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TEACHERS' PERSPECTIVES ON THE USE OF VIRTUAL INFORMAL ENVIRONMENTS IN THE PANDEMIC CONTEXT

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ABSTRACT

Since the pandemic situation, there has been a need for enacting student-centered teaching activities to make distance education more effective. "Informal Learning Environments" activities are suitable opportunities to meet this need and positively affect students in many aspects. The use of "Virtual Informal Environments" (VIE) is important during the pandemic situation in this case. The purpose of this research is to examine the teaching processes of teachers using VIEs during the pandemic situation and to make general judgements in the context of teaching processes using VIEs according to their status of taking or not taking courses on teaching in informal environments. In the study, the descriptive research method was used. The study group of the research consists of 93 teachers and it was determined by using the "Easy Access Sampling" method. Eight open-ended question forms were applied to the participants. The data were evaluated with the Content Analysis Method. The results showed that the Informal Science Education (ISE) course-taken teachers used VIEs more consciously than the non-course-taken participants. By focusing on the achievements in the curriculum, teachers planned to use VIEs and integrate these environments into their lessons by adopting a student-centered approach. In the evaluation studies after the teaching activities using VIEs, it was concluded that they tend to evaluate the achievements, not the learning process.

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1. INTRODUCTION

The new type of Coronavirus, which affects many countries around the world, was first seen in China in December 2019. The coronavirus disease has affected all countries in the world, including Turkey, and people living in these countries (Kaya, 2020). Education is one of the sectors affected by the Pandemic and the pandemic process has brought different applications with it (Miralay, 2020). The Ministry of Education (MEB) attempted to address the problem of education shortcomings caused by the pandemic by strengthening the infrastructure of its platforms and producing online education content, and the lessons of teachers and students were provided online during the distance education process. Looking at the literature, it is possible to say that the distance education process has advantages and disadvantages (Adnan & Anwar, 2020; Gupta, Marwaha & Singh, 2013). Distance education has changed the teaching methods of teachers and the way of teacher-student communication. In the 2020-2021 academic year, face-to-face education was gradually introduced in the fall semester, but due to the the virus' rapid spread, distance education was started again in November (Türkmen & Sürgit, 2021). During the pandemic process, teachers shared course content and homework activities with their students via EBA (Educational Information Network) or the ZOOM platform where schools conduct their online courses (Demirtaş & Kavuk, 2021). The fact that the epidemic could not be brought under control in the second period encouraged the continuation of the distance education process and the teachers to update their technological knowledge (Kırmızıgül, 2020).

As in all countries of the world, teachers in Turkey have found themselves in a situation as education-teaching process, which they have not experienced before also for the education of students, they have tried to administer distance teaching and learning (Bulunuz & Ünal, 2020). In this process, both students and teachers tried to get used to digital education that they were not used to (Çakın & Külekçi Akyavuz, 2020). The Pandemic is a new and different process for education than in other fields.

With the pandemic' announcement, to protect themselves from the virus; social distance, wearing a mask, disinfectant /cologne, etc. human beings have personally experienced the necessity of using and giving importance to cleaning. They made an effort to overcome the vital problem encountered in the light of the knowledge gained from these experiences. People continued the learning process that they entered from the moment they were born, in this process as well; lived, experienced, and learned. Just like in this subject, experiences are an important building block for education. Experiences play a major role in the purpose of ensuring and maintaining the permanence of education, and it is based on learning by doing. Education is completely life itself, and life is spent learning. As it can be understood, as a part of education, there is a need for environments where students can gain experiences by doing and living.

Informal education starts from birth and continuous throughout life, occurring spontaneously in a natural area, regardless of a specific learning environment, where professionalism is not sought in the trainer, everyone can be a trainer and can lead to positive or negative learning (Eshach, 2007; Hofstein & Rosenfeld, 1996; Tudor, 2013). It includes processes that are more intertwined with life and based on experience. By Türkmen, Durak & Karaoğlu in their presentation entitled *Ziyaretçilerinin Otobiyografik Anılarının İncelenmesi: İzmir Hayvanat Bahçesi Örneği* in 2019, "Museums, zoos, botanical gardens, parks, nature centers, environmental education centers, scientific research centers, etc." environments such as "informal learning environments" (p. 82). There are some basic conditions for teaching activities in these environments to be student-centered. These conditions; the informal environment to be used is "fun", students' "voluntary" participation (the permission of students under 18 must be obtained from their parents), "self-directed" students regardless of how they will discover, "hands-on" provides an "open-ended" environment. In this way, the lack of time constraints for students to access information, and the problem-solving skills of students in the informal learning process. It can be listed as ensuring that there is no "non-sequential" that the whole process is aimed at a learning outcome in the curriculum of the course and that it must be "purposeful" (Orion & Hofstein, 1994; as cited in Türkmen, 2010).

Informal environments are powerful mediators of learning, memory, and entertainment (Anderson et al., 2002). When a literature review is made, in many studies; it is seen that it has positive contributions and effects on the academic achievement of the students (Bozdoğan & Kavcı, 2016; Bozdoğan & Yalçın, 2006; Türkmen, 2018; Türkmen et al., 2016; Türkmen et al., 2018), their scientific thinking and questioning, interest in the lesson, attitudes, skills, love of science (Bonnette et al., 2019; Dori & Tal, 2000; Lin & Schunn, 2016; Sasson, 2014), being social individuals (Henriksen & Froyland, 2000). There is much evidence in the literature that teaching activities in informal environments are not limited to these positive effects, but have an essential place not only in the education of students but also in adult and family learning. This includes Briseño-Garzón, Anderson & Anderson's study (2007); examples include studies that conclude that adults demonstrate that they have learned in many areas, including cognitive, social, and effective. Teaching in informal environments has numerous benefits, and for this reason, the use of these environments is very important.

