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Exploring Faculty Members' Experiences with Virtual Classroom Platforms and Their Perceived Usability during the COVID-19

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Abstract

This two-phase mixed-method study examined faculty experiences with Virtual Communication Platforms (VCPs) and their usability in distance education during the COVID-19 pandemic. A stratified random sample of 913 faculty members from 167 universities was selected to participate in an online questionnaire that included the System Usability Scale, demographic information, and open-ended questions. Twenty-five of the faculty members who had completed the online questionnaire were then interviewed using semi-structured interviews. The quantitative data were subjected to analysis using an independent sample t-test, one-way ANOVA, and descriptive statistics. In contrast, the qualitative data were examined through an inductive analysis technique. The quantitative analysis results indicate that Zoom was the most favored platform, obtaining a good usability score together with Google Meet and Adobe Connect. In contrast, Perculus and Microsoft Teams were evaluated as having poor usability. Results also revealed the significant effect of gender on Perculus, distance education experience on Zoom, and age and academic status on Zoom and Google Meet usability perceptions. Furthermore, the qualitative analysis results revealed usability challenges (e.g., technical challenges, functionality issues, usability concerns), positive aspects (e.g., usability and effectiveness, support and issue resolution, performance and accessibility), and suggestions for improvement (e.g., instruction and support, exploration and optimization, format and assessment enhancement) for VCPs. The study offers valuable insights for institutions to make informed decisions about adopting VCP, investing in targeted training programs, and ultimately fostering a more effective and inclusive distance learning environments.

Keywords: Virtual classroom platform, synchronous distance education, Covid-19, system usability, faculty members.

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Introduction

Distance education, a pedagogical approach characterized by the physical separation of students and teachers, has evolved significantly over time, primarily due to advancements in telecommunications technology. This approach harnesses technological means like the internet, video conferencing, and online learning platforms to connect learners and educators (Keegan, 1980). It frees students from the necessity of attending a fixed place at a fixed time for instruction (Markel, 1999). Despite being a relatively recent and trending phenomenon, it has a long and rich history dating back to the mid-19th century, when correspondence courses were offered through the mail (Schulte, 2011). The advent of radio and television in the 20th century further expanded the reach of distance education, making it more widely accepted (Moore & Kearsley, 2011). With the penetration of the internet into every part of our lives, the demand for distance education has increased rapidly. For instance, in China, the number of students enrolled in distance education programs rose from 1.1 million in 2000 to 10.03 million in 2015 (Li & Lalani, 2020).

The COVID-19 pandemic has significantly impacted the education sector worldwide, leading to the widespread adoption of compulsory distance education. The pandemic has underscored the significance of distance education in mitigating the adverse effects on higher education. It has also accelerated the adoption of distance education as it allows for continuous learning while maintaining social distancing protocols, making it an essential tool for educators and students during these challenging times (Grynyuk et al., 2022). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), over 1.5 billion students have been affected by school closures due to the pandemic, leading to a surge in online learning (UNESCO, 2023).

Distance education has become increasingly important in today's fast-paced and rapidly changing society, providing students with access to education regardless of their location, time constraints, or physical disabilities. Working professionals can also benefit from distance education, improving their skills and knowledge without having to take time off work. Furthermore, distance education can be more cost-effective than traditional classroom-based education, as it eliminates the need for expensive facilities and reduces travel expenses (Mutea & Cullen, 2012). Consequently, the number of students enrolled in distance education programs has been increasing globally (Moore, 2000; Qayyum & Zawacki-Richter, 2018). Despite this increase, distance education has its own challenges, including the need for self-motivation, time management skills, and the potential for social isolation (Moore & Kearsley, 2011). Therefore, it is crucial to design and deliver distance education courses that are effective, engaging, and responsive to students' needs (Di Giacomo & Di Paolo, 2021).

There are mainly two types of distance education: synchronous and asynchronous distance education. Synchronous distance education is characterized by the participation of students and instructors in real time. Students and instructors interact simultaneously through virtual classrooms, video conferencing, or webinars (Bailey, 2022). In contrast, asynchronous distance education allows learners to access course materials, discussions, and assignments at their own pace and at any time they choose (Lytvyn et al., 2021).

Synchronous education is an essential component of distance education, as it fosters a sense of community among learners and instructors (McDaniels et al., 2016). This mode of education allows for real-time discussions and collaborations among learners by providing immediate feedback (Islam et al., 2022; Stewart et al., 2011). Furthermore, synchronous education has been shown to enhance student engagement, motivation, and retention (Khan et al., 2022; Nieuwoudt, 2020; Shoepe et al., 2020). However, synchronous distance education requires a stable internet connection, appropriate hardware, and a reliable virtual classroom platform (Karagöz & Ağadayı, 2020). Virtual classroom platforms (VCPs) such as Zoom and Google Meet have become indispensable tools for facilitating synchronous distance education. These platforms provide a range of features, such as video conferencing, chat rooms, and screen sharing, that enable instructors to deliver high-quality instruction to online learners (Correia et al., 2020; Mesran et al., 2021).

VCPs, in essence, refer to computer-based systems that allow learners and instructors to participate in synchronous, live audio and visual interaction with one another, regardless of their physical location (Chen et al., 2017; Oiwake et al., 2018; Rehman & Khan, 2016). They can be effectively employed for both individual and group instruction, as in traditional face-to-face classrooms. However, for VCPs to be successful in facilitating learning, system usability becomes a critical factor. As with all systems and technologies, the ease of use, learnability, and user satisfaction—components that Nielsen (1993) identifies as key to system usability—play an essential role in the effective implementation of VCPs.

