

Remote Teacher Education During the COVID-19 Pandemic: Experiences and Recommendations*

Hatice Hanım Erol¹ and Semra Tican Başaran^{**2}

Abstract

The purpose of this study is to explore faculty members and prospective teachers' experiences and recommendations regarding remote teacher education during the COVID-19 pandemic. Using an explanatory sequential design, the study collected quantitative data from 54 faculty members and 711 prospective teachers via a questionnaire, and qualitative data from 21 faculty members and 25 prospective teachers through semi-structured interviews. Quantitative data were analyzed through descriptive statistics, whereas qualitative data were examined using content analysis. Findings reveal a decline in prospective teachers' motivation and learning outcomes, especially in practice-based courses, during remote education. Technical problems such as power outages and internet disruptions, as well as prospective teachers keeping cameras and microphones off, traditional teaching methods, and inadequate digital materials, hindered in-class interaction. Remote assessment processes raised concerns about the reliability of exams and increased anxiety due to potential technical issues. Recommendations include improving technological infrastructure, enhancing remote assessment practices, and identifying digital competencies for teachers. Faculty members suggested that teacher education could continue with blended learning, while prospective teachers preferred face-to-face education after pandemic.

Keywords

Pandemic
Remote education
Teacher education
Faculty member
Prospective teacher

Article Info

Received
June 11, 2024
Accepted
November 15, 2024
Article Type
Research Paper

COVID-19 Salgınında Uzaktan Öğretmen Eğitimi: Deneyimler ve Öneriler

Öz

Araştırmanın amacı öğretim elemanları ve öğretmen adaylarının COVID-19 salgını döneminde uzaktan yürütülen öğretmen eğitimine yönelik deneyim ve önerilerini ortaya koymaktır. Karma yöntem araştırmalarından açıklayıcı sıralı desenin izlendiği çalışmada nicel veriler 54 öğretim elemanı ve 711 öğretmen adayından anketle; nitel veriler ise 21 öğretim elemanı ve 25 öğretmen adayından yarı yapılandırılmış görüşme formuyla toplanmıştır. Nicel veriler betimsel istatistikler, nitel veriler ise içerik analiziyle çözümlenmiştir. Bulgular uzaktan öğretmen eğitimi döneminde öğretmen adaylarının öğrenme motivasyonlarının; kazanımlara erişim düzeyinin düştüğünü, özellikle uygulamalı derslerde öğrenme eksiklikleri meydana geldiğini, elektrik kesintileri, bağlantı kopmaları gibi teknik sorunlar yaşandığını göstermiştir. Öğretmen adaylarının derslerde kamera ve mikrofonlarını kapalı tutması, geleneksel öğretim yöntemlerinin tercih edilmesi ve dijital ders materyallerinin yeterli olmayışı sınıf içi etkileşimi olumsuz etkilemiştir. Uzaktan yürütülen değerlendirme süreçleri sınav güvenliğini olumsuz etkilemiş, öğretmen adaylarının çevrim içi sınavlarda olası teknik aksaklıklar sebebiyle sınav kaygıları artmıştır. Katılımcılar uzaktan öğretmen eğitiminde verimi artırabilmek için teknolojik altyapı sorunlarının giderilmesini, uzaktan ölçme değerlendirme uygulamalarının geliştirilmesini, öğretmenlere yönelik dijital yetkinliklerin belirlenmesini önermişlerdir. Salgın sonrasında öğretmen eğitimine, öğretim elemanları harmanlanmış eğitimle, öğretmen adayları yüz yüze eğitimle devam edebileceğini belirtmişlerdir.

Anahtar Sözcükler

Salgın
Uzaktan eğitim
Öğretmen eğitimi
Öğretim elemanı
Öğretmen aday

Makale Hakkında

Gönderim Tarihi
11 Haziran 2024
Kabul Tarihi
15 Kasım 2024
Makale Türü
Araştırma Makalesi

Citation: Erol, H. H., & Tican Başaran, S. (2024). Remote Teacher Education During the COVID-19 Pandemic: Experiences and Recommendations. *Ege Journal of Education*, 25(3), 213-236. doi: <https://doi.org/10.12984/egeefd.1499737>

* Bu çalışma, ilk yazarın "COVID-19 salgını döneminde eğitim fakültelerinde uzaktan eğitim: Deneyimler ve öneriler" isimli yüksek lisans tezinden üretilmiştir. [This study was produced from the first author's master's thesis entitled "Distance education in faculties of education in the COVID-19 pandemic: Experiences and recommendations".] Araştırmanın bir kısmı 26-28.10.2023'te düzenlenen 11. Uluslararası Eğitim Programları ve Öğretim Kongresi'nde özet bildiri olarak sunulmuştur. [A part of the research was presented at the 11th International Congress on Curriculum and Instruction organized on 26-28.10.2023]

¹  Muğla Sıtkı Koçman University, Institute of Educational Sciences, Türkiye, hatice97erol@gmail.com

^{**} Corresponding Author / Sorumlu Yazar

²  Muğla Sıtkı Koçman University, Faculty of Education, Department of Educational Sciences, Türkiye, semrabasaran@mu.edu.tr



This paper is licensed under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 terms.

Genişletilmiş Türkçe Özet

Giriş

Bu araştırma, COVID-19 salgını sırasında uzaktan eğitim sürecinde öğretim elemanları ve öğretmen adaylarının deneyimlerini ve bu sürecin eğitim üzerindeki etkilerini incelemeyi amaçlamaktadır. Salgın, dünya genelinde eğitim sistemlerinde büyük bir değişiklik yaratarak, geleneksel yüz yüze eğitimin yerine uzaktan eğitimi getirmiştir. Bu durum, eğitimciler ve öğrencilere yeni fırsatlar sunarken çeşitli zorlukları da getirmiştir. Çalışmanın temel amacı, uzaktan eğitim sürecinin öğretmen eğitimine etkilerini belirlemek ve bu süreçte karşılaşılan sorunları ve önerileri ortaya koymaktır. Ayrıca, uzaktan eğitim sürecinde öğretim elemanları ve öğretmen adaylarının deneyimlerini ve bakış açılarını derinlemesine anlamak hedeflenmiştir.

Yöntem

Bu araştırma, karma yöntem araştırması olarak tasarlanmış ve hem nicel hem de nitel veri toplama teknikleri kullanılmıştır. Nicel veriler, betimsel istatistikler (f , %, ss, \bar{X}), nitel veriler ise içerik analiziyle çözümlenmiştir. İçerik analizi sürecinde açık ve in-vivo kodlama ile elde edilen kodlar eksen kodlaması ile temalar altında toplanmıştır. Çalışma grubu, 2021-2022 akademik yılında Muğla Sıtkı Koçman Üniversitesi Eğitim Fakültesinden 54 öğretim elemanı ve tabakalı örnekleme yöntemi ile seçilen 711 öğretmen adayından oluşmaktadır. Veri toplama araçları olarak anket ve yarı yapılandırılmış görüşme formları kullanılmıştır. Anketler, öğretim elemanları ve öğretmen adaylarının uzaktan eğitime yönelik görüşlerini ve deneyimlerini toplamak amacıyla kullanılmıştır. Yarı yapılandırılmış görüşme formları ise nitel verilerin derinlemesine incelenmesini sağlamıştır.

Bulgular

Araştırmanın nicel bulgularından, öğretim elemanlarının uzaktan eğitim sürecine yönelik genel tutumları incelendiğinde, bu sürecin çoğunlukla memnuniyetsizlik ve kararsızlık yarattığı görülmektedir. Öğretim elemanları, uzaktan eğitimin başlangıcında teknik altyapı ve dijital araçlar konusunda yeterince hazırlıklı olmadıklarını belirtmiştir. Bu durum, derslerin verimliliğini olumsuz etkilemiş ve öğrenci-öğretim elemanı etkileşimini düşürmüştür. Öğretim elemanları, uzaktan eğitimde ders materyallerine erişimde yaşanan zorluklar ve internet bağlantısı sorunları gibi teknik sorunların sıklıkla karşılaşılan problemler olduğunu vurgulamışlardır. Ayrıca, öğretim elemanlarının önemli bir kısmı, uzaktan eğitimde öğrenci motivasyonunun düşük olduğunu ve etkileşimin yetersiz kaldığını belirtmiştir. Öğrenci katılımının sınırlı olması, derslerin verimliliğini azaltmış ve öğretim elemanlarının ders işleme sürecindeki enerjisini düşürmüştür. Uzaktan eğitimde, öğrencilerin derse ilgisini çekmek ve etkileşim sağlamak için yeni yöntemler geliştirilmesi gerektiği vurgulanmıştır. Öğretim elemanları, uzaktan eğitimin değerlendirme sürecinde de adalet ve güvenlik sorunları yaşandığını belirtmiştir. Özellikle sınav güvenliği konusunda endişeler dile getirilmiş ve uzaktan eğitimde kullanılacak güvenilir değerlendirme yöntemlerine ihtiyaç duyulduğu ifade edilmiştir.

Öğretmen adaylarının uzaktan eğitim sürecindeki deneyimleri ve karşılaştıkları sorunlar incelendiğinde ise, uzaktan eğitim sürecinde en çok etkileşim eksikliğinin üzerinde durulmuştur. Derslere katılımın düşük olması sınıf ortamının pasifleşmesine neden olmuş ve bu durum, öğrenme sürecini olumsuz etkilemiştir. Öğretmen adayları, öğretim elemanlarının genellikle düz anlatım yöntemini kullandığını ve etkileşimli öğretim yöntemlerine yeterince yer verilmediğini belirtmişlerdir. Öğretmen adaylarının karşılaştığı diğer önemli sorunlar arasında teknik problemler, internet bağlantısı sorunları ve dijital platformların kullanım zorluğu yer almaktadır. Öğretmen adayları, ders materyallerine erişimde yaşanan zorluklar ve teknik desteğin yetersizliği gibi sorunlarla sıklıkla karşılaşmıştır. Bu durum, derslere odaklanmayı ve öğrenme sürecini olumsuz etkilemiştir. Ayrıca, öğretmen adayları uzaktan eğitim sürecinde sosyal izolasyon, sağlık sorunları ve düşük motivasyon gibi problemlerle de mücadele etmek zorunda kalmıştır. Bunun yanı sıra sınav güvenliği ve değerlendirme adaleti konusunda öğretmen adayları, uzaktan eğitimde yapılan sınavların güvenliği ve değerlendirme sürecinin adaleti konusunda şüpheleri olduğunu dile getirmişlerdir. Bu durum, öğretmen adaylarının sınavlara ve değerlendirme süreçlerine olan güvenini sarsmıştır. Öğretmen adayları, uzaktan eğitimde daha güvenilir ve adil değerlendirme yöntemlerinin geliştirilmesi gerektiğini vurgulamıştır.