There are also the virtual alternatives to informal environments exist. However, it is probable to see that Virtual Learning Environments (VIEs) are widely available not only in Turkey; but also in every country in the world. VIEs are considerable as alternatives to existing and known informal learning environments which can be visited with a 360° virtual tour. For example, virtual zoos, virtual museums, virtual national parks, virtual aquariums, virtual planetariums, etc. Environments such as VIEs can be included in the group of VIEs. As a reflection of the integration of technology into education, the use of VIEs is useful and efficient in many ways. In the study of Türkmen and Kaplan (2021); It was found that some science teachers drew attention to these VIEs,

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and stated that they can be accepted as science teaching environments and environments where activities can be done. This result has been interpreted by the researchers as a sign that technology will make some difficulties more ineffective.

As it is understood, it is very valuable to carry out teaching activities in informal environments. At this point, our teachers, who are the planner, implementers, and evaluators of these activities, have a great responsibility. The more accurately, consciously, student-centered, and efficient the planning of the pre-trip, during the trip and post-trip sections that constitute the teaching activities process in informal environments, the more our teachers will reap the fruits of their efforts. To support these, there are a lot of courses such as Informal (Out of School) Learning Environments Information Seminar for teachers according to MEB in their guidebook entitled *Millî Eğitim Bakanliği Okul Dişi Öğrenme Ortamlari Kilavuzu*. In this research, it was estimated that the teachers, who participated in this type of course, were more aware and equipped about teaching in informal environments than the course-taken teachers.

In the light of all this information, since the teaching activities in informal environments have many positive effects on students, it can be said that the use of VIEs, which are accessible alternatives in these informal environments in the computer environment, is important during pandemic situation. By integrating VIEs into their lessons, teachers can achieve many gains such as the above-mentioned gains by realizing student-centered teaching. When the literature was scanned, no study was found to examine the processes of teachers' use of VIEs during the process in Turkey. It is expected that this study to fill this gap in the literature. The research aims to examine the teaching processes of teachers using VIEs during the Pandemic process and to reveal their teaching processes using VIEs according to their status of taking or not taking a course on teaching in informal environments. Hence, this study aims to address two research questions: (1) how do teachers carry out their teaching processes (before to, during, and post virtual informal teaching); and (2) is it significant for them to have taken or not taken a course on the subject?

2. METHOD

Research Design

The descriptive method was used in this study to reveal features, actions, or views as they are in compliance with Özdemir & Doğruöz in their book entitled *Bilimsel Araştırma Desenleri* in 2020. For this research, we chose this method because it allows for a detailed examination and understanding of phenomena through the systematic collection and analysis of data.

Study Group

The study group of the research consisted of 93 teachers. The study group was determined by using the "Easy Access Sampling" method, one of the "Purposeful Sampling" methods. The basis of this method is based on completely available items, quickly, and easily accessible (Patton, 2005; as cited in Baltacı, 2018). Demographic and branch information of the study group are given in Table 1 and Table 2. In total, 93 participants stated and while 54 (58.1%) of them have not taken any ISE course, 39 (41.9%) had.

Table 1.
Demographic information of the study group

Demographic Information	Categories	*F*	%
Gender	Female	68	73.1
	Male	25	26.9
Age	22-30	20	21.5
	31-40	27	29.1
	41-45	8	8.6
	46 & Above	38	40.9
Statue of Taking a Course About ISE*	Yes, I took	39	41.9
	No, I didn't take	54	58.1

*Informal Science Education

Table 2.
Branch information of participants

Branch	*f* (%)	Branch	*f* (%)
Science	23 (24.7)	Geography – Social Studies	4 (4.3)
Class	19 (20.4)	Religious Culture & Moral Knowledge	2 (2.2)
Language (Turkish, English, German, Arabic)	13 (13.98)	Technology & Design	2 (2.2)
Mathematics	12 (12.9)	Information Technologies	1 (1.1)
Biology – Chemistry –	12 (12.9)	Virtual Arts	1 (1.1)

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Physics			
Pre-school	5 (5.4)	Health Service	1 (1.1)

Most of the participants were science teachers (24.7%) and less branch groups were (1.1%) technology and design, information technologies and health service teachers

Data Collection and Analysis

Data collection tool which is a form consisting of 8 open-ended questions was applied to the participants. It was presented to the opinions of 3 experts, in the light of the feedback received, the data collection tool was revised and finalized to be applied by submitting it to the opinions again. In this way, the content validity of the data collection tool was ensured. The open-ended question form transferred to "Google Forms" and delivered to teachers with social media applications, pages and groups. It takes approximately 8 minutes to fill the form for each participant. Lastly the received answers (93 data) analyzed. The data obtained were evaluated by using the content analysis method, and the calculated frequency distribution (f) and percentage (%) values were tabulated.