In today's technology-driven world, learners expect high-quality user experiences from any digital platform they use. A user-friendly and easy-to-use VCP can significantly enhance the learning experience (Alhusban et al., 2024), while a poorly designed one can led to frustration and dissatisfaction among students and instructors and may hinder the achievement of educational goals (Alanazi et al., 2020; Van Nuland et al., 2017). The usability of VCPs is one of the most critical factors in predicting learners' satisfaction with distance education (Rizwan & Iftikhar, 2019). Learners' satisfaction is a crucial outcome of VCPs because it directly influences their engagement, motivation, and overall learning experience. Therefore, it is essential for educators to choose a VCP that is user-friendly for both instructors and learners with features such as clear navigation, a simple interface, and reliable connectivity. In summary, system usability is key to the success of VCPs, as it directly affects the quality and efficiency of synchronous distance learning.

Usability is a crucial factor that greatly influences faculty preferences when it comes to adopting and using Video Conferencing Platforms (VCPs) (Alajmi & Said Ali, 2022). Prior investigations in the context of COVID-19 have mainly focused on two areas: the preferences of users for specific virtual communication platforms like Google Meet, Zoom, and BigBlueButton (Mastrisiswadi et al., 2023), and the evaluation of the usability of Blackboard in relation to the demographic characteristics of faculty members (Alhadreti, 2021). Additionally, there have been individual assessments of the usability of Microsoft Teams for online teaching (Al-Qora'n et al., 2022). However, these studies have focused narrowly and have not thoroughly examined the usability features of many platforms, such as Google Meet, Zoom, Perculus, Microsoft Teams, and Adobe Connect. Furthermore, they have not adequately tackled the difficulties linked to their usage during the COVID-19 pandemic. The current study addressed the aforementioned gap by answering the following research questions.

- What is the usability level of VCPs from the perspective of faculty members, as measured by system usability scale (SUS)?
- Do the demographic characteristics of faculty members have any impact on the SUS scores?
- What are the challenges faculty members face when implementing VCPs in their classrooms?
- How do VCPs differ in terms of usage and preference among faculty members?

Method

A mixed-methods research with sequential explanatory design was employed, in which quantitative data were first collected and analyzed, followed by the collection and analysis of qualitative data (Creswell, 2012). The two phases of the research design are illustrated in Figure 1. Overall, the mixed-methods approach enabled a more comprehensive understanding of the research questions to be gained, beyond what could have been achieved with a single data source or method alone.

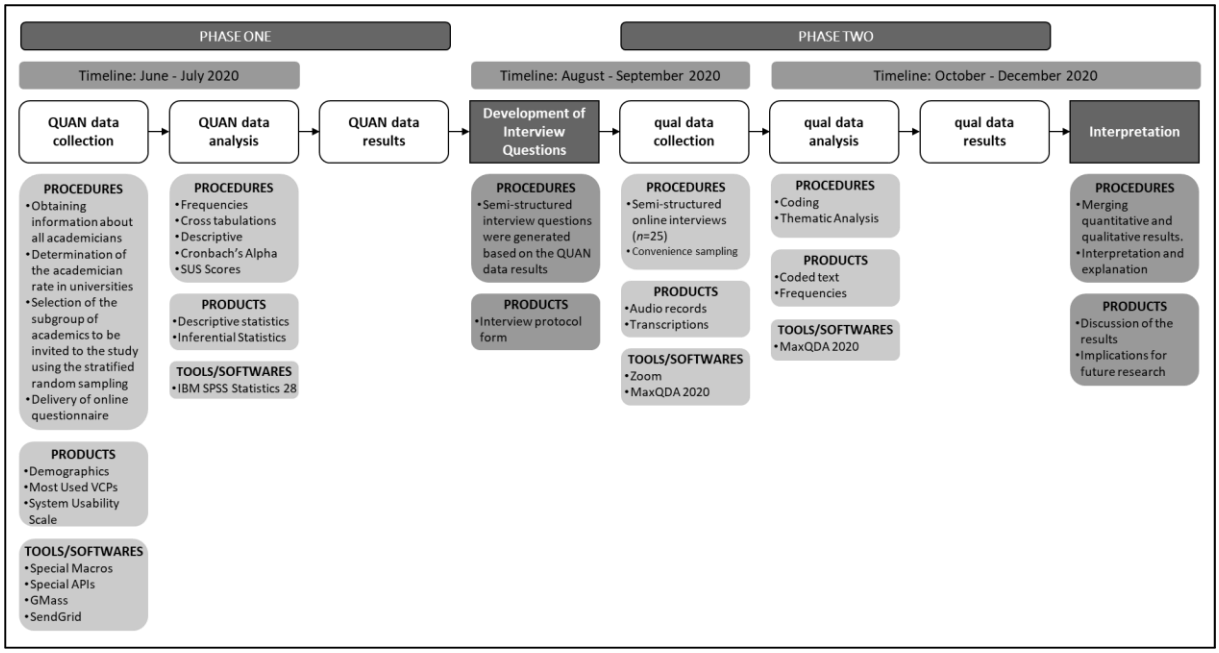

Figure 1. The Timeline and the Procedures Used in the study

Sampling

Two sampling methods were employed: stratified random sampling and convenience sampling. Researchers used the Higher Education Information System (YOKSIS) in Turkey to access the population. YOKSIS, administered by the Council of Higher Education (HEC), manages information about students and graduates in higher education institutions. Specialized macros and software were utilized to access data from YOKSIS's website (https://istatistik.yok.gov.tr/). The dataset, comprising the personal details of 175,172 faculty members from 208 universities, underwent two-sided encryption for privacy. Additionally, the dataset was securely stored and processed to prevent unauthorized access.