Araştırmanın nitel verileri öğretim elemanları ve öğretmen adaylarının uzaktan öğretmen eğitimi sürecindeki deneyimlerine ilişkin daha derinlemesine bilgiler sunmaktadır. Öğretmen adayları ile yapılan görüşmelerde etkileşim eksikliği yine en fazla üzerinde durulan konulardan birisi olmuştur. Canlı derslerin azlığı, yüz yüze iletişim imkânlarının sınırlı olması ve grup çalışmaları yapma fırsatının olmaması, öğretmen adaylarının eğitim sürecini olumsuz etkileyen başlıca faktörlerdir. Öğretmen adayları, derslere olan ilgilerinin ve motivasyonlarının düşük olduğunu belirtmiş ve bu durumun akademik başarılarını olumsuz etkilediğini ifade etmiştir. Öğretmen adayları, derslere odaklanmakta zorluk çektiğini ve uzaktan eğitim sürecinde öğrenme motivasyonlarının azaldığını belirtmiştir. Süreç boyunca yaşanan internet bağlantısı problemleri, platformların kullanım zorluğu ve teknik desteğin yetersizliği gibi teknik aksaklıklar da uzaktan eğitim sürecinin verimliliğini düşüren önemli unsurlar olarak öne çıkmıştır. Öğretmen adayları, ders materyallerine erişimde yaşanan zorluklar ve teknik

desteğin yetersizliği gibi sorunlarla sıklıkla karşılaşmıştır. Bu durum, derslere katılımı olumsuz etkilemiş ve öğretmen adaylarının öğrenme sürecindeki motivasyonlarını düşürmüştür.

Öğretim elemanları, uzaktan eğitim sürecinde öğrenci motivasyonunu artırmanın zor olduğunu ve derslerde etkileşimi sağlamak için çeşitli yöntemler geliştirmek gerektiğini belirtmiştir. Öğretim elemanlarının bir kısmı, uzaktan eğitimde ders materyallerinin daha dikkat çekici ve etkileşimli hale getirilmesi gerektiğini vurgulamışlardır. Ayrıca, uzaktan eğitim sürecinde sınav güvenliği ve adil değerlendirme yapmanın zorlukları da öğretim elemanları tarafından dile getirilen önemli konular arasındadır. Öğretim elemanları, uzaktan eğitimde kullanılan değerlendirme yöntemlerinin çeşitlendirilmesi ve öğrenci performansını daha tarafsız ölçen sistemlerin geliştirilmesi gerektiğini ifade etmiştir. Öğretim elemanları, uzaktan eğitim sürecinde teknolojiyi etkili bir şekilde kullanma becerilerinin artırılması gerektiğini belirtmiştir. Ayrıca, uzaktan eğitimde öğrenci geri bildirimlerinin düzenli olarak alınması ve bu geri bildirimlerin derslerin planlanmasında ve değerlendirilmesinde dikkate alınması gerektiğini vurgulamışlardır. Öğretim elemanları, uzaktan eğitimde ders işleme sürecinde çeşitli zorluklarla karşılaştıklarını ve bu zorlukların üstesinden gelmek için yenilikçi öğretim yöntemleri geliştirdiklerini ifade etmiştir. Öğretmen adayları COVID-19 salgınından sonra öğretmen eğitiminin yüz yüze gerçekleştirilmesi gerektiğini belirtirken, öğretim elemanları teorik dersler için uzaktan, uygulamalı dersler için yüz yüze olacak şekilde harmanlanmış modelin kullanılabileceğini belirtmişlerdir.

Tartışma ve Sonuç

Araştırma bulguları, uzaktan eğitimin öğretmen eğitimi üzerindeki etkilerini kapsamlı bir şekilde ortaya koymaktadır. Öğretim elemanları ve öğretmen adayları, uzaktan eğitim sürecinde çeşitli teknik ve pedagojik sorunlarla karşılaştıklarını belirtmişlerdir. Bu sorunlar arasında teknik altyapının yetersizliği, etkileşim eksikliği ve motivasyon düşüklüğü gibi faktörler öne çıkmaktadır. Öğretmen adayları, uzaktan eğitim sürecini daha verimli hale getirmek için çeşitli önerilerde bulunmuştur. Bu öneriler arasında derslerin etkileşimli ve çeşitli materyaller ile desteklenerek işlenmesi, teknolojik altyapının güçlendirilmesi ve öğrencilere yönelik desteklerin artırılması yer almaktadır. Öğretmen adayları, uzaktan eğitimde derslerin eş zamanlı yapılmasını, ders materyallerinin daha erişilebilir hale getirilmesini ve teknik destek hizmetlerinin iyileştirilmesini önermiştir. Ayrıca, öğretmen adayları uzaktan eğitimde sınav güvenliği ve adil değerlendirme sistemlerinin geliştirilmesi gerektiğini vurgulamıştır. Öğretim elemanları ise uzaktan eğitimde kullanılan yöntemlerin ve materyallerin daha ilgi çekici ve etkileşimli hale getirilmesi gerektiğini belirtmiştir. Ayrıca, uzaktan eğitimde adil ve güvenilir bir değerlendirme sisteminin oluşturulması önemli bir gereklilik olarak ortaya çıkmıştır. Öğretim elemanları, uzaktan eğitimde öğrenci geri bildirimlerinin düzenli olarak alınması ve bu geri bildirimlerin derslerin planlanmasında ve değerlendirilmesinde dikkate alınması gerektiğini vurgulamıştır. Sonuç olarak, uzaktan eğitim sürecinde karşılaşılan zorlukların üstesinden gelmek ve süreci iyileştirmek için belirli stratejilerin ve teknolojik çözümlerin uygulanması gerekmektedir. Bu bağlamda, öğretim elemanlarının teknolojiyi etkili kullanma becerilerinin artırılması ve öğrenci geri bildirimlerinin düzenli olarak alınması önerilmektedir. Ayrıca, uzaktan eğitimde kullanılacak dijital platformların ve araçların kullanım kolaylığı sağlaması ve öğrenci-öğretim elemanı etkileşimini artırıcı özellikler taşıması önemlidir. Bu şekilde uzaktan eğitim sürecinin daha verimli ve etkili hale getirilmesi mümkün olacaktır.

Introduction

Education, as one of the most important and indispensable elements in the development of a nation, is directly influenced by the changing needs of society and global developments. Rapid technological advancements have led to significant transformations in education, such as remote education. While Wedemeyer (1981) defines remote education as learning activities that students and teachers are physically separated, Keegan (1995) describes it as a process where students are not required to be in a fixed location or time, and teaching is conducted through technology.

At the beginning of 2020s, COVID-19 emerged in China and quickly spread, leading to its declaration as a pandemic by the World Health Organization. Face-to-face education at all levels was suspended, and there was an urgent transition to remote education to ensure continuity in educational activities. Remote education, previously a supportive element to formal education, became the primary tool for education during the pandemic crisis.

According to data from the Higher Education Council (HEC) in Türkiye, there are 7.081.289 students in higher education (HEC, 2024). During the pandemic period, the simultaneous implementation of remote education across all levels, including higher education, was a situation encountered for the first time by such a large population. At the onset of the pandemic, education faculties, including 206.827 prospective teachers (PTs) and 9.023 faculty members (FMs), were among the higher education institutions facing this situation (HEC, 2020a). However, the pandemic revealed that many educational institutions were not adequately prepared to manage such magnitude of crisis and deliver effective online education (Erkut, 2020). The United Nations Educational, Scientific and Cultural Organization (UNESCO) (2021) announced in its report that COVID-19 led to various problems in higher education, such as increased pressure on financing and FMs, health, and safety concerns of individuals at universities, decline in the quality of teaching and learning processes, and increased inequality in access to the internet and education. Despite the challenges, this crisis has also provided opportunities to strengthen and promote equity within education systems through proper planning and policies (The World Bank Group, 2020).

Given the possibility of similar crises in the future, it is important to enhance the digital skills of PTs and teachers through improvements in education systems (Çelik, 2020). Considering the likelihood of quality online education becoming an integral part of education systems in the future, it is imperative to examine the experiences in remote teacher education (RTE) and gather recommendations for future evidence-based policy development (TEDMEM, 2021; UNESCO, 2021). With the delegation of authority decision made by HEC (2020b) in August 2020, the responsibility for developing and updating teacher education programs was given to education faculties. It is believed that awareness of the experiences and recommendations of FMs and PTs in remote education will provide a scientific basis for education faculties in the process of developing their own teacher education programs. Additionally, in HEC's (2020c) announcement of the Procedures and Principles Regarding Distance Education in Higher Education Institutions it is stated that '... up to 30% of the courses in each semester (including foreign language preparation) can be delivered through distance education based on ECTS credits.' This statement indicates that distance education is already integrated into the education system, including teacher education, and will continue to play a role. Therefore, this study aims to explore the experiences and recommendations of FMs and PTs regarding RTE during the COVID-19 pandemic. In line with this aim, the following questions were addressed:

1. What are the experiences and the recommendations of FMs regarding RTE during the COVID-19 pandemic?
2. What are the experiences and the recommendations of PTs regarding RTE during the COVID-19 pandemic?