3. RESULTS

In this section, research findings are given by considering the data obtained from the answers of the study group. The "Taken" and "Not Taken" categories in the tables denote participants' attendance status in ISE courses."

Firstly, we examined that what do participants know regarding virtual informal contexts (Table 3).

Table 3.
Responses to VIEs

Theme	Codes	Taken		Not Taken	
		f	%	*f*	%
Environment Focused Approach	Virtual Museums	11	7.97	12	8.69
	Virtual Alternative to Informal Env.	10	7.24	4	2.89
	3D /360° Env.	4	2.89	1	0.72
	Virtual Science Centers	2	1.44	3	2.17
	Virtual National Parks	2	1.44	3	2.17
	Virtual Zoos	2	1.44	1	0.72
	Every Out-Of-School Environment	1	0.72	5	3.62
	Virtual Botanic Gardens	0	0	1	0.72
	Virtual Planetariums	0	0	1	0.72
Quality Focused Approach	Hands-on Learning	3	2.17	3	2.17
	Educative – Instructional Experiences	3	2.17	3	2.17
	Permanent Learning	3	2.17	0	0
	Learning Outcomes	2	1.44	1	0.72
	Social Learning	2	1.44	1	0.72
	Collaborative / Active Learning	2	1.44	0	0
	Supporter for Formal Education	2	1.44	3	2.17
	Savior/ Necessity for Pandemic	2	1.44	4	2.89
	Fun/ Enjoyable	2	1.44	1	0.72
	Observation	1	0.72	1	0.72
	Curiosity/ Interest	0	0	2	1.44
Other	Unrelated	9	6.52	9	6.52

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Theme	Codes	Taken		Not Taken	
		f	*%*	*f*	*%*
	Responses				
	I Don't Know	1	0.72	15	10.86
TOTAL		64	46.37	74	53.63

Teachers, both courses taken and not-taken groups, frequently mentioned "Virtual Museums" (8,69%) particularly emphasizing the virtual alternative of informal environments, possibly indicating a need heightened by the pandemic. Despite some differences in knowledge levels between course-taken and not course taken teachers, a significant proportion from both groups demonstrated understanding of VIEs, suggesting that formal education may not be the sole determinant of familiarity with teaching in VIEs.

Second question investigated the importance of VIE activities in distance education process during the pandemic (Table 4).

Table 4.
Responses regarding the importance of using VIEs

Theme	Codes	Taken		Not Taken	
		f	*%*	*f*	*%*
Qualitative Approach	Motivating - Fun - Engaging	13	9.7	9	6.72
	Permanent-Effective Learning	12	8.95	12	8.95
	Visuality / Reality Feeling	3	2.24	5	3.73
	Freedom	3	2.24	2	1.49
	Hands-on Learning	3	2.24	2	1.49
	21st Century Skills	2	1.49	1	0.75
	Topic Reinforcement	0	0	2	1.49
Accessibility Based Approach	Easy to Use / Reach	4	2.99	6	4.48
	Solution to Disadvantaged Situations	3	2.24	4	2.99
Pandemic Based Approach	Advantages in the Pandemic Process	14	10.45	12	8.95
	Protecting Health	2	1.49	1	0.75
	Unrelated	5	3.73	9	6.72
Other	Responses				
	Not Important	1	0.75	4	2.99
TOTAL		65	48.51	69	51.5

It was found that is important for the course-taken participants, stating that VIEs provide "Advantage in the Pandemic Process" (10.45%), "Motivating-Fun- Engaging" (9.7%), and "Permanent-Effective Learning" (8.95%); however, on the other hand, 1 participant (0.75%) adopted the idea that teaching in these environments is unimportant. The rate of not having this thought among the course-taken teachers corresponds to a percentage of 2.56%. Furthermore, teachers' recognition of the importance of VIEs, particularly during the pandemic, reflects their awareness of the advantages and efficiency of integrating VIEs into face-to-face courses.

Third question examined which VIEs teachers use during the pandemic process (Table 5).

Table 5.
Responses to which VIEs used

Codes	Taken		Not Taken	
	f	*%*	*f*	*%*
Virtual Museums	19	18.1	14	13.33
Unrelated Answers	17	16.09	18	17.14
Virtual Zoos	2	1.9	1	0.95
Virtual Science Centers	2	1.9	5	4.76
Virtual National Parks	2	1.9	1	0.95
I Didn't Use	2	1.9	18	17.14
Virtual Planetariums	1	0.95	1	0.95
Virtual Aquariums	0	0	1	0.95

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Codes	Taken		Not Taken	
	f	%	*f*	%
Virtual Botanical Gardens	0	0	1	0.95
TOTAL	45	42.86	60	57.14

It was found that the participants mostly integrated "Virtual Museums" (ISE Course Taken: 18.1%; ISE Course Not Taken: 13.3%) into their lessons, as they not taken any course participants. It was reached to the finding that the participants also use VIEs such as "Virtual Science Centers" (6.66%), "Virtual Zoos" (2.85%), and "Virtual National Parks" (2.85%). However, while some use the "Virtual Botanical Gardens" and "Virtual Aquariums" among non-course-taken teachers, none of the course-taken teachers have used them. The reason why "Virtual Museums" is the most used VIE in both participant groups can be envisaged as the fact that there are many virtual museum options in different types compared to other VIEs, which contain varieties that can appeal to every acquisition. We encountered the answer to one of the critical questions of our study in the third question. Fourth question investigated how teachers plan VIE activities during the pandemic process (Table 6).