To ensure maximum diversity and representation within the selected sample group, the data were systematically stratified based on affiliation, gender, and academic title. The researchers considered the number of faculty members in each university and their distribution by gender and academic titles as crucial dimensions for strata development. Using these strata, 10,000 faculty members were randomly selected and invited to participate in the study. Figure 2 provides an overview of the sampling methodology and strategies employed.

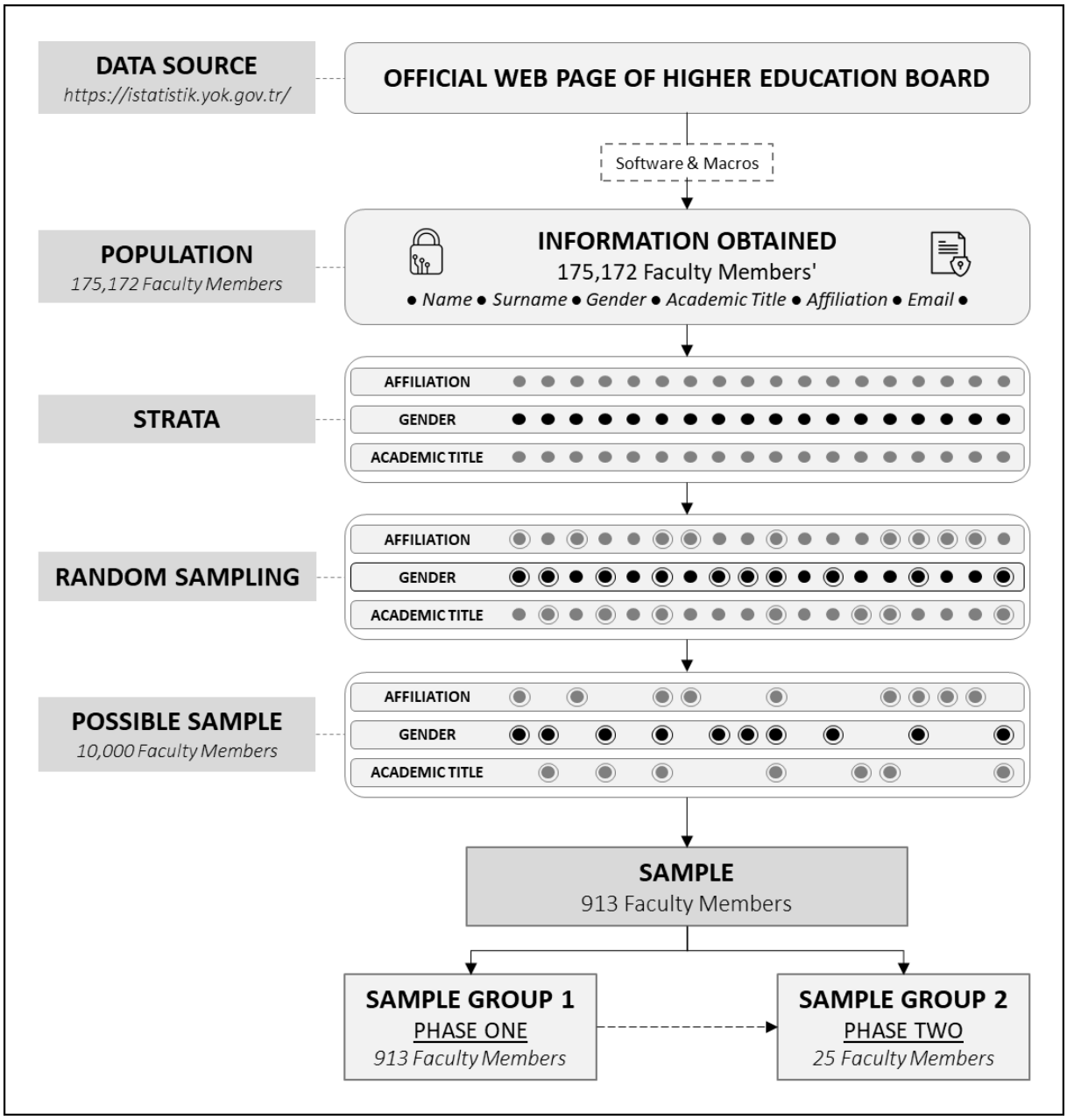

Figure 2. The Sampling Methodology Consisting of a Combination of Stratified Random Sampling and Convenience Sampling

Participants

The study's participants were 798 faculty from 167 out of 208 universities in Turkey. The study was conducted in two phases, and each phase incorporated a different sample group. Table 1 presents the demographics of each sample group.

The first sample was used in the quantitative part of the study. It consisted of 798 faculty members, aged 22 to 78 years (M = 41.90, SD = 10.12). The gender distribution was evenly distributed, with n = 387 (48.50%) female and n = 411 (51.50%) male participants. The academic titles included professor (n = 184, 23.06%), associate professor (n = 151, 18.92%), assistant professor (n = 207, 25.94%), instructor (n = 151, 18.92%), and research assistant (n = 105, 13.16%).

The second sample was used in the study's qualitative part. It consisted of 25 faculty members who were selected from the first sample on a voluntary basis. Their ages ranged from 27 to 64 years (M = 39.60, SD = 7.76), with more female participants (n = 18, 72.00%) than male participants (n = 7,

28.00%). The second sample had an equal distribution of academic titles: professors, associate professors, assistant professors, instructors, and research assistants (n = 5, 20.00% each). All participants were recruited from a variety of academic departments and institutions and provided informed consent prior to participation in the study.