Method

The research methodology, with each stage explained under the respective headings, is visualized in Figure 1.

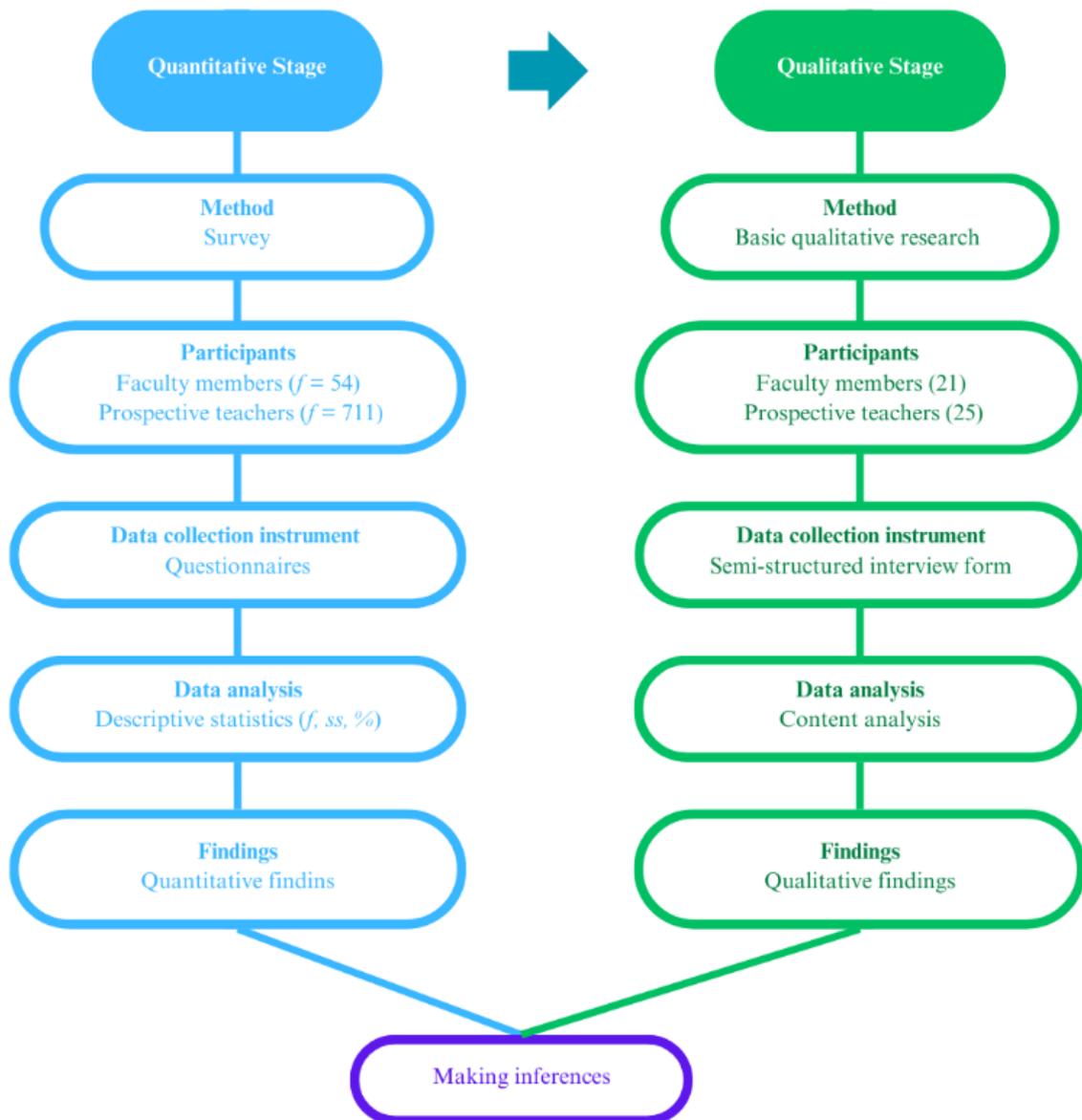


Figure 1. Research methodology

Research Design

In this study, an explanatory sequential design (Creswell & Plano-Clark, 2011), which is a type of mixed-methods research (Teddlie & Tashakkori, 2009), was followed. Within this framework, the first stage of the study conducted as a survey (Büyüköztürk et al., 2020) to reveal the experiences and recommendations of FMs and PTs. In the second stage, a basic qualitative research method (Merriam, 2018) was employed to elaborate on the quantitative results obtained in the first stage and to gain a deeper understanding of the issue. In mixed-method research, the final stage involves blending quantitative and qualitative findings and making inferences (Creswell, 2009; Teddlie & Tashakkori, 2009). Accordingly, in the final stage of this study, the quantitative findings were combined with the qualitative findings, and inferences were made, thus understanding the RTE during the COVID-19 pandemic holistically.

Study Group

The population of the study consisted of 152 FMs working at the Faculty of Education of Muğla Sıtkı Koçman University and 2518 PTs enrolled in the teacher education curriculum in the academic year of 2021-2022. The distribution of FMs and PTs voluntarily participating in the quantitative part of the study according to their departments is presented in Table 1.

Table 1
Distribution of the Study Group by Departments

Department	FMs		PTs	
	Population	Study group	Calculated sample size	Study group
Computer and instructional technology education	5	-	2	2
Educational sciences	44	16	54	106
Fine arts education	21	2	37	58
Mathematics and science education	25	8	65	100
Basic education	22	9	99	179
Turkish and social sciences	21	3	86	182
Foreign language education	11	2	92	84
Special education	3	3	-	-
Unspecified	-	11	-	-
Total	152	54	435	711

As seen in Table 1, it was aimed to reach all FMs without sampling, and 54 FMs volunteered to participate in the study. Due to the large number of PTs, a stratified sampling method was conducted considering the homogeneous structures within the teaching programs and the heterogeneous structure within the population (Büyüköztürk et al., 2020). Following Yamane's (1967/2001, p.117) recommended formula ($n = \frac{Nz^2pq}{Nd^2+z^2pq}$), which resulted in a sample size of 435, more PTs were reached, forming a study group of 711 PTs.

Table 2
Demographic Characteristics of FMs

No.	Gender	Age range	Title	Teacher education program they are working at	Remote learning experience
K1	Female	36-45	Assist. Prof. Dr.	Special education	Yes
K2	Female	26-35	Assist. Prof. Dr.	Early childhood education	No
K3	Female	46-55	Prof. Dr.	German language education	No
K4	Male	36-45	Assist. Prof. Dr.	Computer and instructional technology education	Yes
K5	Male	36-45	Assist. Prof. Dr.	Music education	No
K6	Female	36-45	Assoc. Prof. Dr.	Elementary mathematics education	Yes
K7	Female	26-35	Assist. Prof. Dr.	Special education	No
K8	Male	46-55	Prof. Dr.	Class education	No
K9	Male	26-35	Research Assistant	Class education	No
K10	Male	>=56	Assist. Prof. Dr.	Science education	No
K11	Female	26-35	Research Assistant	Music education	No
K12	Male	36-45	Assoc. Prof. Dr.	Computer and instructional technology education	Yes
K13	Female	36-45	-	Curriculum and instruction	Yes
K14	Female	36-45	Assoc. Prof. Dr.	Educational administration	No
K15	Female	46-55	Prof. Dr.	Educational administration	No
K16	Female	46-55	Assist. Prof. Dr.	Curriculum and instruction	No
K17	Male	36-45	Assoc. Prof. Dr.	Primary school education	No
K18	Male	>=56	Prof. Dr.	English language education	Yes
K19	Female	46-55	Prof. Dr.	Guidance and counselling	No
K20	Female	36-45	Assoc. Prof. Dr.	Turkish language education	No
K21	Male	46-55	Prof. Dr.	Curriculum and instruction	No

From the FMs and PTs participating in the quantitative stage, 21 FMs and 25 PTs were selected for the qualitative stage using criterion sampling method (having teaching and learning experiences in both remote and face-to-face teaching during the pandemic, department, teaching program, class, etc.). The decision about the size of the study group for the qualitative stage was based on data saturation (Yıldırım & Şimşek, 2016). The demographic characteristics of the FMs included in the qualitative section are presented in Table 2.

As shown in Table 2, out of the 21 FMs participating in the qualitative stage, 12 are female, accounting for 42.85% are in the age range of 36-45 and 71.42% of them did not have experience in remote education before the pandemic. The demographic characteristics of the PTs included in the qualitative stage are presented in Table 3.

Table 3

Demographic Characteristics of PTs

No.	Gender	Grade	Teacher education program they are attending	Regular work	Regularly attendance at classes	Study environment at home
K1	Female	3	German language education	Yes	Yes	Yes
K2	Female	4	German language education	No	Yes	Yes
K3	Female	2	Early childhood education	No	Yes	Yes
K4	Female	3	Early childhood education	No	No	No
K5	Male	4	Social studies education	Yes	No	Yes
K6	Female	4	Music education	Yes	No	Yes
K7	Male	4	Turkish language education	No	Yes	Yes
K8	Female	2	English language education	No	Yes	Yes
K9	Female	2	Turkish language education	No	Yes	Yes
K10	Male	4	Social studies education	No	Yes	No
K11	Female	2	Elementary mathematics education	No	Yes	Yes
K12	Female	4	-	No	Yes	Yes
K13	Male	3	Science education	No	No	Yes
K14	Male	3	Primary school education	No	No	No
K15	Male	3	Primary school education	No	Yes	Yes
K16	Male	3	Art education	No	No	No
K17	Female	3	Art education	No	Yes	No
K18	Female	4	Music education	Yes	No	Yes
K19	Male	4	Guidance and counselling	Yes	No	Yes
K20	Female	4	Guidance and counselling	Yes	No	Yes
K21	Male	4	Guidance and counselling	No	Yes	Yes
K22	Female	4	Guidance and counselling	No	Yes	Yes
K23	Female	4	Elementary mathematics education	Yes	Yes	Yes
K24	Male	4	Computer and instructional technology education	Yes	Yes	Yes
K25	Female	3	Science education	No	Yes	Yes

As seen in Table 3, at least one prospective teacher from each teacher education program was reached, and interviews were conducted with 25 PTs in total. It is observed that PTs generally did not work in any income-generating job during the pandemic period ($f = 17$), they regularly attended classes during this period ($f = 16$), and they had a dedicated study environment at their homes ($f = 20$).