Table 6.
Responses regarding the planning of VIE

Codes	Taken		Not Taken	
	f	%	*f*	%
Curriculum	21	19.27	16	14.68
Student Expectations-Needs	8	7.34	6	5.5
Educational Materials	5	4.59	3	2.75
Unrelated Responses	5	4.59	12	11
Time	4	3.67	0	0
Features of VIEs	4	3.67	2	1.83
Methods-Techniques - Models	2	1.83	4	3.67
Educational Philosophies	1	0.92	0	0
I Do Not Plan	1	0.92	14	12.84
Administrative Procedures	0	0	1	0.92
TOTAL	51	46.79	58	53.21

Table 6 shows that that the participants in both groups mostly planned their virtual informal teaching activities “According to the Curriculum” (Course-taken Participants: 19.27%, Non-course-taken Participants: 14.68%). It has been found that the other priorities that the trained teachers based on when planning are "According to Student Expectations - Needs" (7.34%), "According to Educational Materials" (4.59%), "According to Time" (3.67%) and "According to the Features of VIEs". It can be interpreted that they attach importance to the principle of "Purposeful", which is sought in the lecture plans prepared for student-centered teaching activities organized in informal environments. While the teachers who prepared the plan "According to Administrative Procedures" were not in the course-taken group, one of the non-course-taken participants (0.92%) put administrative procedures at the center of planning. The opposite of this situation occurred when one of the trained teachers was planning "According to the Educational Philosophy" while the non-course-taken teachers, did not mention their educational philosophies. As with the third question, 14 (25.93%) non-course-taken teachers and 1 (2.56%) course-taken teacher did not plan, indicating heightened planning awareness among trained teachers, who often visit VIEs before lessons to tailor their preparation to environmental features.

Fifthly we examined how do teachers apply their plans for VIEs during the pandemic process (Table 7).

Table 7.
Responses to the use of VIEs in lessons during the pandemic

Codes	Taken		Not Taken	
	f	%	*f*	%
Sharing the Screen	13	13,4	18	18,55
Via EBA*/ZOOM	12	12,37	13	13,40
Sending Link of Virtual Environments	9	9,27	4	4,12
Unrelated Answers	6	6,18	9	9,27
I Do Not Practice	2	2,06	10	10,30
TOTAL	43	44,36	54	55,64

*Educational Information Network in Turkey

The most frequently stated application method by teachers (13.40%) who have taken a course and who have not taken a course (18.55%) was "Sharing the Screen in Classes". The majority of the teachers stated that they used VIEs in their online lessons by providing information about the subject to the students before the lesson. It was

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concluded that course-taken teachers (12.37%) and the non-course-taken teachers (13.40%) applied VIEs using these platforms "EBA and Zoom" in this process. It is seen that the teachers who use “By Sending the Link of Virtual Environments” to their students to examine during the course or at the end of the course, apply these environments synchronously and asynchronously in their courses, including course-taken (9.27%) and have not taken participants (4.12%). Considering all the participants, among the 39 (41.93%) course-taken teachers, 2 (2.06%) teachers stated that they "Do Not Practice" about VIEs, and among 54 (58.07%) non-course-taken teachers, 10 (10,30%) people did not practice. In the light of this information, it can be said that whether to take the course does not have great importance on the application of VIEs in lessons. However, the participants who reported “Unrelated Answers” to the question are in both groups. When the irrelevant answers were examined, it was seen that the teachers gave answers such as lectures and materials at home.

Sixth question examined which teaching methods/ techniques /models do teachers use in VIEs during the pandemic process (Table 8).

Table 8.
Methods/techniques/models used by teachers in teaching practices in VIEs during the pandemic process

Codes	Taken		Not Taken	
	f	*%*	*f*	*%*
Question & Answer	16	13,44	15	12,60
Expository	10	8,40	12	10,08
Excursion/Observation	10	8,40	3	2,52
Brainstorming	7	5,88	3	0,84
4E, 5E, and Learning Cycle	6	4,44	15	2,52
Discovery	4	3,36	1	0,84
Cooperative Learning	3	2,52	1	0,84
Unrelated Answers	3	2,52	9	7,56
I Do Not Use	2	1,68	10	8,40
6 Hats	1	0,84	1	0,84
TOTAL	62	52,08	57	17,92

The technical “Question and Answer” that was touched upon by the course-taken teachers (13.44%) and the non-course-taken teachers (12.60%) the most. The majority of the teachers stated that they did the question and answer with their students both at the time of the lesson and at the end of the lesson in VIEs. Course-taken teachers (8.40%) and have not taken a course teacher (10.08%) gave lessons through "Expository" in VIEs in this process. Non-course-taken teachers use techniques such as “Cooperative Learning”, “Brainstorming“ and “6 Hats” less frequently in lessons. But the course-taken teachers (8.40%) in terms of using the” Excursion/Observation" methods virtually in their courses and non-course-taken teachers (2.52%) mentioned them more. The importance of receiving courses in the use of these environments in the lessons is revealed. Considering all the participants, it was found that 2 (1.68%) of course-taken teachers and 10 (8.40%) non-course-taken teachers stated that “I Do Not Use”.