Table 1.
Demographics of the Sample Groups

Variable	Sample Group 1 n = 798				Sample Group 2 n = 25			
	n	*%*	*M*	*SD*	*n*	*%*	*M*	*SD*
Age								
Young (≤ 36)	259	32.46	31.03	3.66	10	40.00	31.40	3.66
Adult (37 – 46)	274	34.34	41.23	2.64	10	40.00	41.50	2.46
Elder (47+)	265	33.21	53.95	5.31	5	20.00	52.20	4.09
Gender								
Female	387	48.50	40.32	10.10	18	72.00	37.39	6.64
Male	411	51.50	43.85	9.89	7	28.00	45.29	10.64
Academic Title								
Professor	184	23.06	52.97	6.49	5	20.00	48.80	5.45
Associate Professor	151	18.92	45.05	7.22	5	20.00	42.60	4.88
Assistant Professor	207	25.94	41.15	7.30	5	20.00	40.00	9.82
Instructor	151	18.92	35.77	7.44	5	20.00	35.00	7.00
Research Assistant	105	13.16	30.09	5.09	5	20.00	31.60	3.65

Data Collection Procedures and Analysis

First Phase

After identifying the possible sample of faculty members, the researchers sent them a personalized email using GMass and SendGrid technologies. The email contained a link to a four-section online questionnaire. To enhance the participation rate, follow-up reminder emails were dispatched at one-week intervals to faculty members who had not responded.

The online questionnaire consisted of four sections. The first section collected demographic information about the participants, including their gender, age, academic title, and university affiliation. The second section focused on identifying participants' previous distance education experiences and the VCPs they commonly used for distance education during the COVID-19 pandemic. The third section was concerned with the assessment of the usability levels of the aforementioned VCPs using the System Usability Scale (SUS). Prior authors adapted the SUS for Turkish and established its reliability and validity by confirmatory and exploratory factor analyses (Kadirhan et al., 2015). The scale comprises two factors: usable and learnable, with respective reliability scores of .79 and .60. In the fourth and final section, participants were presented with a question inquiring about their willingness to participate in follow-up interviews.

Out of 10,000 faculty members surveyed, 913 completed the questionnaire. However, 115 of these respondents indicated that they do not use any VCPs, leading to their exclusion from the study. Consequently, the effective response rate stood at 7.98%. This rate is considered high given that the sample represents about 0.46% of the total faculty population in Turkey, which is 175,172. This substantial representation makes a significant contribution to the understanding of the phenomenon being studied.

IBM SPSS 28 was utilized to analyze quantitative data using both descriptive statistics (e.g., mean, standard deviation, percentage) and inferential statistics (e.g., independent samples t-test and analysis of variance (ANOVA)). While the first one was used as a preliminary analytical tool to summarize and describe the basic characteristics of the data, the second one was utilized as a more advanced method to investigate the relationships and differences between groups at a significant level of 0.05.

Second Phase

Semi-structured interviews were conducted with 25 faculty members out of 79 who voluntarily expressed their willingness to participate through the questions included in the online questionnaire. The interview questions were developed by the authors and reviewed by a subject matter expert for content and relevance. The expert's feedback was crucial in refining the questions, ensuring that they were clear, relevant, and addressed the key aspects of participants' experiences with distance education.

Interviewees were selected based on their frequently used VCPs and academic titles, which were considered crucial in providing a comprehensive understanding of the phenomenon under investigation. Participants were verbally asked for their consent at the start of each 30–60-minute semi-structured interview, which took place online using videoconferencing technologies. Afterward, the video-recorded interviews were transcribed for data analysis. Aliases were allocated to guarantee anonymity.

Following Braun and Clarke's (2006) six-phase theme analysis framework, two researchers independently examined the video transcriptions, meticulously generating initial codes to capture key concepts and patterns. Subsequently, a collaborative review was conducted to foster in-depth discussions and exchanges of insights. Through this collaborative effort, initial themes emerged as a result of synthesizing the coded data. This iterative procedure facilitated a detailed analysis of the content, enabling the identification of overarching themes that included the depth of the participants' opinions and experiences.

System Usability Scale (SUS)

SUS is a widely used tool for measuring the usability of various systems, ranging from software applications to websites. In this study, the Turkish version of SUS was utilized to assess the perceived usability of VCPs (Kadirhan et al., 2015). The SUS is comprised of 10 statements pertaining to usability, which are rated by respondents on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." The total SUS scores are calculated by converting the responses into a single usability score, which can range from 0 to 100. A higher score indicates better perceived usability. Researchers interpreted SUS scores for VCPs based on the following literature guidelines (also illustrated in Figure 3):

- *Excellent usability (above 80):* A SUS score of 80 or higher implies that the system is both highly usable and user-friendly (Bangor et al., 2008).
- *Acceptable usability (68-80):* A SUS score of 68 to 80 indicates acceptable usability, indicating that the system is easy to use and fits the needs of the majority of users (Brooke, 2013).
- *Poor usability (below 68):* A SUS score of less than 68 indicates poor usability, implying that the system is difficult to use and does not meet the users' needs (Lewis & Sauro, 2018).