Data Collection Instruments

The data were collected using questionnaires and semi-structured interview forms developed by the researchers for PTs and FMs, respectively. The process of developing the semi-structured interview forms is visualized in Figure 2.



Figure 2. The process of developing the semi-structured interview forms

The process of developing the questionnaires is visualized in Figure 3.

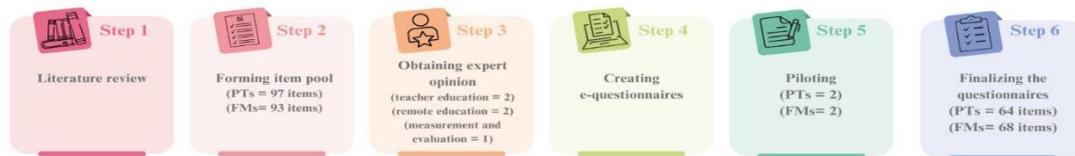


Figure 3. The process of developing the questionnaires

Data Analysis

Descriptive statistics (frequency (*f*), percentage (%), mean (\bar{X}), and standard deviation (*sd*)) were used in the analysis of quantitative data. In the interpretation of the means derived from quantitative data, the intervals in Table 4, calculated based on the equation $\text{Range} = (\text{Highest value} - \text{Lowest value})/5$ with a range of 0.80 were taken as the criteria.

Table 4

Intervals for Interpretation of Mean

Score	Range	Level of agreement
1	1.00 – 1.80	Strongly disagree
2	1.81 – 2.60	Disagree
3	2.61 – 3.40	Undecided
4	3.41 – 4.20	Agree
5	4.21 – 5.00	Strongly agree

The qualitative data underwent content analysis. Codes obtained through open and in-vivo coding were subjected to axial coding (Gürbüz & Şahin, 2018), in this way similar and related codes were grouped under specific themes to make the raw data more meaningful (Creswell, 2009). In the final stage, findings obtained from both quantitative and qualitative datasets were interpreted together, and inferences were made (Teddlie & Tashakkori, 2009).

Validity and Reliability

To ensure validity and reliability, expert opinions were consulted during the development of data collection tools. Feedback from experts in teacher education, educational programs, instruction, and methodology shaped these tools. Qualitative data were transcribed verbatim, with direct quotations used to support findings. Experts in teacher education and qualitative research verified the accuracy of codes. Data triangulation was achieved by collecting quantitative and qualitative data from PTs and FMs. Both data types were analyzed separately and then interpreted together, considering literature findings to enhance internal and external validity.

Role of the Researchers

The first author studied Computer Education and Instructional Technology and experienced remote education during their graduate studies. The second author earned an online education certificate conducted by the Remote Education Application and Research Center at Muğla Sıtkı Koçman University, and taught various courses at

undergraduate and graduate levels, gaining practical experience. Both researchers possess substantial knowledge in remote education, which contributed to a comprehensive study.

Ethical Issues

Prior to the data collection process, approvals regarding the feasibility of the research were obtained from the Ethics Committee for Social and Human Sciences Research at Muğla Sıtkı Koçman University.

Findings

In this section, first, the quantitative findings regarding the experiences of FMs and PTs in RTE during the COVID-19 pandemic are presented, followed by qualitative findings.

Quantitative Findings Regarding FMs' Experiences in RTE

The findings regarding the general views of FMs on RTE during COVID-19 pandemic are presented in Table 5.

Table 5
General Views of FMs on RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I am happy to provide remote education.	<i>f</i>	4	15	7	19	9	3.26	Undecided
	%	7.40	27.80	13.00	35.20	16.70	1.24	
2. I easily adapted to remote education.	<i>f</i>	-	3	3	34	14	4.09	Agree
	%	-	5.60	5.60	63.00	25.90	0.73	
3. Necessary announcements regarding remote education were made by the university in a timely manner.	<i>f</i>	1	4	13	23	13	3.80	Agree
	%	1.90	7.40	24.10	42.60	24.10	0.95	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

Upon examining Table 5, it can be observed that for item 1, more than half of the FMs agreed with agree (35.20%) and strongly agree (16.70%), and the mean ($\bar{X} = 3.26$) corresponds undecided. For item 2, opinions of the FMs were largely in agreement (63.00%), similarly for item 3, they mostly leaned towards agreement (66.70%) and strongly agree. Findings regarding FMs' views on learning outcomes in RTE during COVID-19 pandemic are presented in Table 6.

Table 6
Views of FMs on the Learning Outcomes in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I find it suitable to achieve the learning outcomes determined in remote education through remote education.	<i>f</i>	1	11	18	20	4	3.28	Undecided
	%	1.90	20.40	33.30	37.00	7.40	0.94	
2. The outcomes of the program during the remote education period are clearly stated.	<i>f</i>	3	9	18	22	2	3.20	Undecided
	%	5.60	16.70	33.30	40.70	3.70	0.95	
3. All learning objectives set in remote education were achieved.	<i>f</i>	8	19	20	5	2	2.52	Disagree
	%	14.80	35.20	37.00	9.30	3.70	0.98	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

In Table 6, it can be observed that for item 1, although 37.00% of FMs expressed agreement, more than half were either undecided (33.30%) or disagreed (20.40%). For item 2, although 40.70% agreed, significant proportions were undecided (33.30%) or disagreed (16.70%). Item 3 had the lowest mean ($\bar{X} = 2.52$) among the items related to learning outcomes. Findings regarding FMs' views on the content of RTE during COVID-19 pandemic are presented in Table 7.

Table 7
Views of FMs on the Content in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I determined the course contents in remote education in accordance with the objectives.	<i>f</i>		1	2	44	7	4.06	Agree
	%		1.90	3.70	81.50	13.00	0.49	
2. I clearly explained the topics to be covered in remote education at the beginning of the semester.	<i>f</i>			1	33	20	4.35	Strongly agree
	%			1.90	61.10	37.00	0.52	
3. Less topics were covered in remote education compared to face-to-face education.	<i>f</i>	17	20	4	10	3	2.30	Disagree
	%	31.50	37.00	7.40	18.50	5.60	1.25	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

Upon examining Table 7, it can be observed that in item 1 (81.50%) and item 2 (61.10%), agree responses prevail, while in item 3, a significant majority (68.50%) of FMs express disagreement or strong disagreement. Findings regarding FMs' views on the teaching and learning processes in RTE during COVID-19 pandemic are presented in Table 8.

Table 8
Views of FMs on Teaching and Learning Processes in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I find the Learning Management System (LMS), which is the university's remote education platform, useful.	<i>f</i>	3	5	9	26	11	3.69	Agree
	%	5.60	9.30	16.70	48.10	20.40	1.07	
2. Other applications should be used instead of Adobe Connect in remote education.	<i>f</i>	4	2	18	14	15	3.57	Agree
	%	7.40	3.70	33.30	25.90	27.80	1.25	
3. In remote education; I supported the lessons with digital course materials.	<i>f</i>	1	2	4	31	16	4.09	Agree
	%	1.90	3.70	7.40	57.40	29.60	0.83	
4. I used active learning methods in remote education.	<i>f</i>	4	11	14	20	5	3.20	Undecided
	%	7.40	20.40	25.90	37.00	9.30	1.10	
5. In remote education; interaction between students was possible in the classroom environment.	<i>f</i>	10	14	15	12	3	2.70	Undecided
	%	18.50	25.90	27.80	22.20	5.60	1.17	
6. The most inefficient courses in remote education were those that required practice.	<i>f</i>	2	8	6	17	21	3.87	Agree
	%	3.70	14.80	11.10	31.50	38.90	1.19	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

According to Table 8, in item 1, 68.50% of FMs expressed agreement, while in item 3, the vast majority (87.00%) agreed or strongly agreed. In item 2, although more than half of the FMs (53.70%) agreed or strongly agreed, there were also those who were undecided (33.30%). For item 4, 46.30% of FMs stated that they used effective learning methods in online classes, while 27.80% indicated they did not. Regarding item 5, 44.40% mentioned that interaction among students was not feasible in the online environment. In item 6, there was a consensus (70.40%) among FMs that courses requiring practice were the least efficient courses during the RTE. Findings regarding FMs' views on the assessment in RTE during COVID-19 pandemic are presented in Table 9.

Table 9
Views of FMs on the Assessment in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X}_{ss}	Level of participation
1. In remote education; I gave students feedback on the projects and helped them see their shortcomings.	f	1	3	15	24	11	3.76	Agree
	%	1.90	5.60	27.80	44.40	20.40	0.91	
2. I took precautions for security in the online exams that I prepared during remote education.	f	3	11	15	18	6	3.19	Undecided
	%	5.60	20.40	27.80	33.30	11.10	1.16	
3. I believe that exams given in remote education are not reliable.	f	2	9	17	11	15	3.52	Agree
	%	3.70	16.70	31.50	20.40	27.80	1.17	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

According to Table 9, in item 1, 64.80% of FMs expressed agreement or strong agreement. For item 2, although the mean corresponds undecided ($\bar{X} = 3.19$), 44.40% of FMs agreed or strongly agreed. In item 3, 48.20% of FMs stated that exams were not reliable because students had the opportunity of cheating.

Qualitative Findings on FMs' Experiences in RTE

Qualitative findings obtained from FMs' opinions on their experiences in RTE during the COVID-19 pandemic are summarized in Figure 4.