Seventh question investigated how teachers evaluated students after VIE activities during the pandemic process (Table 9).

Table 9.
Findings on how teachers evaluated students after VIE activities during the pandemic process

Themes	Codes	Taken		Not Taken	
		f	*%*	*f*	*%*
Traditional Evaluation	Question & Answer	10	9,52	14	13,33
	Multiple Choice Question	8	7,61	8	7,61
	Discussion	4	3,80	4	3,80
	Lesson Participation	3	2,85	4	3,80
Alternative Assessment Types	Performance Assignment	10	9,52	4	3,80
	Web 2.0 Tools	7	6,66	8	7,61
	Process Evaluation	4	3,80	10	9,52
	Self-Assessment	1	0,95	1	0,95
Other	I Do Not Use	4	3,80	10	9,52
TOTAL		51	48,63	54	51,37

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For the seventh question, the most frequently mentioned evaluation method related to ISE among the course-taken (9.52%) and have not taken a course participant (13.33%) was “Question and Answer”. Teachers stated that at the end of their lessons in VIEs, they made question and answer questions with their students, in this way they repeated the lesson and evaluated their students. Among the types of "Based on the Criteria Used Evaluation", the teachers who evaluated with "Multiple Choice Question" at the end of the lessons are equal to course-taken (7.61%) and who have not taken a course participant (7.61%). It is seen that the teachers who evaluate at the end of the lesson with a “Discussion” prefer equal to the course-taken (3.80%) and have not taken a course participant (3.80%). Considering all participants, 39 (41.93%) of the course-taken teachers, 4 (3.80%) teachers stated that they “I Do Not Use” on VIEs, and among 54 (58.07%) teachers who have not taken a course, 10 (9.52%).

Last question investigated what kind of difficulties do teachers encounter during the pandemic in all VIE process (Table 10).

Table 10.
The difficulties encountered by teachers during the pandemic in all VIE process

Themes	Codes	Taken		Not Taken	
		f	%	*F*	%
Student/ Teacher Related Problems	Internet Access	14	11,6	14	11,7
	Low Attendance	13	10,83	8	6,7
	Inability to Communicate Effectively	5	4,16	4	3,4
	Planning/ Supervision	2	1,66	3	2,5
Infrastructure &Technical Problems	Lack of Technologic Devices	11	9,16	13	10,8
	Lack of Content-Appropriate Materials	3	2,5	0	0
Course Related Problems	Time (Duration of the lesson)	3	2,5	9	7,5
	Insufficient Knowledge	1	0,83	10	8,3
Other	Didn’t Experience Difficulties	3	2,5	4	3,3
TOTAL		55	45,86	65	54,1

According to the last question, the most addressed problem of the course-taken teachers (11.66%) and non-course-taken teachers (11.66%) related to ISE was “Internet Access”. Teachers expressed problems such as disconnection in their lessons in VIEs, and the lack of sufficient internet access for students to attend the lesson and stated that for these reasons, the participation in the lesson was low and they could not reach their students. On the theme of “Infrastructure and Technical Problems”, course-taken (9.16%) and non-course-taken teachers (10.83%) stated that they had problems caused by “Lack of Technological Devices" and that their students did not have devices such as tablets/phones that they could use in their lesson and therefore could not attend regular classes. It was concluded that the course-taken teachers (2.50%) did not have “Content-Appropriate Materials” for their courses and could not use VIEs in their lessons. It is seen that (2.50%) of the teachers who have difficulties in terms of “Time (Duration of the lesson)" have taken a course and those non-course-taken (7.50%). In this process, it was concluded that teachers experienced personal difficulties when using virtual informal learning environments in lessons. It is seen that the teachers who have “Insufficient Knowledge” in this regard are

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in both groups, including course-taken (0.83%) and have not taken a course participant (8.33%). According to this information, it can be said that whether the teachers take courses has great importance in terms of the difficulties encountered in the planning/ implementation/evaluation processes in teaching activities in VIEs. Among the teachers who stated that they "Didn't Experience Difficulties" in this process were two groups who have taken a course (2.50%) and who have not taken it (3.33%).

4. DISCUSSION

In this study, it found that the participants thought that it was necessary to use virtual informal learning environments during the Pandemic process and that these environments qualitatively met their educational needs. At this point, it can be mentioned from the findings that teachers have a high rate of positive perceptions. However, non-course-taken teachers have mostly wrong perceptions of VIEs and define VIEs as distance education applications or technology-based materials. On the contrary, teachers taking the course are more aware of teaching in informal environments.

Most of the participants agreed that the use of VIEs is important during the Pandemic process. The fact that VIEs are seen as an environment providing "Motivational - Fun - Engaging", "Permanent - Effective Learning", "Freedom" and "Advantage in the Pandemic Process" states that teachers recognize the importance of VIEs. Participants adopt the "Fun" principle, the "Hands-on Learning" principle, and the "Self-Directed" principle, which are among the requirements of the lecture plan in a student-centered informal environment. On the other hand, some non-course-taken participants think that using these environments is not important. Although the number of participants forming this group is not large, the presence of a teacher among the trainees who stated that it is not important to use VIEs can be considered a negative comment.