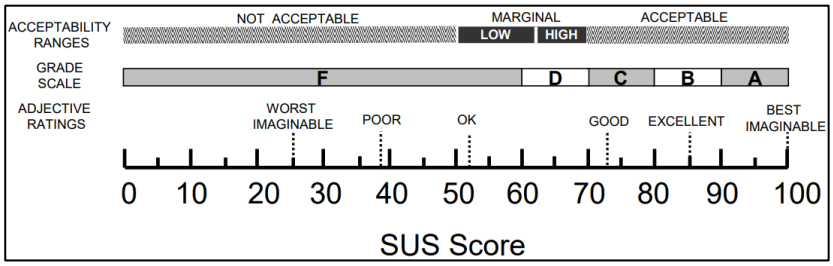

Figure 3. Interpretation of SUS Score (Bangor et al., 2009)

Findings

VCP Adoption

Study results showed that, as indicated in Table 2, among the faculty members surveyed (n = 798), Zoom emerged as the most widely utilized VCP, with 217 respondents (23.7% of the sample) choosing Zoom for their virtual classroom needs. Adobe Connect ranked as the second most used VCP, with 129 faculty members (14.1%) incorporating this platform into their teaching practices. Perculus and Microsoft Teams were also prominently employed, by 119 (13%) and 111 (12.1%) users, respectively. Google Meets, another popular platform, was utilized by 93 faculty members (10.2%). The study reflects a diverse landscape of VCP adoption, showcasing a variety of platforms, each catering to the preferences and needs of the faculty members.

Table 2.
The Most Frequently Utilized VCPs by Faculty Members

#	VCP	*f*
1	Zoom	217
2	Adobe Connect	129
3	Perculus	119
4	Microsoft Teams	111
5	Google Meets	93
6	BigBlueButton	71
7	Blackboard Collaborate	44
8	Cisco WebEx Meetings	6

VCPs by SUS Scores

The SUS scores were utilized to evaluate the experiences and satisfaction levels of faculty members regarding the diverse features of the VCPs. They were calculated for each VCP, and the reference threshold values shown in Figure 3 were used as benchmarks to gauge the platform's usability and user satisfaction levels. As indicated in the Table 3, Google Meets, Zoom, and Adobe Connect received a "B" grade, indicating "Good" usability. On the other hand, Perculus and Microsoft Teams received a "C" grade, indicating "Poor" usability. This finding indicates that Perculus and Microsoft Teams demonstrated inferior usability performance when contrasted with Google Meets, Zoom, and Adobe Connect.

Table 3.
Comparison of VCPs by SUS Scores

VCP	SUS Score				Grade	Adjective Rating
	Minimum	Maximum	Mean	SD		
Google Meets	35.00	100.00	75.54	13.52	B	Good
Zoom	27.50	100.00	72.91	13.42	B	Good
Adobe Connect	10.00	100.00	68.10	16.24	B	Good
Perculus	25.00	95.00	67.46	13.36	C	Poor
Microsoft Teams	17.50	100.00	67.32	14.47	C	Poor

Table 4.
Participants Demographics by VCP SUS Scores

	Zoom (*n* = 217)			Adobe Connect (*n* = 129)			Perculus (*n* = 119)			Microsoft Teams (*n* = 111)			Google Meets (*n* = 93)		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Gender															
Female	103	74.20	13.63	64	70.51	13.70	58	69.87	14.16	53	65.52	16.58	46	73.59	12.95
Male	114	71.75	13.19	65	65.73	18.19	61	65.16	12.22	58	68.97	12.15	47	77.45	13.92
Age															
Young (≤ 36)	70	76.14	12.54	32	67.50	13.06	49	70.20	12.72	34	65.74	16.30	34	79.51	11.49
Adult (37 – 46)	75	70.67	12.78	51	71.27	15.92	31	66.77	11.89	35	70.50	10.74	34	75.43	14.60
Elder (47+)	72	72.12	14.44	46	65.00	18.14	39	64.55	14.81	42	65.95	15.48	20	69.20	12.90
Academic Title															
Professor	50	73.45	14.32	36	66.94	15.89	23	63.26	16.61	26	66.73	13.45	12	66.73	16.53
Associate Professor	35	69.50	14.52	30	71.42	16.04	15	66.50	11.37	27	66.11	15.56	19	74.75	13.93
Assistant Professor	53	69.25	12.74	29	68.02	19.39	43	66.86	12.70	26	70.48	14.18	21	74.78	13.77
Instructor	35	76.64	12.89	22	65.57	16.56	31	71.21	12.53	16	65.63	18.15	21	79.09	12.09
Research Assistant	44	76.48	11.22	12	68.13	7.62	7	70.36	11.22	16	66.88	11.24	15	80.17	8.32
Distance Education Experience															
Yes	56	76.92	13.37	30	72.17	11.81	22	67.05	11.28	20	65.75	18.07	18	78.50	16.15
No	161	71.52	13.20	99	66.87	17.22	97	67.55	13.83	91	67.66	13.65	70	74.73	12.71
Training on VCP															
Yes	33	70.08	10.96	44	68.07	13.61	58	69.14	11.92	35	66.00	15.29	19	76.45	13.08
No	184	73.42	13.78	85	68.12	17.52	61	65.86	14.51	76	67.93	14.14	69	75.30	13.71

The effect of demographic attributes on SUS

Statistical tests were utilized to explore the influence of demographic characteristics on the perceived usability of VCPs. Table 4 presents statistics detailing demographic attributes in terms of SUS scores for each examined VCP.

SUS Scores by Gender, Distance Education Experience, and Training

Independent sample t-tests were conducted to compare the usability scores of VCPs in terms of gender, distance education experience, and VCP training. As indicated in Table 5, a significant difference was observed only for Zoom by distance education experience. More specifically, faculty members with distance learning experience reported significantly higher usability scores for Zoom compared to those without distance learning experience. Interestingly, no statistically significant differences were observed across the remaining variables under examination. These results shed light on the potential impact of prior distance education experience on the perceived usability of specific VCPs, underlining the importance of considering these factors when implementing and designing VCPs for educational purposes.