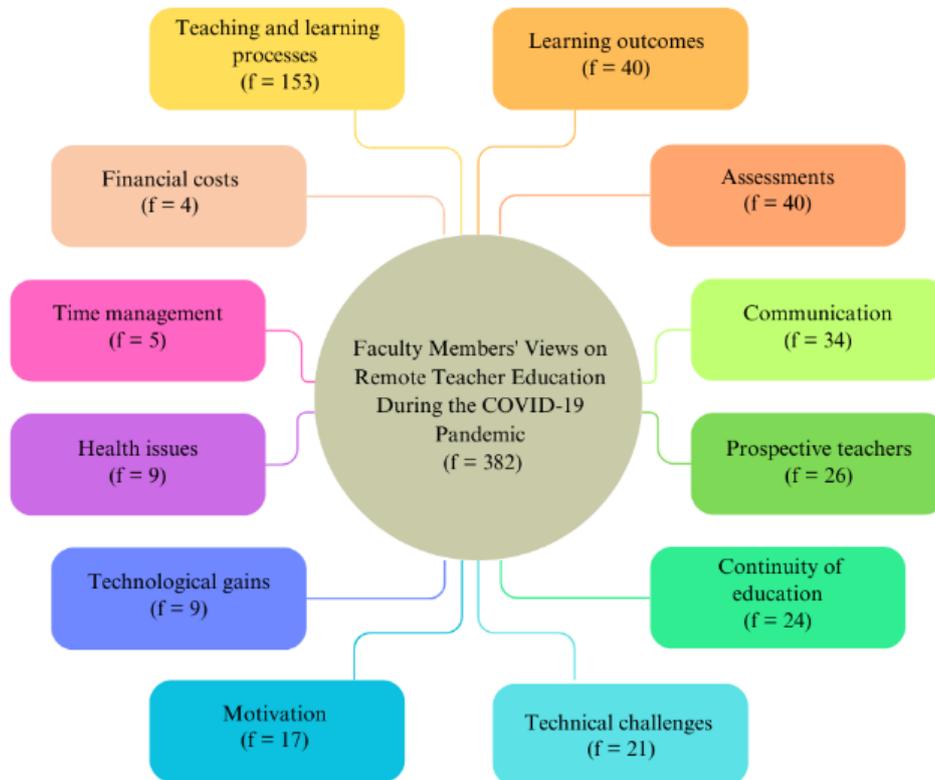


Figure 4. FMs' views on their experiences in RTE during COVID-19 pandemic

In Figure 4, it is observed that the views of FMs on their experiences in RTE during the COVID-19 pandemic ($f = 382$) are categorized into 12 main themes, with themes such as teaching and learning processes, assessments, learning outcomes and communication being prominent.

Under the learning outcomes theme, some FMs mentioned that while some PTs were able to achieve learning outcomes determined for RTE period, others experienced learning losses, insufficient access to learning outcomes, and graduated without gaining sufficient experience in real school environments. Direct quotations related to these findings are provided below:

K2: *"It is possible to say that there was a more dominant loss in teaching practice course, but there were also serious learning losses in other courses."*

Under the teaching and learning processes theme, FMs generally stated that due to students' preference for watching video records of online classes later, class participation for live classes was low, interaction within the class was low due to their preference for not participating with audio and video, and high student numbers in the class. It was also mentioned that lecturing and question-answer were commonly used techniques in teaching-learning processes, along with techniques such as demonstration, experimentation, and discussion. Regarding teaching and learning materials, slides were mostly preferred, along with the use of Web 2.0 tools, videos, films, e-books, and articles. Some FMs pointed out that uploading course materials to the LMS led to unauthorized sharing and compromised the security of intellectual property rights. Direct quotations related to these findings are provided below:

K1: *"Students did not want to be present in class either visually or audibly..."*

K11: *"...I tried to make them show and do, as if they were in front of me, by putting the camera further away and trying to do it as if it were face-to-face."*

Under the assessments theme, FMs highlighted the inadequacy of exam security in online exams. Some FMs preferred to assess through project assignments/homework instead of online exams, but they also pointed out that reading and grading each student's project/homework was very tiresome and time-consuming. Direct quotations related to these findings are provided below:

K17: *"The first thing that came to mind in exams was exam security. We could go for question variations, rearrange multiple-choice questions differently, different paths for students, shuffle the choices, etc., but these can be overcome."*

Under the continuity of education theme, FMs stated that the continuity of education was ensured thanks to remote education, and they were able to communicate with PTs via email addresses and social networks, primarily WhatsApp groups throughout the process. However, regarding technical issues, they experienced many technical problems such as connectivity issues and power outages throughout the remote education. In addition, regarding motivation, FMs stated that PTs could not be present in the university environment and were deprived of the social environments brought by the university, so the self-confidence and motivation of PTs decreased, and they themselves also experienced a decrease in motivation during this process. Regarding health issues, it was stated that the remote education process was physically and psychologically exhausting, and financially challenging. Direct quotations related to these findings are provided below:

K8: *"Because of the sudden disappearance of the registration due to an internet interruption or power outage we had to redo the same lesson, this was very disadvantageous."*

K16: *"The university serves not only as a pathway to acquiring a profession but also as a means of cultural, artistic, and social development. Unfortunately, these students were deprived of these opportunities..."*

Under the technological gains theme, FMs mentioned that remote education technologies provided benefits such as being able to review lessons repeatedly, increase the number of students in the class, share documents quickly, have more time for work, and improve technology use. Direct quotations related to these findings are provided below:

K20: *"Students could watch the lessons again and again because they were recorded, they could go back to the points they missed..."*

K2: *"We are not wasting time on the road... I could focus more on my publications because I had more time..."*

K6: *"The remote education enabled me to gain a better understanding of technology use in teaching."*

Findings Regarding FMs' Recommendations for RTE

Regarding the recommendations of FMs to make the RTE more efficient, qualitative findings are summarized in Figure 5.



Figure 5. Recommendations of FMs for RTE

In Figure 5, it can be observed that recommendations for making the RTE more efficient are grouped under eight themes. Among the prominent themes, in the technological infrastructure theme ($f = 7$), FMs suggested strengthening the technological infrastructure and preferring interactive applications. In the education theme ($f = 7$), they recommended FMs and PTs to take education on the use of educational technology, and in the theme of equal opportunities ($f = 7$), ensuring equal opportunities in access to remote education. Additionally, creating a specialized technical support team for immediate intervention in technical issues, establishing clear rules for the remote education, using alternative methods in assessment, and reducing the class sizes for efficient classroom performance are recommended. Direct quotations related to these findings are provided below:

K.14. "There is no equal opportunity in learning here; each student comes from a different socio-economic background... more effort is needed to ensure equal opportunities in learning."

Qualitative findings derived from FMs' recommendations for teacher education after the COVID-19 pandemic are presented in Figure 6.

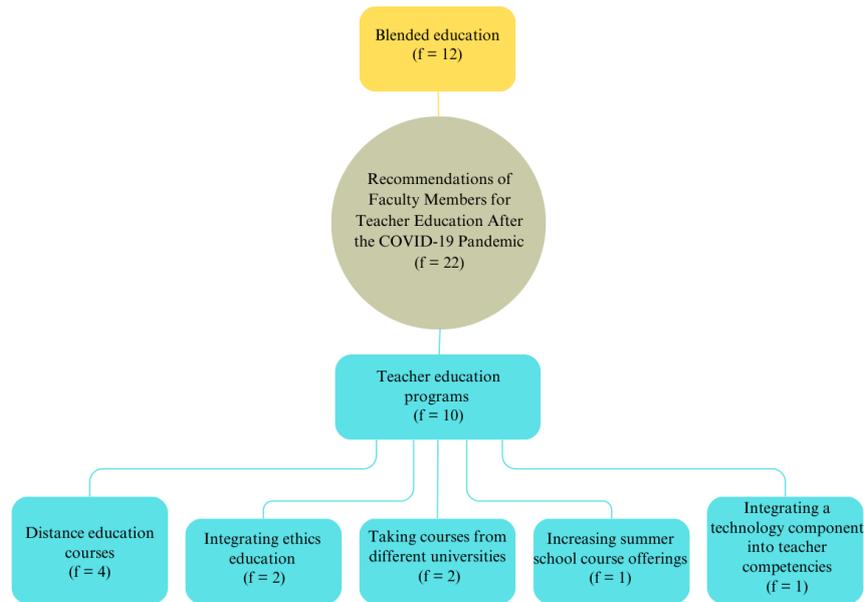


Figure 6. Recommendations of FMs for teacher education after the COVID-19 pandemic

When examining Figure 6, it is seen that opinions of FMs are grouped under two main themes, with blended education standing out, and based on experiences during the pandemic, FMs recommend blended model of teacher education. Under the theme of teacher education programs, they recommended providing ethical education to PTs, adding new courses related to remote education and digital/non-digital educational technologies, as well as adding a technological/digital competency dimension to teacher qualifications determined by the Turkish Ministry of National Education [MoNE] (MoNE, 2017). They also mentioned innovations such as allowing PTs to take courses from different universities and increasing summer school courses. Direct quotations related to these findings are provided below:

K.2. "For the future, more investment can be made in blended education..."

K.4. "...there must be competencies in the technology dimension, and courses related to this should be added to the teacher education programs."

Quantitative Findings Regarding PTs' Experiences in RTE

The findings regarding the general views of PTs' on RTE during COVID-19 pandemic are presented in Table 10.

Table 10
General Views of PTs on RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X}_{ss}	Level of participation
1. I am happy to receive remote education.	<i>f</i>	186	172	148	117	86	2.63	Undecided
	<i>%</i>	26.20	24.20	20.80	16.50	12.10	1.35	
2. I easily adapted to remote education.	<i>f</i>	111	150	128	211	108	3.06	Undecided
	<i>%</i>	15.60	21.10	18.00	29.70	15.20	1.33	
3. Necessary announcements regarding remote education were made by the university in a timely manner.	<i>f</i>	47	104	154	299	102	3.41	Agree
	<i>%</i>	6.60	14.60	21.70	42.10	14.30	1.14	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

According to Table 10, in the first item, 50.40% of PTs expressed dissatisfaction with remote education, while 28.60% were satisfied. In the second item, 44.90% of them stated that they were able to adapt to remote education, whereas 36.70% mentioned that they could not adapt. In the third item, like those of FMs, 56.40% of the PTs indicated that announcements were made by the University on time. Findings regarding PTs' views on learning outcomes in RTE during COVID-19 pandemic are presented in Table 11.