Moreover, the most used VIE in each participant group is "Virtual Museums". It can be said that the basis of this approach towards "Virtual Museums" is the fact that there are many different types of virtual museums in Turkey compared to other VIEs, which can appeal to all gains. In the question in which VIEs used were investigated, it was found that most of the non-course-taken teachers stated that they did not use these environments, and besides, their misconceptions about VIEs continued in this question. In the virtual context, "Aquariums, Botanical Gardens, Planetariums, National Parks, Zoos and Science Centers" are used very little by the participants during the process, due to the convenience of content, students' needs-expectations, time, internet access, etc. conditions may have been affected. The biggest outcome of this question is the result that a high percentage of the non-course-taken teachers do not use VIEs. It is clear that the trained participants integrate and tend to integrate these environments into their lessons.

It was concluded that the participants mostly followed a curriculum-based way in the lesson plans they prepared to integrate VIEs into their lessons. This is the same for both groups. The teachers, who look at planning from this perspective, attach importance to the principle of "Purposeful", which is one of the necessary conditions to ensure that the teaching activities organized in informal environments are student-centered. It has been determined that some constraints (time, material, etc.) affect the situations taken as a basis in planning. At this point, it is important to examine what these constraints are for solving problems. In planning, "Student Expectations – Needs" was one of the most mentioned points in both groups. Depending on this idea, teachers' lessons can be seen as an effort to keep students active during the lesson. In terms of student-centered teaching, this effort of teachers is promising. "Methods – Techniques and Models", "Time", "Materials", "VIE Features", "Educational Philosophies" and "Administrative Procedures" also play a role in planning. On the other hand, in parallel with the finding obtained in the previous question, the non-course-taken teachers did not make planning at a high rate. Once again, the hypothesis that taking a course leads to teachers being more conscious about the teaching done in VIEs has been supported.

The participants in both groups mostly used VIEs by " Sharing the Screen in Lessons " during the Pandemic process and included them in their lessons by using platforms such as "Educational Information Network (EBA) and Zoom". It can be said that it is preferable for the applications in the courses to be this way, to be easy to use, and to be familiar with the platforms for teachers taken and non-taken a course on ISE. The ISE course-taken participants tend to use VIEs more in their lessons and they are more competent in using these environments in their lessons; On the other hand, it was determined that the participants in the non-course-taken group did not practice in their lessons about VIEs and gave more irrelevant answers about the subject. These findings supported the finding that the participants in the non-course-taken group parallel with the finding in the last question did not use VIEs in their lessons due to individual problems.

Participants used the most in their lessons in VIEs during the pandemic situation process was the "Question-Answer Technique" one of the traditional types of assessment. This outcome is the same for both groups and is in line with the views of Bakioğlu and Çevik (2020), which investigated the views of science teachers on distance education during the pandemic, that the techniques used by teachers in their lessons changed with the transition to distance education. Teachers who use this technique the most in their lessons have often used this technique to involve their students in the process and increase interaction. The course-taken participants in the training teach their lessons in a student-centered way and they prefer the techniques that will make their students active in this process. It was concluded that the non-course-taken participants mostly teach through "Expository" or do not practice VIEs in their lessons. This result is in parallel with the Iadecola and Piave's (2008) study and shows that teachers have difficulty evaluating students in these environments. The lesson, the subject of the lesson, and the number of students have an impact on the choice of methods/ techniques/ models used in the lesson in a virtual informal environment. Additionally, the Question-Answer technique is the most preferred method for evaluating at the end of teaching activities in VIEs. They evaluated the students in this way because of factors such as quickly evaluating the students and taking less time in the

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evaluation part of their lessons. The course-taken teachers preferred the alternative assessment methods in which they evaluated the process as a whole more than the non-course-taken teachers. It seems that teachers tend to evaluate students with different types of assessments and as a whole, without adhering to a single method during the semester.

During the pandemic, the most difficulty encountered by the participants in all activities in VIEs is "Internet Access" in both groups. Teachers expressed problems such as disconnection in their lessons in VIEs, the lack of sufficient internet access for students to attend the lesson, and it was concluded that for these reasons, the low participation to lessons, they could not reach their students and they had problems with the "Lack of Technological Devices" used by the students. This result obtained is parallel to the opinions expressed by Bulunuz and Ünal (2020); Zajac, Randall and Holladay (2022) in their study; they experienced difficulties due to the Internet and the system at the beginning of the distance education process, and then students who did not have a computer and a smartphone had difficulty participating in the distance education process.

On the other hand, students could not participate classes regularly because of “Infrastructure and Technical Problems”. The reasons such as disconnection of the participants, visual blurring in the devices that provide mutual communication such as microphone/camera, and not transmitting sound reduce the interaction and the teachers experience an additional difficulty during the lesson. This result is in parallel with the conclusion of Bilgiç and Tüzün's (2015) study in which they examined the problems experienced in distance education programs, that the mobile technologies of the students are insufficient to use the platforms, with the transfer of the course content to the electronic environment, and that there must be a solid infrastructure for the healthy progress of the distance education process. In addition, this result is parallel to the results of Dalgarno and Lee's (2010); Carraro and Trinder's (2021) studies that technology provides students with better learning potential in the learning environment. It is seen that the difficulties experienced by all participants during the planning phase are due to the lack of materials suitable for the content of the lesson or the insufficient lesson hours.