Table 5.
Results of Independent-Samples T-Tests

	t	*df*	*p*	*Cohen's d*
Zoom				
Gender	1.34	215	0.181	0.18
Distance Education Experience	2.63	215	0.009*	0.41
VCP Education	-1.32	215	0.188	0.25
Adobe Connect				
Gender	1.68	127	0.095	0.30
Distance Education Experience	1.92	69.8	0.059	0.33
VCP Education	-0.02	127	0.987	0.00
Perculus				
Gender	1.94	117	0.054	0.36
Distance Education Experience	-0.16	117	0.873	0.04
VCP Education	1.34	117	0.182	0.25
Microsoft Teams				
Gender	-1.26	109	0.212	0.24
Distance Education Experience	-0.53	109	0.594	0.13
VCP Education	-0.65	109	0.517	0.13
Google Meets				
Gender	-1.38	91	0.170	-0.29
Distance Education Experience	1.11	91	0.271	0.28
VCP Education	0.38	91	0.744	0.84

$p < 0.05$*

SUS by Age and Academic Title

A one-way ANOVA was conducted to compare the usability scores of VCPs in terms of age and academic title. As shown in Table 6, there was a significant difference in age and academic title for Zoom and Google Meets. However, no statistically significant differences were observed across the remaining variables under examination.

Follow-up post-hoc tests with an LSD (Least Significant Difference) were conducted to identify the significant difference across groups at the significant level of 0.05. The post-hoc results are reported below. The *p* values given next to the group below indicate the significant level at which the groups compared are significant on the relevant VCPs.

For *Zoom*, faculty members of a younger age reported significantly higher usability scores compared to their adult counterparts ($p = 0.014$). Furthermore, instructors indicated significantly better usability experiences with Zoom when compared to both associate professor ($p = 0.024$) and assistant professor ($p = 0.011$). Besides, research assistants demonstrated a significantly higher usability scores for Zoom in comparison to associate professor ($p = 0.020$) and assistant professor ($p = 0.008$). These results suggest that tailoring training and support for Zoom to the specific needs and responsibilities of different faculty members, particularly considering their age and professional roles, may lead to improved user experiences and overall satisfaction with the platform in an educational setting.

For *Google Meets*, young faculty ($p = 0.004$) reported significantly higher usability scores when compared to their elder counterparts. Additionally, faculty members holding the titles instructor ($p = 0.009$) and research assistant ($p = 0.008$) reported significantly higher usability scores compared to those with the title of professor. These results underscore the importance of considering the diverse technological backgrounds and professional roles of faculty members when designing and implementing virtual meeting platforms in an educational context.

Table 6.
Results of One-way ANOVA Tests

	F	*df*	*p*	η^2
Zoom				
Age	3.27	2, 214	0.040*	0.01
Academic Title	3.15	4, 212	0.015*	0.02
Adobe Connect				
Age	1.86	2, 126	0.160	0.02
Academic Title	0.48	4. 124	0.747	0.03
Perculus				
Age	2.04	2, 116	0.135	0.02
Academic Title	1.32	4, 118	0.268	0.03
Microsoft Teams				
Age	1.24	2, 108	0.293	0.02
Academic Title	0.42	4, 106	0.796	0.04
Google Meets				
Age	4.25	2, 90	0.017*	0.02
Academic Title	2.37	4, 88	0.054*	0.04

$p < 0.05$*

Qualitative Results

Qualitative data were gathered to provide in-depth and contextually appropriate understanding of the usability setting of each VCP. The analysis results presented in Table 7 outlined many aspects of VCP usability, including issues experienced by academics, positive features identified, and recommended enhancements.

Table 7.
Summary Of VCP Usability: Challenges, Positives, And Suggestions

Platform	Usability challenges	Positive Aspects	Suggestions
Zoom	Time constraints, connectivity issues, technical glitches	Ease of use, valuable for teaching	Improve instructions, simplify sharing, enhance support
Adobe Connect	Slow transfers, network issues, crashes	Effective support, rapid issue resolution	Explore alternatives, optimize video, backup strategies
Perculus	Screen sharing delays, microphone issues, compatibility	Flawless performance, user-friendly	Switch browsers, improve formats, resolve outages
Microsoft Teams	Audio disruptions, test suitability, connectivity problems	Easy lectures, responsive IT support	Enhance assessments, consider challenges, seek support
Google Meet	Minor glitches, managing large classes	Minimal issues, user-friendly, accessible support	Provide troubleshooting resources, optimize sharing

Zoom

The current research into participants' experiences with Zoom revealed a mixture of challenges and successes. While some participants praised its ease of use for distance education, others encountered numerous obstacles. Time constraints, connectivity issues, technical glitches like audio interruptions, and limited interactivity hampered smooth interactions. One participant shared their frustration: "Constant glitches and audio problems disrupt the flow of lectures, making it difficult to engage students." Security concerns were also mentioned, though details were absent. However, positive experiences existed. Participants found Zoom user-friendly and valuable for online teaching, suggesting: "More detailed and accessible instructions for specific features would greatly improve the user experience." Proposed solutions from participants included simplifying file/screen sharing, providing clearer instructions, and offering enhanced technical support. Overall, Zoom presents both potential and challenges for distance education, highlighting the need for improved user experience and addressing technical limitations.

Adobe Connect

The analysis of participants' report on Adobe Connect presents a varied perspective, emphasizing both difficulties and alternative solutions. Technical difficulties such as sluggish file transfers, network issues, audio/video disturbances, and restricted data transmission caused disruptions in certain online classrooms. As reported by one participant, "The slow upload times and frequent system crashes were frustrating and disrupted the flow of my online classes". They proposed potential remedies such as employing alternative modes of communication, optimizing video resolution, breaking up lengthy meetings, and implementing technical backup strategies. Another participant stated that "We started breaking our lectures into shorter, more manageable segments, which reduced the load on the platform". The tech personnel and coordinators were commended for their supporting role, with one participant expressing appreciation for the rapid resolution of issues by the IT team. Overall, while Adobe Connect faces challenges, its effectiveness hinges on both platform improvements and user strategies for mitigating technical roadblocks.