Table 11

Views of PTs on the Learning Outcomes in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I find it suitable to achieve the learning outcomes determined in remote education through remote education.	<i>f</i>	157	166	186	144	57	2.68	Undecided
	%	22.10	23.30	26.20	20.30	8.00	1.24	
2. All learning objectives set in remote education were achieved.	<i>f</i>	8	19	20	5	2	2.52	Disagree
	%	14.80	35.20	37.00	9.30	3.70	0.98	
3. I believe I have acquired the knowledge and skills outlined in remote education.	<i>f</i>	157	158	198	145	53	2.69	Undecided
	%	22.10	22.20	27.80	20.40	7.50	1.23	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

According to Table 11, in the first item, there was no prominent opinion, and the mean corresponds undecided ($\bar{X} = 2.68$). In the second item, like FMs, PTs also indicated that not all goals were achieved ($\bar{X} = 2.52$) during the period of remote education. In the third item, predominantly 44.30% of PTs mentioned that they did not achieve the knowledge and skills outlined in RTE. Findings regarding PTs' views on the content of RTE during COVID-19 pandemic are presented in Table 12.

Table 12

Views of PTs on the Content in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. The course contents in remote education were selected in accordance with the objectives.	<i>f</i>	53	74	162	341	81	3.45	Agree
	%	7.50	10.40	22.80	48.00	11.40	1.06	
2. The topics to be covered in remote education are clearly explained at the beginning of the semester.	<i>f</i>	43	73	88	374	133	3.68	Agree
	%	6.00	10.30	12.40	52.60	18.70	1.07	
3. Less topics were covered in remote education compared to face-to-face education.	<i>f</i>	135	209	178	124	64	2.68	Undecided
	%	19.00	29.40	25.00	17.40	9.00	1.22	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

Table 13

Views of PTs on the Teaching and Learning Processes in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I find LMS, which is the university's remote education platform, useful.	<i>f</i>	67	77	139	308	120	3.47	Agree
	%	9.40	10.80	19.50	43.30	16.90	1.17	
2. Other applications should be used instead of Adobe Connect in remote education.	<i>f</i>	58	114	231	153	151	3.30	Undecided
	%	8.20	16.00	32.50	21.50	21.20	1.23	
3. The digital course materials used in remote education were sufficient.	<i>f</i>	140	169	196	148	53	2.70	Undecided
	%	19.70	23.80	27.60	20.80	7.50	1.22	
4. Active learning methods were used in remote education.	<i>f</i>	71	127	286	169	57	3.02	Undecided
	%	10.00	17.90	40.20	23.80	8.00	1.07	
5. In remote education; I usually kept my camera and microphone on during lessons.	<i>f</i>	235	239	94	105	37	2.25	Disagree
	%	33.10	33.60	13.20	14.80	5.20	1.21	
6. The most inefficient courses in remote education were those that required practice.	<i>f</i>	71	63	155	167	255	3.66	Agree
	%	10.00	8.90	21.80	23.50	35.90	1.31	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

According to Table 12, in the first item, 59.40% and in the second item, 71.30% of PTs expressed agreement and strong agreement, parallel to the views of FMs. Although the mean in the third item indicates undecided, the opinions of PTs are weighted towards disagree (29.40%) and strongly disagree (19.00%). Findings regarding PTs' views on the teaching and learning in RTE are presented in Table 13.

According to Table 13, in the first item, like FMs, 60.20% of PTs found LMS useful during the period of RTE. In the second item, although there is a predominance (42.70%) of agreement and strong agreement, there is also a high percentage (32.50%) of undecided responses. In the third item, while 43.50% of PTs disagreed or strongly disagreed, in the fourth item, although the majority (40.20%) were undecided, 27.90% disagreed or strongly disagreed. The fifth item has the lowest mean ($\bar{X} = 2.25$), and in the sixth item, the majority of the PTs (59.40%) agree or strongly agree. Findings regarding PTs' views on the assessment in RTE are presented in Table 14.

Table 14
Views of PTs on the Assessment in RTE During COVID-19 Pandemic

Items		1	2	3	4	5	\bar{X} $_{ss}$	Level of participation
1. I received feedback from the FMs regarding the homeworks and projects I did during the remote education.	<i>f</i>	76	105	136	272	121	3.36	Undecided
	%	10.70	14.80	19.10	38.30	17.00	1.23	
2. In remote education; I did not encounter any technical problems during the exams.	<i>f</i>	222	203	83	122	81	2.49	Disagree
	%	31.20	28.60	11.70	17.20	11.40	1.38	
3. I believe that, exams taken in remote education are not reliable.	<i>f</i>	222	117	168	132	71	2.59	Disagree
	%	31.20	16.50	23.60	18.60	10.00	1.35	

1: Strongly Disagree, 2: Disagree, 3: Undecided, 4: Agree, 5: Strongly Agree

Upon examining Table 14, it is noted that in the first item, the consensus (55.30%) is in favor of agree and strongly agree. The second item has the lowest mean ($\bar{X} = 2.49$), indicating that 59.80% of PTs encountered technical issues. In the third item, opinions tend to lean towards disagree ($\bar{X} = 2.59$), indicating that PTs, like FMs, also believe that online exam results are not sufficiently reliable.

Qualitative Findings on PTs' Experiences in RTE

Qualitative findings regarding PTs' views on their experiences in RTE during the COVID-19 pandemic are summarized in Figure 7.

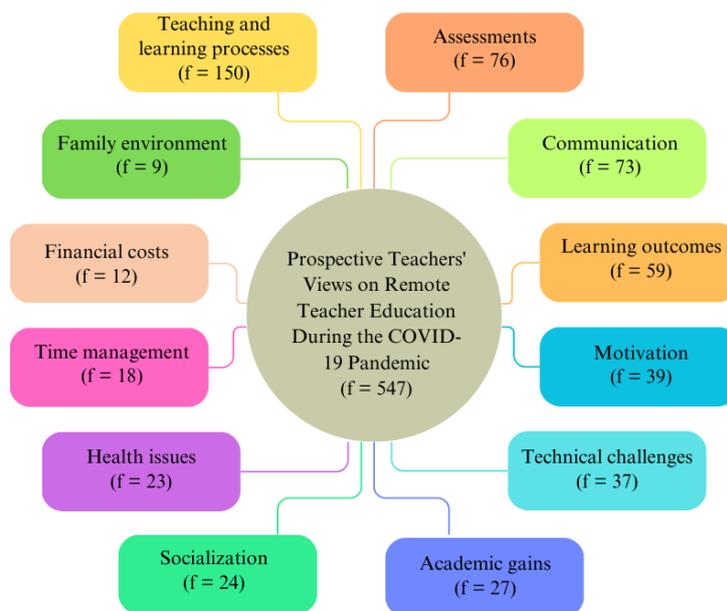


Figure 7. PTs' views on their experiences in RTE during COVID-19 pandemic

Figure 7 shows that, the views of PTs on RTE during the COVID-19 pandemic ($f = 547$) are grouped under 12 themes, with themes such as teaching and learning processes, assessments, communication, and learning outcomes standing out.

Under the learning outcomes theme, some PTs expressed the view that access to learning outcomes varied depending on the PTs, but the consensus is that particularly in practice courses, learning outcomes were not achieved. Direct quotations related to these findings are provided below:

K.3. *"In our online first aid class, teacher demonstrated first aid practically, but we couldn't see it live. When I become a teacher, if a child suddenly gets sick in class, I might panic and not know how to behave."*

Under the teaching and learning processes theme, PTs mentioned that classroom environments were generally passive. Due to the availability of video records of online classes for later watching with no deadline, class participation was low, and interaction was minimal. They attributed the low active participation in online classes mainly to Adobe Connect's inability to support active participation and the high class sizes. PTs also noted that online classes predominantly favored lecturing and question-answer as teaching strategies, relying mostly on slides as teaching materials, supplemented by videos, articles, and the use of web 2.0 tools. Direct quotations related to these findings are provided below:

K.14. *"No one attended most classes, they were watched later, there was no classroom environment, no communication."*

K.14. *"Mostly FMs just read off slides, there was lecturing."*

Within the assessments theme, PTs emphasized that online exams lacked sufficient exam security measures, and the rules implemented to enhance exam security increased PTs' exam anxiety, ultimately rendering the exams unreliable. Additionally, some PTs mentioned that FMs were generous in grading, giving high grades to everyone, resulting in a lack of fairness in evaluation. Direct quotations related to these findings are provided below:

K.12. *"Time was limited in exams. I was extra anxious during the exam..."*

K.14. *"I don't think a fair evaluation was made..."*

Within the communication theme, PTs reported having trouble in communicating with FMs during the RTE and noted a decrease in communication with their peers. Under the technical difficulties theme, they mentioned facing technical problems such as power outages and disconnections throughout the remote education. Under the socialization theme, they indicated not being able to be in social environments enough. Under the health issues theme, they expressed experiencing physical and psychological problems. Lastly, under the motivation theme, they indicated a low motivation throughout the remote education. Direct quotations related to these findings are provided below:

K.7. *"There were those who didn't have internet, didn't have a computer, or had to share a computer with many others."*

K.13. *"Socialization was very bad, I closed myself off, didn't communicate with people, disconnected from school..."*

K.15. *"Back pain from sitting at the computer because of not being able to move; eye pain ..."*

In the academic gains theme, PTs defined the advantages of remote education as being able to watch online class video records whenever they wanted, access course materials from the system, and having more free time as they didn't go to university. In the financial expenses theme, they highlighted several advantages of remote education, including the absence of expenses such as transportation and accommodation, as well as the flexibility to work and earn money by watching video recordings of classes later. However, they also mentioned acquiring necessary equipment such as computers, smartphones, and internet access as financial disadvantages. Direct quotations related to these findings are provided below:

K.1. *"FMs recorded the classes, we could watch them later ... thanks to the pandemic, I got a job, I could financially help my family and at the same time tried to deal with my classes..."*

K.12. *"I had to get internet, buy a computer and my family had financial difficulties."*

Findings Regarding PTs' Recommendations for RTE

The qualitative findings obtained from the recommendations of PTs to make the remote education process more efficient are provided in Figure 8.