5. CONCLUSION

It can be concluded that the course-taken teachers had less difficulty using VIEs in their lessons individually. The teachers in non-course-taken group did not integrate VIEs into their classes this term or they have more difficulty in doing so than the participants in the other group since their knowledge of informal environments is insufficient. It can be said that the most common problems experienced by the majority of each participant group are socioeconomic difficulties. As a result of this study, the course-taken teachers use VIEs more and more consciously than the non-course-taken participants. This result is parallel to the teacher effect finding in the study of Lin and Lan’s (2015). At this point, it is important for teachers to plan their use of VIEs by focusing on the achievements in the curriculum and integrated these environments into their lessons by adopting a student-centered approach in this process. In the evaluation studies conducted after the teaching activities using VIEs, they tend to evaluate the achievements, not this learning process. To make better use of the environments in the research, in-service training on teaching in informal environments for teachers can be increased and they can be encouraged to participate. Examining the content of the courses can be another research topic. In this way, the content of in-service training can be arranged according to the current educational needs of both students and teachers during the pandemic situation. Increasing the training and arranging the content will contribute greatly to the teachers' knowledge of the practices they will do in the future, and develop solutions to the problems/difficulties they have experienced or may experience.

6. REFERENCES

Adnan, M., & Anwar, K. (2020). Online learning amid the Covid-19 pandemic: students' perspectives. *Journal of Pedagogical Sociology and Psychology*, *2*(1), 45-51. https://doi.org/10.33902/JPSP.2020261309

Anderson, D., Piscitelli, B., Weier, K., Everett, M. & Tayler, C. (2002). Children’s museum experiences: identifying powerful mediators of learning. *Curator: The Museum Journal*, *45*(3), 213–231. https://doi.org/10.1111/j.2151-6952.2002.tb00057.x

Bakioğlu, B., & Çevik, M. (2020). COVID-19 pandemisi sürecinde fen bilimleri öğretmenlerinin uzaktan eğitime ilişkin görüşleri. *Turkish Studies*, *15*(4), 109-129. https:// doi.org/10.7827/TurkishStudies.43502

Baltacı, A. (2018). Nitel araştırmalarda örnekleme y öntemleri ve örnek hacmi sorunsalı üzerine kavramsal bir inceleme (A conceptual review on sampling methods and sample size problems in qualitative research). *Bitlis Eren Üniversitesi Sosyal Bilimler Dergisi*, *7*(1), 231–274.

Bilgiç, H. G., & Tüzün, H. (2015). Yükseköğretim kurumları web tabanlı uzaktan eğitim programlarında yaşanan sorunlar (Problems experienced in web-based distance education programs of higher education institutions). *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, *1*(3), 26 - 50.

Bonnette, R.N., Crowly, K. & Shunn, C.D. (2019). Falling in love and staying in love with science: ongoing informal science experiences support fascination for all children. *International Journal of Science Education*. *41*(12), 1626-1643. https://doi.org/10.1080/09500693.2019.1623431

Bozdoğan, A. E. & Kavcı A. (2016). Sınıf dışı öğretim etkinliklerinin ortaokul öğrencilerinin fen bilimleri dersindeki akademik başarılarına etkisi (The effect of out-of-class teaching activities on the academic success of secondary school students in science classes.). *Gazi Eğitim Bilimleri Dergisi*, *2*(1),13-30.

Bozdoğan, A.E. & Yalçın, N. (2006). Bilim merkezlerinin ilköğretim öğrencilerinin fene karşı ilgi düzeylerinin değişmesine ve akademik başarılarına etkisi: enerji parkı (The effect of science centers on the change in