Perculus

The findings indicated that the faculties had a varied usability experience with Perculus. While several participants praise Perculus for its flawless performance and effortless connection with students, others continue to be disturbed by persistent technical problems. Satisfied participants, such as one who expressed, "Perculus functioned impeccably for my classes", praise its user-friendly nature. Nevertheless, there are other prevalent obstacles that hinder the experiences of others, encompassing intermittent delays in screen sharing, microphone complications for both instructors and learners,

incompatibility with Adobe software resulting in screen sharing difficulties, and constraints in the utilization of virtual whiteboards for drawing and annotation. A different participant conveyed his frustration: "The microphone frequently ceased to function during crucial discussions, causing interruptions in the class's progression". Several participants also emphasized the need to switch to alternative browsers, such as Explorer, to improve performance. In addition, there were complaints about the platform's insufficient support for some file formats, such as PDFs, and occasional outages during live sessions.

Microsoft Teams

The participants' experiences with Microsoft Teams were varied, showcasing both its promise and constraints. While certain participants praised its ease of use, stating that "I found it quite user-friendly for lectures, a straightforward interface for both students and teachers", others experienced technical malfunctions such as audio disruptions. Participants also expressed concerns over the suitability of online tests as full evaluations, highlighting obstacles they encountered. They indicated a preference for utilizing the university's course administration system for exams instead. Another participant voiced his apprehensions: "The platform was generally good, but we had problems with audio interruptions. I also agree that it's not ideal for high-stakes exams; the course management system offers better security". Furthermore, there were concerns expressed on the constraints of distance education and the difficulties in guaranteeing active student participation and deterring academic dishonesty during online examinations. While several participants successfully adjusted to the platform, others encountered difficulties pertaining to internet connectivity and hardware. Specifically, assistance from the university's IT department was often seen as beneficial in resolving technological difficulties. A participant recounted his experience, highlighting the IT department's rapid and effective response in resolving connectivity issues, noting that "the IT department was responsive and helped with connectivity issues promptly".

Google Meets

Google Meet usability feedback was mostly good. One participant said, "Google Meets has been incredibly user-friendly for me and my students; it has made distance education much smoother." Most participants reported few technical issues. However, a few participants had screen sharing or internet connectivity issues. These challenges were frequently resolved with educational videos or peer help. One participant said, "Initially, I had trouble with screen sharing, but after watching a tutorial, I was able to resolve it effortlessly. My coworkers helped me with connectivity issues". Although the site was user-friendly, several users had trouble managing large courses, sharing presentations, and using many screens at once. One participant reported reduced word size and image clarity when using multiple displays "Sharing my presentation and the Meet screen on two monitors was difficult. Font size and image quality suffered." The results show that most participants find Google Meet's user interface easy to use and its tools for fixing small issues. However, optimizing screen sharing for presentations, managing large classrooms, and ensuring screen compatibility could improve its instructional usefulness.

Discussion, Conclusion, and Suggestions

The significant impact of COVID-19 on the higher education sector worldwide pushed many universities to use VCPs for delivering lectures and conducting classes. Therefore, the usability evaluation of VCPs has become increasingly important for faculty members due to the widespread adoption of these platforms during the COVID-19 pandemic (Mastrisiswadi et al., 2023; Pal & Vanijja, 2020). The current study examined the usability of popular five VCPs, the effect of demographic attributes on the final scores of SUS, and the challenges associated with their use during COVID-19 pandemic. The study findings showed that the usability features of Google Meet, Zoom, and Adobe Connect surpassed those of Perculus and Microsoft Teams. This finding supports the research of Al-Qora'n et al. (2022) as to the usability of Zoom over Microsoft Teams and contradicts earlier research involving university students, which suggested that the usability of Microsoft Teams and Zoom were equally superior to Google Meet (Amin Rifat et al., 2022). The disparity in findings may stem from varying experiences between instructors and students in using VCPs. During COVID-19 pandemic, instructors tend to interact with these platforms from an instructional standpoint,

emphasizing features for content delivery, collaboration, and assessment. Students, on the other hand, often focus on user-friendliness, engagement, and accessibility. These distinct perspectives contribute to the nuanced assessment of usability and may explain the divergence in research outcomes.

In addition to privacy and security, usability is proven to play a critical role on the adoption of VCPs (Mastrisiswadi et al., 2023). Therefore, VCPs with high usability features are likely to be the first choice for faculty members seeking a seamless and user-friendly virtual collaboration experience (Poolsawas & Chotikakamthorn, 2023) such as Google Meet (Mastrisiswadi et al., 2023) and Zoom (Leporini et al., 2021).

It is noteworthy that during the course of the ongoing pandemic, faculty members did not fully have the autonomy to select the VCPs utilized for instructional purposes. A considerable number of educational institutions, both internationally and within Turkey, mandated the use of specific platforms to standardize online teaching and ensure consistent access across departments. In Turkey, for instance, numerous universities initially mandated the utilization of platforms such as Adobe Connect during the initial stages of the pandemic, subsequently transitioning to platforms like Google Meet or Microsoft Teams as the situation evolved. These decisions were often shaped by institutional policies rather than individual preferences or platform usability, as institutions sought to rapidly implement scalable solutions for a vast number of users. The reliance on institutionally mandated platforms necessitated that faculty members adapt to the available tools, regardless of personal preferences or usability concerns.