Figure 8. Recommendations of PTs for RTE

In Figure 8, the recommendations of PTs ($f = 82$) are grouped under 8 themes, among which the themes of teaching-learning process, assessment, and evaluation, strengthening technological infrastructure, and support for students stand out. In the theme of the teaching and learning process, PTs have recommended the effective processing of classes through interactive video conferencing software using various materials, the establishment of classroom rules such as mandatory participation with camera and microphone during classes, ensuring high communication between PTs and FMs, setting clearly defined and infrequently changed rules, and effective use of technology by FMs. In the assessments theme, some PTs believe that alternative methods such as process-based assessment and project-based assessment would be more efficient instead of online exams, but they also mentioned that online tests and exams could be developed. In the assessments theme, certain PTs suggested that employing formative evaluation and alternative assessment approaches such as project-based evaluation could prove more effective evaluations than relying solely on summative evaluation strategies like online tests. Nevertheless, they have also acknowledged the potential for further development in online testing and other assessment strategies. Additionally, they suggested having exam advisors to contact in case of any issues during exams, creating and sharing grading criteria with students before exams, and obtaining feedback from students would be beneficial. Furthermore, in the theme of strengthening technological infrastructure, they suggested strengthening internet infrastructure, addressing technological deficiencies with university or government support under the theme of support for students; organizing online activities such as online student meetings to facilitate socialization, suggesting that break times could be longer in the theme of breaks between classes, and finally, in the theme of raising awareness among families, providing educational activities to raise awareness among families about their responsibilities in remote education. Direct quotations regarding these findings are provided below:

K.7. "Online exams are really troublesome. Online exams definitely need to be worked on and improvements made."

K.24. "... we need to solve the internet problem. There is no infrastructure in villages, you can't even connect to the internet..."

K.12. "Many students experienced financial difficulties. ... the state could have provided discounts for computers."

K.2. "They could have used different teaching materials. No one used such things, reduced efficiency."

The recommendations of PTs for teacher education after the COVID-19 pandemic are provided in Figure 9.

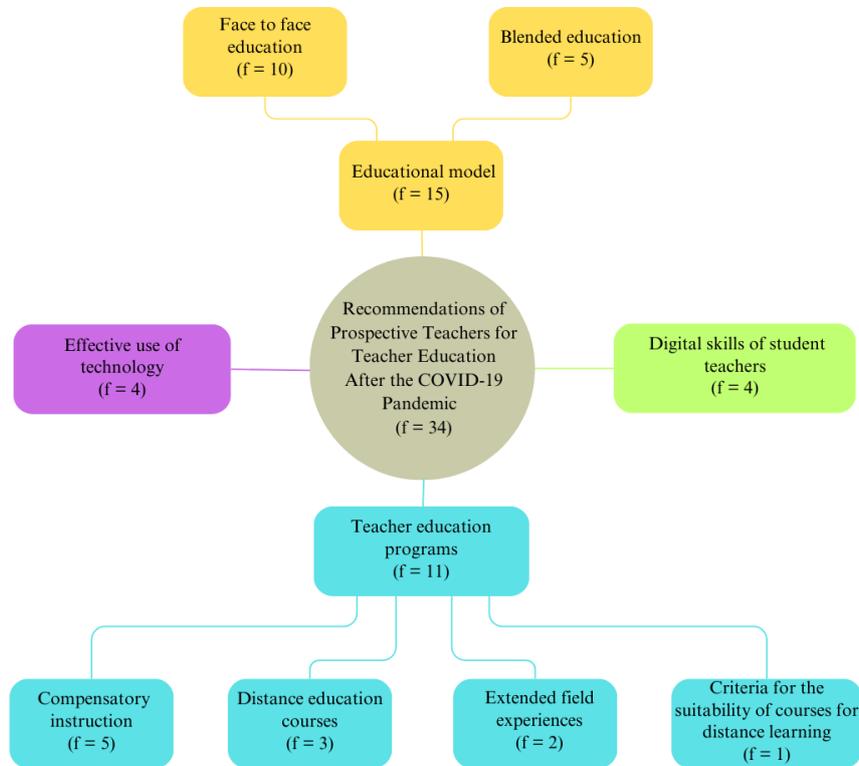


Figure 9. Recommendations of PTs for teacher education after the COVID-19 pandemic

When examining Figure 9, it is observed that the recommendations of PTs ($f = 34$) are grouped under four main themes, with the themes of educational model and teacher education program standing out. In the theme of educational model, it is seen that most PTs recommended face-to-face education, while some suggest blended teacher education after pandemic. Under the theme of teacher education programs, they propose adding new courses related to remote education and educational technologies to equip PTs with technological competencies and conducting remedial education to address learning deficiencies raised during the remote education. They also suggested that increasing the teaching practices in real school environments (school practices), and technology could continue to be effectively used in educational settings. Direct quotations regarding these findings are provided below:

K.9. "In my opinion, remote education is more disadvantaged compared to face-to-face education... face-to-face education is much better."

K.8. "We should give more emphasis to courses related to remote education in our curriculum."

K.24. "The pandemic period was a bit uncertain, so it was a lost period. I think there should be remedial education..."

Discussion, Conclusion and Recommendations

With the rapid transition to remote education, both FMs and PTs initially struggled but eventually adapted to remote learning. Kaysi (2020) noted that university students had a high level of adaptation to remote education, while Wingo et al., (2017) stated that as FMs gained experience and their adaptation to online environments increased. Considering the continuation of education processes in online environments, it is recommended that FMs stay current with developments in educational technologies.

Participants believe that PTs could not acquire many social skills due to physically not being in the university environment. The literature also highlights that remote education often lacks opportunities for students to engage in socialization environments, thereby inadequately supporting their social development. (Karahana et al., 2020;

Paydar & Doğan, 2019). In addition to not gaining sufficient social skills, participants believe that learning goals were not adequately achieved in classes, particularly in courses requiring practice, leading to significant learning gaps. Other studies also highlight similar results (e.g. Gündeğer & Gündoğdu, 2023). Socialization holds significant importance among the expectations of PTs from university. Therefore, it is recommended that online environments be utilized not only for teaching but also for organizing social and cultural activities by universities or student clubs to promote socialization. Additionally, compensatory training programs should be implemented to address any learning gaps that may arise during remote education, ensuring they do not hinder future learning.

The pandemic had negative effects on the physical and psychological health of the participants. Sedentary lifestyle and continuous exposure to screen led to physical health problems, while staying at home for a long time, not being able to socialize, and health concerns led to psychological issues. Jeong and Lee (2022), and Yığ (2023) have also reported similar results, while Tüzün and Yörük-Toraman (2021) suggested providing individuals with more psychological support in pandemic. Based on this, centers where FMs and PTs can receive psychological support could be established to address these issues, and informational sessions about computer usage and ergonomics could be conducted to minimize physical health problems.

Adobe Connect application was generally preferred in RTE in the university at the focus of this study. Findings from the study suggest that Adobe Connect did not adequately support active participation. Istanbul University (2020) reported low satisfaction with Adobe Connect in their remote education report, and Erşen and Yumak (2021) stated that this dissatisfaction stemmed from issues such as freezing, audio delays, and lack of mobile device access. Additionally, this study found that participants encountered technical issues (connection interruptions, power outages, etc.) during the process, consistent with findings in the literature (Lai & Widmar, 2021; Yorgancı, 2022). Considering these findings, it is recommended to prefer interactive software that supports active participation in the future.

While FMs mentioned using digital course materials in classes, PTs expressed dissatisfaction with their adequacy and indicated that FMs did not effectively use technology. It was found that in online classes commonly used teaching materials like slides, videos, articles did not sufficiently support active learning, alongside a limited number of Web 2.0 tools. Other studies also support this finding (e.g. Çakır & Akıncan, 2021). Hence, in addition to providing in-service training for FMs on preparing digital course materials, it is suggested that universities establish educational technology support units, consisting of experts, to assist in the development of effective and high-quality teaching materials.

It was evident that there was low classroom interaction and inactive class environments in remote education. Simple lecturing and question-answer methods were mostly used in RTE, resulting in difficulties for PTs to focus, reduced interest in classes, and inability to actively participate in classes by keeping their cameras and microphones off, negatively impacting classroom interaction. Other studies also indicate decreased interaction in instructional procedures (Bozkurt, 2017; Çalışkan, 2023). In line with these results, it is recommended to organize in-service training sessions for FMs to develop skills in designing, engaging, participatory, and interactive online courses, and to enhance professional networks with good examples.

The urgent transition to remote education also had significant effects on the assessment in teacher education (Sahu, 2020). During this period, FMs conducted assessments through online exams, projects, or assignments. Participants perceived online exams disadvantaged in terms of reliability and considered assignments as unfairly graded. PTs felt that grading was lenient in assignments. FMs also mentioned that the grading process for assignments took too much time. Relevant studies also indicate that project assignments significantly increase the workload for FMs, especially in large classes (Şeren et al., 2020; Tüzün & Yörük-Toraman, 2021). Moreover, the distance nature of exams made it difficult to conduct sufficient supervision due to each student being in a different environment, negatively affecting exam security. Studies suggest that online exams have a high risk of ethical violations and low reliability (Erşen & Yumak, 2021; Saleh, 2020). FMs implemented various measures, such as shuffling question orders and closing transitions between questions, to enhance exam security. However, these measures inadvertently heightened exam anxiety among some PTs, consequently impacting the reliability of assessments negatively. Other studies also indicate that students experience exam anxiety in online exams (Karahan et al., 2020; Özer & Turan, 2021). Therefore, it is recommended to provide in-service training for FMs to enhance their professional competencies in distance assessment and to improve the reliability of distance assessments in RTE by implementing alternative assessment strategies.