primary school students' interest in science and their academic success: energy park). *Ege Eğitim Dergisi*, *2*(7), 95–114.
Briseño-Garzón, A., Anderson, D., & Anderson, A. (2007). Adult learning experiences from an aquarium visit: the role of social interactions in family groups. *Curator: The Museum Journal*, *50*(3), 299-318. https://doi.org/10.1111/j.2151-6952.2007.tb00274.x
Bulunuz, N., & Ünal, M. (2020). COVID-19 salgını dönemi uzaktan eğitim çalışmaları ve sonraki süreçle ilgili fen bilimleri öğretmenlerinin görüş ve önerileri (Opinions and suggestions of science teachers regarding distance education studies during the COVID-19 epidemic period and the subsequent process). *Milli Eğitim*, *49*, 343-369. https://doi.org/10.37669/milliegitim.775521
Carraro, K., & Trinder, R. (2021). Technology in formal and informal learning environments: Student perspectives. *Global Journal of Foreign Language Teaching*, *11*(1), 39-50. https://doi.org/10.18844/gjflt.v11i1.5219
Çakın, M., & Külekçi Akyavuz, E. (2020). COVID-19 süreci ve eğitime yansıması: öğretmen görüşlerinin incelenmesi (COVID-19 process and its reflection on education: examination of teachers' opinions). *International Journal of Social Sciences and Education Research*, *6*(2), 165-186. https://doi.org/10.24289/ijsser.747901
Dalgarno, B., & Lee, M. (2010). What are the learning affordances of 3-D virtual environments? *British Journal of Educational Technology*, *41*(1), 10-32. https://doi.org/10.1111/j.1467-8535.2009.01038.x
Demirtaş, H., & Kavuk, E. (2021). Difficulties experienced by teachers in the distance education during COVID-19 pandemic. *E-International Journal of Pedandragogy*, 1(1), 55-73.
Dori, Y. J. & Tal, R. T. (2000). Formal and informal collaborative projects: Engaging in industry with environmental awareness. *Science Education Journal*, *84*(1), 95-113. https://doi.org/10.1002/(SICI)1098-237X(200001)84:1<95::AID-SCE7>3.0.CO;2-W
Eshach, H. (2007). Bridging in-school and out-of-school learning: Formal, non-formal, and informal education. *Journal of Science Education and Technology*, *16*(2), 171-190. https://doi.org/10.1007/s10956-006-9027-1
Gupta, C. P., Singh, B., & Marwaha, T. (2013). Relationship between social media and academic performance in distance education. *Universal Journal of Educational Research*, *1*(3), 185–190. https://doi.org/10.13189/ujer.2013.010307
Henriksen, E.K. & Froyland, M. (2000). The contribution of museum to scientific literacy: views from audience and museum professionals. *Public Understanding of Science*, *9*, 393-415. https://doi.org/10.1088/0963-6625/9/4/304
Hofstein, A., & Rosenfeld, S. (1996). Bridging the gap between formal and informal science learning. *Studies in Science Education*, *28*, 87-112. https://doi.org/10.1080/03057269608560085
Iadecola, G., & Piave, N. (2008). Evaluating Informal Learning in a Virtual Context. In *fourth International Scientific Conference, eLSE, Bucharest*.
Kaya, B. (2020). Pandeminin ruh sağlığına etkileri (Effects of the pandemic on mental health). *Klinik Psikiyatri*, *3*(2), 123-124. https://doi.org/ 10.5505/kpd.2020.64325
Kırmızıgül, H. G. (2020). COVID-19 salgını ve beraberinde getirdiği eğitim süreci (COVID-19 epidemic and the education process it brought with it). *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi*, *7*(5), 283 - 289.
Lin, T. J., & Lan, Y. J. (2015). Language learning in virtual reality environments: Past, present, and future. *Educational Technology & Society*, *18*(4), 486-497.
Lin, P.Y. & Shunn, C.D. (2016). The dimensions and impact of informal science learning experiences on middle schoolers' attitudes and abilities in science. *International Journal of Science Education*, *38*(17), 2551-2572. https://doi.org/10.1080/09500693.2016.1251631
Miralay, F. (2020). Evaluation of distance education practice in 2020 Covid-19 pandemic process. *Near East University Journal of Education Faculty*, *3*(2), 79-86. https://doi.org/10.32955/neuje.v3i2.253
Sasson, I. (2014). The role of informal science centers in science education; attitudes, skills and self-efficacy. *Journal of Technology and Science Education*, *4*(3), 167. https://doi.org/10.3926/jotse.123
Tudor, S. L. (2013). Formal–non-formal–informal in education. *Procedia-Social and Behavioral Sciences*, *76*, 821-826. https://doi.org/10.1016/j.sbspro.2013.04.213
Türkmen, H., Topkaç, D. D., Yamık & G. A. (2016). İnformal öğrenme ortamlarına yapılan gezilerin canlıların sınıflandırılması ve yaşadığımız çevre konusunun öğrenilmesine etkisi: tabiat tarihi müzesi ve botanik bahçesi örneği (The effect of trips to informal learning environments on learning about the classification of living things and the environment we live in: the example of a natural history museum and botanical garden.). *Ege Eğitim Dergisi*, *17* (1), 174-197. https://doi.org/10.12984/eed.20218
Türkmen, H. (2018). İnformal öğrenme ortamının fosiller konusunun öğrenilmesine etkisi: tabiat tarihi müzesi örneği (The effect of informal learning environment on learning the subject of fossils: the example of a natural history museum). *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi*, *20*, 165-175. https://doi.org/10.32709/akusosbil.417266
Türkmen, H., Doğru, Ö., & Şükran, Ö., (2018). İnformal öğrenme ortamlarında fen öğretimi: sasalı doğal yaşam parkı gezisine yönelik ortaokul öğrencilerin görüşleri (Teaching science in informal learning environments: secondary school students' opinions on the Sasalı wildlife park trip.). *Turan-Sam International Scientific Peer-Reviewed Seasonal Journal*, *10*, 641-650. http://dx.doi.org/10.15189/1308-8041
Türkmen, H. & Kaplan, G. (2021). Why science teachers can't teach in informal environments? *International Journal of Multidisciplinary Research and Analysis (IJMRA),* *4*(12), 2002-2012. https://doi.org/10.47191/ijmra/v4-i12-32

DOI: https://doi.org/10.17509/ije.v17i1.52885x
p- ISSN 1978-1342 e- ISSN 2442-4730

Türkmen, H. & Sürgit, C. (2021). COVID-19 salgınında LGS sınavına hazırlanan 8.sınıf öğrencisi olmak (Being an 8th grade student preparing for the LGS exam during the COVID-19 epidemic). *Turan-Sam*, *13*(50), 32-41. https://doi.org/10.15189/1308-8041

Zajac, S., Randall, J., & Holladay, C. (2022). Promoting virtual, informal learning now to thrive in a post-pandemic world. *Spring*, *127*(1), 283-298. https://doi.org/10.1111/basr.12260

DOI: https://doi.org/10.17509/ije.v17i1.52885
p- ISSN 1978-1342 e- ISSN 2442-4730