each other.

In the study, students' self-regulation perceptions improved positively. In other words, after the implementation, students could become individuals who can be more planned and better organized in their daily and school outlives, and have better motivation in setting goals for themselves. In addition, these students can develop a strategy when they are given a task. It is also seen that students can do research from reliable online sites when they need help. On the other hand, they do better self-assessment and social evaluation; It has been reached that the students think that they need to set a new goal and work again. It is also among the remarkable results that they specify more flexible and longer working hours in time management.

Nowadays, it is expected that individuals with self-discipline, goal, and duty consciousness will be raised as people of that age. Individuals of our age should be open to self and social criticism. It is a fact that time is much more valuable in daily and academic life. Accordingly, individuals also need to be successful in time management. The primary school students in the study are the individuals of the future, and it is thought that working in this direction is effective in raising individuals suitable for our age and accordingly contributing to society.

By making use of Web 2.0 technologies, students can continue their learning processes, such as planning, implementation, and reflection over the web. Thus, they can improve their self-regulation and self-learning skills (Huang et al., 2012).

Limitation

The limitations of this study are as follows:

- The study is limited to the fifth-grade students.
- The study is limited to four weeks.

Recommendation

This study found that Web 2.0 tools have a positive effect on self-regulation. Accordingly, Web 2.0 tools can be used to improve students' self-regulation. More work can be done in this direction. Further, this study was carried out with the fifth-grade students. Studies can be carried out with different participants. It was also carried out in a limited time frame. Longer-term studies can be carried out in order to generalize the results of the study.

Acknowledgments

Conflict of Interest

The Author(s) declare(s) that there is no conflict of interest.

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