This study is limited to the experiences and recommendations of FMs and PTs at the Education Faculty of Muğla Sıtkı Koçman University regarding RTE during the COVID-19 pandemic. Researchers are encouraged to undertake fresh investigations comparing these experiences with those of other faculties of education in Türkiye and with the experiences of the countries that have excelled in remote education.

Acknowledgement

We express our gratitude to all participants who contributed to the realization of this study through their voluntary participation.

Declaration of Competing Interest

As the authors, we declare that there are no financial or non-financial conflicts of interest that could affect this research.

Funding

As the authors, we declare that we have not received any financial support related to this research from any public, commercial, or non-profit organizations.

Ethics Committee Permission Information: This research was conducted with the permission granted by the Muğla Sıtkı Koçman University Ethics Committee for Social and Human Sciences Research, under decision number 175, dated 07/05/2021.

References / Kaynakça

- Bozkurt, A. (2017). Türkiye’de uzaktan eğitimin dünü, bugünü ve yarını [The past, present and future of the distance education in Turkey]. *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, 3(2), 85-124. <https://dergipark.org.tr/tr/pub/auad/issue/34117/378446>
- Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, E. Ö., Karadeniz, Ş., & Demirel, F. (2020). *Bilimsel araştırma yöntemleri [Scientific research methods]* (34th ed.). Pegem Akademi Yayıncılık.
- Creswell, J. W. (2009). *Research design. Qualitative, quantitative and mixed methods approaches* (3rd ed.). Sage Publications.
- Creswell, J., & Plano-Clark, V. (2011). *Designing and conducting mixed methods research* (2nd ed.). Sage Publications.
- Çakır, R., & Akıncan, E. (2021). Advices and suggestions to increase the performance of instructors teaching in the distance education process. *International Journal of Field Education*, 7(2), 134-165. <https://doi.org/10.32570/ijofe.1012742>
- Çalışkan, R. (2023). Problems encountered by English teachers during remote education process in the pandemic period. *Journal of National Education*, 3(2), 361-373. <https://doi.org/10.5281/zenodo.7691353>
- Çelik, Z. (2020). COVID-19 salgınının gölgesinde eğitim: Riskler ve öneriler [Education in the shadow of the COVID-19 pandemic: Risks and recommendations]. *Eğitim-Bir-Sen*, (Focus Analysis No. 5), 2-52. <https://doi.org/10.13140/RG.2.2.34400.30723>
- Erkut, E. (2020). Higher education after COVID-19. *Journal of Higher Education*, 10(2), 125-133. <https://doi.org/10.2399/yod.20.002>
- Erşen, Z. B., & Yumak, Y. (2021). Preservice mathematics teachers' views on distance education applications during the COVID-19 pandemic process. *Cumhuriyet International Journal of Education*, 10(4), 1449-1470. <http://dx.doi.org/10.30703/cije.853688>
- Gündeğer, C., & Gündoğdu, R. (2023). Opinions of psychological counseling and guidance undergraduate students on the conduct of practical courses in the process of distance education. *Mehmet Akif Ersoy University Journal of Faculty of Education*, (65), 114-134. <https://doi.org/10.21764/maeuefd.1047615>
- Gürbüz, S., & Şahin, F. (2018). *Sosyal bilimlerde araştırma yöntemleri. Felsefe-Yöntem-Analiz [Research methods in social sciences. Philosophy-Method-Analysis]* (5th ed.). Seçkin Yayıncılık.
- HEC. (2020a). *Eğitim birimlerine göre öğrenci ve öğretim elemanları sayıları, 2020-2021 [Number of students & teaching staff by educational institutions, 2020-2021]*. <https://istatistik.yok.gov.tr/>
- HEC. (2020b). *YÖK'ten eğitim fakültelerine önemli yetki devri kararı [An important decision from YÖK on delegation of authority]*. <https://www.yok.gov.tr/Sayfalar/Haberler/2020/egitim-fak%C3%BCltelerine-yetki-devri.aspx>
- HEC. (2020c). *Yükseköğretim kurumlarında uzaktan öğretime ilişkin usul ve esaslar [Procedures and principles regarding distance education in higher education institutions]*. https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Uzaktan_ogretim/yuksekogretim-kurumlarinda-uzaktan-ogretime-iliskin-usul-ve-esaslar.pdf
- HEC. (2024). *Öğrenci sayıları özet tablosu, 2022-2023 [Summary table of number of students, 2022-2023]*. <https://istatistik.yok.gov.tr/>
- İstanbul University. (2020). *Uzaktan eğitim değerlendirme raporu öğretim elemanı ve öğrenci anketleri [Distance education evaluation report, instructor, and student surveys]*. <https://cdn.istanbul.edu.tr/FileHandler2.ashx?f=uzaktan-eg%CC%86itim-deg%CC%86erlendirme-raporu.pdf>
- Jeong, H., & Lee, B. (2022). The factor structure of the hospital anxiety depression scale adapted for Korean preschool prospective teachers during the coronavirus disease 2019 pandemic. *Psychiatry and Clinical Psychopharmacology*, 32(3), 196-204. <https://doi.org/10.5152/pcp.2022.22426>
- Karahan, E., Bozan, M. A., & Akçay, A. O. (2020). The online learning experiences of primary school pre-service teachers during the COVID-19 pandemic process. *Electronic Turkish Studies*, 15(4), 201-214. <https://dx.doi.org/10.7827/TurkishStudies.44348>

- Kaysi, F. (2020, September). *COVID-19 salgını sürecinde Türkiye’de gerçekleştirilen uzaktan eğitimin değerlendirilmesi [Evaluation of distance education in Türkiye during the COVID-19 pandemic]*. 5th International Scientific Research Congress, İstanbul. https://www.researchgate.net/publication/344418456_COVID-19_Salgini_Surecinde_Turkiye%27de_Gerceklestirilen_Uzaktan_Egitimin_Degerlendirilmesi
- Keegan, D. (1995). Distance education technology for the new millennium compressed video teaching. *ZIFF Papiere 101*, 1-43. <https://eric.ed.gov/?id=ED389931>
- Lai, J., & Widmar, N. O. (2021). Revisiting the digital divide in the COVID-19 era. *Applied Economic Perspectives and Policy*, 43(1), 458-464. <https://doi.org/10.1002/aep.13104>
- Merriam, S. B. (2018). *Nitel araştırma: Desen ve uygulama için bir rehber [Qualitative research: A guide to design and implementation]*. (S. Turan. translation ed.) (3rd ed.). Nobel Akademik Yayıncılık. (Original publication date 2009).
- MoNE. 2017. *Öğretmenlik mesleği genel yeterlikleri [General qualifications for the teaching profession]*. https://oygm.meb.gov.tr/dosyalar/StPrg/Ogretmenlik_Meslegi_Genel_Yeterlikleri.pdf
- Özer, S., & Turan, E. Z. (2021). Opinions of prospective teachers about distance education due to COVID-19. *Turkish Studies - Education*, 16(2), 1049-1068. <https://dx.doi.org/10.47423/TurkishStudies.48147>
- Paydar, S., & Doğan, A. (2019). Prospective teachers' views on open and distance learning environments. *Education and Technology*, 1(2), 154-162. <https://dergipark.org.tr/pub/egitek/issue/50136/650237>
- Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus*, 12(4), 1-6. <https://doi.org/10.7759/cureus.7541>
- Saleh, S. E. (2020). Remote teaching for higher education: opportunities and challenges. *First International Conference*, (6), 1-10. https://www.academia.edu/download/65014213/9_Remote_Teaching_for_Higher_Education_Opportunities_and_Challenges.pdf
- Şeren, N., Tut, E., & Kesten, A. (2020). Distance education in corona virus times: Opinions of lecturer’s primary education department. *Turkish Studies*, 15(6), 4507-4524. <http://dx.doi.org/10.47423/TurkishStudies.46472>
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences* (1st ed.). Sage Publications.
- TEDMEM. (2021). *2020 Eğitim değerlendirme raporu [2020 education evaluation report]*. (TEDMEM Evaluation Series 7). Turkish Education Association. <https://tedmem.org/yayin/2020-egitim-degerlendirme-raporu>
- The World Bank Group (2020). *Individuals using the internet (% of population)*. <https://data.worldbank.org/indicator/IT.NET.USER.ZS>
- Tüzün, F., & Yörük-Toraman, N. (2021). Factors affecting distance education during pandemic. *Ömer Halisdemir University Faculty of Economics and Administrative Sciences Journal*, 14(3), 822-845. <https://doi.org/10.25287/ohuibf.780189>
- UNESCO. (2021). *UNESCO COVID-19 education response*. <https://unesdoc.unesco.org/ark:/48223/pf0000378174>
- Wedemeyer, C. A. (1981). *Learning at the back door: Reflections on nontraditional learning in the lifespan* (1st ed.). IAP.
- Wingo, N. P., Ivankova, N. V., & Moss, J. A. (2017). Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning*, 21(1), 15-35. <https://doi.org/10.24059/olj.v21i1.761>
- Yamane, T. (2001). *Temel örnekleme yöntemleri [Basic sampling methods]* (1st ed.). (A. Esin, M. A. Bakır, C. Aydın ve E. Gürbüzselsel translation eds.). Literatür Yayıncılık. (Original publication date 1967).
- Yığ, K. G. (2023). Experiences of mathematics education prospective teachers in the emergency remote education: Reflections on the new normal. *Mehmet Akif Ersoy University Journal of Faculty of Education*, (65), 549-577. <https://doi.org/10.21764/maeuefd.1162499>
- Yıldırım, A., & Şimşek H. (2016). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences]* (12th ed.). Seçkin Yayıncılık.

Yorgancı, O. K. (2022). The views of Turkish education lecturers on technological competencies. *Journal of Mother Tounque Education*, 10(1), 177-198. <http://dx.doi.org/10.16916/aded.1050519>