It is thus imperative to contextualize the findings of this study within the framework of institutional decision-making processes. Although platforms such as Google Meet and Zoom have been found to be more usable, the actual adoption of these platforms by faculty members is frequently determined by administrative mandates rather than personal preference. For instance, although Google Meet and Zoom were rated highly for ease of use and integration with instructional tools, the extensive use of platforms such as Microsoft Teams or Adobe Connect in Turkish universities was predominantly driven by administrative policies focused on scalability, licensing agreements, and technical support infrastructure. Therefore, although VCP usability was a significant factor, it was not the sole determining factor in platform adoption during the pandemic. This highlights the necessity for institutions to consider both usability and practical considerations when selecting which platforms to implement, particularly in emergency situations such as the ongoing pandemic.

It is important to note that the usability evaluation in this study focused specifically on the use of Virtual Classroom Platforms (VCPs) in educational settings, particularly within higher education. While many of these platforms were also utilized for personal or non-educational purposes during the pandemic, the findings of this study are directly related to their implementation for teaching and learning purposes. This distinction ensures that the usability assessments and the challenges identified are reflective of the unique needs and constraints of educational environments, where features like collaboration tools, content delivery, and assessment functionalities were prioritized.

The research revealed the interplay of different demographic characteristics, such as gender, age, teaching experience, and academic position, in shaping individual perceptions of VCP usability across Perculus, Zoom, and Google Meet. Interestingly, VCP training did not significantly impact reported usability. Focusing on specific platforms, gender emerged as a non significant factor on the usability of Perculus, aligning with previous research Alhadreti (2021), but contrasting with the results of Bangor et al. (2008). Furthermore, our study revealed that having prior teaching expertise in distance education plays a crucial role in determining the perceived usability of Zoom. Besides, for both Zoom and Google Meet, instructors in earlier career stages reported significantly higher usability scores, supporting previous studies (Bangor et al., 2008; Granić & Ćukušić, 2011), but contradicts the findings of Alhadreti (2021). In addition to the prior knowledge, the current study demonstrates that the academic status had a significant influence on the perceived usability of Zoom and Google Meet. These findings indicate that faculty members with more senior status may have a different perception of Zoom and Google Meet due to their greater technological experience, varying roles and needs, access to technical support, adaptability to new tools, and expectations based on their broader academic experience.

The participants' perception of the usability of VCPs are likely to be shaped by the challenges they experienced in conjunction with the VCPs. The study findings uncovered some of these challenges as technical difficulties, connectivity issues, usability concerns, security considerations, insufficient instructor knowledge, and limited adaptability and support from technical teams. This finding aligns with previous research (Vital-López et al. (2022), which identified economic challenges, training needs, and connectivity issues as the most significant effects of COVID-19 on university instructors. Some of the uncovered challenges could be due to the dynamic nature of streaming rates for VCPs as available bandwidth, session size, and mobile device conditions are prone to influence the perceived streaming quality of VCPs (Chang et al., 2022). Moreover, few areas appear to be open for usability enhancement of VCPs such as the ease of screen sharing, use of intuitive icons, and user-friendly platform designs (Zou et al., 2020). Furthermore, these challenges seem to stem from university instructors' perceived deficiencies in technological knowledge during emergency remote teaching (Çakıroğlu et al., 2023), hindering their ability to effectively accomplish their teaching objectives (Labrie et al., 2022).

These findings underscore the importance of considering demograsphics, inluding gender, prior experience with distance teaching, age, and academic status when ssessing the usability of certain VCPs. It also suggests that training efforts for VCPs might need to be tailored or enhanced to better address the unique needs and preferences of users, considering factors beyond general training. It's also worth noting that individual studies contribute to our understanding of specific contexts, and findings may vary based on factors like the study sample, methodology, and the platforms under investigation. Further research and analysis can help provide a more comprehensive understanding of the relationships between gender, teaching experience, training, and the usability of virtual teaching platforms.

In this context, assessing the usability of VCPs becomes crucial for both the academic community and institutional administrators, as it directly influences the effectiveness of online education delivery. The findings of this study highlight the importance of selecting platforms that meet the diverse needs of educators, especially during emergency remote teaching scenarios. For educators, usability features such as ease of use, accessibility, and integration with existing instructional tools are essential for facilitating engagement and ensuring a smooth teaching experience. For instance, platforms like Google Meet and Zoom, with their user-friendly interfaces and robust collaboration tools, provide clear advantages in usability over alternatives like Perculus and Microsoft Teams. Institutional administrators should consider these usability strengths when making decisions about which platforms to implement across their institutions. Moreover, regular evaluations and updates of these platforms, along with targeted training, can help address the weaknesses identified in this study, such as technical difficulties and limited support. By prioritizing the usability of VCPs, educational institutions can enhance both the quality of instruction and the overall learning experience.

Future research could expand on these findings by conducting comparative studies of various VCPs to evaluate how specific platform features—such as security, accessibility, and interactivity—affect both faculty and student experiences. Longitudinal research could also explore how usability perceptions change over time with increased exposure to distance education technologies, helping to identify the long-term effects of training and support. Investigating the role of specialized training in enhancing platform usability, particularly for platforms like Perculus and Microsoft Teams, could provide further insights into effective professional development strategies. Additionally, exploring student perspectives on VCP usability would complement faculty-focused studies, offering a more comprehensive understanding of virtual classroom experiences. Finally, research on the use of VCPs in hybrid learning models could shed light on how platforms perform when blending in-person and virtual teaching, helping educators optimize their use of technology in diverse learning environments.

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Ethics statement: In this study, we declare that the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with and that we do not take any of the actions based on "Actions Against Scientific Research and Publication Ethics". At the same time, we declare that there is no conflict of interest between the authors, which all authors contribute to the study, and that all the responsibility belongs to the article authors in case of all ethical violations.

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