

Article

Online Teaching in COVID-19 Pandemic: Secondary School Teachers' Beliefs on Teaching Presence and School Support

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Abstract: The COVID-19 pandemic, with the consecutive lockdowns, has led schools around the world to transition suddenly from face-to-face education to online teaching. The purpose of this paper was to investigate secondary school teachers' beliefs on online teaching presence and school support for online learning during the pandemic. The sample was 238 teachers in Greece who are interested in e-learning and received some preparation to teach online courses. An online questionnaire was administered and three factors were revealed: instruction and organization, facilitation and cognitive activation, and school support. Teachers' perceived online teaching presence was strong (over 63% expressed agreement), and the highest percentages of agreement were linked to clear instruction, communication of time frames and course topics, and facilitation and encouragement that could help students learn. On the other hand, perceived school support for online learning was weak (over 50% expressed disagreement and neutral views), and the highest percentages of disagreement regarded the existence of a professional development strategy and of clear objectives/vision towards online learning. Gender, years of teaching experience, and experience with online teaching had a small effect on teachers' beliefs. Implications for teacher professional development, educational policy, and the design of educational technology applications are discussed.

Keywords: online teaching; online learning; secondary education; teaching presence; school support; COVID-19



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1. Introduction and Background

COVID-19 outbreak was declared by the World Health Organization to be a global pandemic in March 2020 [1]. Educational institutions were forced to close in many countries, teachers faced the challenge of rapid urgent transition to full online teaching, and the academic process continued by using digital sources. Digital technology played an important role in enabling teachers to teach students at a distance using tools for synchronous and asynchronous communication, accessing learning materials, and interactive collaborative activities [2]. The rapid and sudden transition from face-to-face to online teaching is associated with challenges, constraints, and also opportunities worth being investigated. Researchers pointed out different factors linked to the effectiveness of online teaching and learning such as technology adoption in schools [3–5]; school technical and pedagogical support [6,7]; school leadership and vision [8]; teachers' digital competencies and perceived stress [4]; and online teaching presence [6,9,10]. Information and Communication Technology (ICT) research also reported that school culture/context [11,12] and leadership [13,14] are key factors that influence teachers' perceptions and technology usage. Ertmer [15] reported that technology integration can be understood clearly when teachers' pedagogical beliefs are considered, while, recently, Ewing and Cooper [3] indicated that emergency technology adoption in schools disabled the purposeful integration of technology; it limited the effectiveness of online learning. Although digital technology (ICT)

tools have affordances and enable interactions, the teachers have the central role in the educational process (e.g., they are expected to engage students and facilitate the learning process seamlessly).

Teacher-related factors are central for effective online teaching and learning [16,17]. Teachers have multiple roles such as facilitators of students' learning-communication processes, designers and managers of courses, and nurturers for social relationships [17]. *Teaching presence* constitutes an essential aspect and this was investigated in relation to teachers' behavior in online and blended learning environments [16]. Components of teaching presence regard the design, organization, and facilitation of the course as well as direct instruction [18,19]. *Teaching presence* in online teaching is associated with teachers' responsibilities of design, organization, facilitation, and instruction in the online learning environment for educational purposes [6]. For example, the teachers select the instructional methods, implement and monitor learning activities, establish time parameters, select and utilize digital resources, acknowledge student contributions, establish a positive learning climate, prompt discussions, present content, and provide feedback to students.

Institutional/school support is an important variable when there is a demand for teachers to move their teaching entirely online. The implementation of online teaching is related to pedagogical and technical support, school vision regarding online learning, and leadership [8,20]. A shared vision (by school leaders and educators) to utilize online technologies in their teaching can motivate teachers to change [21], while when teachers perceive that their school supports them, it is more likely to (continue to) use online teaching. Thus, teachers' perceived online teaching presence and school support are both essential during the online teaching-learning process. However, the empirical evidence regarding teachers' beliefs on *online teaching presence* and *school support* during the COVID-19 era is limited [6,22]. Additionally, online teaching-learning is not widespread in secondary schools in comparison, for example, with the higher education sector [23–25].

Howard et al.'s global survey [6] from 20 countries identified secondary education teacher profiles in order to understand perceptions of both individual and institutional readiness to switch to online teaching. High, medium, and low profiles were identified, as well as mixed perceptions of readiness to teach online. Their findings inform how education institutions can personalize and support transitions to online teaching. In our study, we used a survey that had been previously validated by Howard et al. [6], which is described under the research instrument. However, the survey was administered to a different culture-country, that is, to Greek teachers who are interested in e-learning and received some preparation to teach online courses.

A survey in the USA [10] indicated that K-12 teachers were split about their ability to provide academically rigorous (beneficial and efficient for learners) online instruction (48% agree or strongly agree; 52% not sure or disagree), but they were consistent in responding to related statements about self-efficacy and having sufficient online resources. Two-thirds of the teachers recognized that online instruction requires significant adaptations, while 25% reported receiving no ongoing mentoring as they taught online. No significant relationship between the years of teaching and teachers' preparation to teach online was found. Another study in the USA with K-12 teachers [26] found that while teachers felt successful with remote instruction during the pandemic, they were not always satisfied with their online experience; secondary/high school teachers felt more successful when instructing their students (in comparison to elementary school teachers). The researchers recommended additional support from school districts (in terms of time, resources, etc.) for teachers to bring their teaching to an online platform.

A study in China [7] studied how K-12 teachers addressed challenges during the transition to online education due to the COVID-19 pandemic. Their results showed that teachers applied live video streaming on multiple social media platforms and repurposed different entertainment features to deliver online teaching for better student engagement, while students developed a better sense of intimacy with their teachers after experiencing certain online interactions.

A study in Lebanon [22] investigated high school teachers' perceptions of online learning during the pandemic period and indicated that teachers seemed to have a high sense of comfort with online teaching; even though they valued more face-to-face instruction, they perceived themselves as efficient in creating positive learning environments.

A study in Spain [27] examined secondary mathematics teachers' perceptions of their readiness to emergency remote teaching, their previous training in digital teaching tools, their level of digital competence for teaching mathematics, and their adaptation to remote teaching. Despite the differences observed in the hours of training received (considerably higher in the case of teachers over 40 years old), no significant age differences were detected in the effort perceived for adapting to remote teaching.

Our study differs from the above-mentioned studies in that we focused on secondary school teachers' perceptions by using a validated instrument, and we also examined the impact of specific demographic variables on teachers' views. Our sample was also diverse with participants teaching various subjects (different specializations).

Since evidence from secondary school teachers is limited, it is worth mentioning a study regarding secondary school leaders' beliefs about technology and digital practices before and during the pandemic in Ireland [28]. The most prominent challenges encountered when schools were closed regarded poor student engagement and lack of internet and/or device access in students' homes. Teachers' lack of proficiency in suitable pedagogic approaches to support online teaching–learning was reported as an obstacle to the continuity of the educational process during the pandemic, a finding that strengthens the importance of teachers' pedagogic approaches and competencies in supporting their students.

Within the Greek context, one study [29] examined K-12 teachers' perceptions about remote online teaching during the COVID-19; 63.0% were teaching in secondary schools—students aged 12.5–18 years old. Their findings indicated that the majority of the participants were willing to adopt online learning tools and practices in their instruction and to use them during and after the pandemic. Teachers also reported the need for training and enhancing their pedagogical skills and learning design abilities. Another study [30] indicated that secondary school teachers, during the first wave of the pandemic, encountered problems in relation to their personal communication and interaction with the students, the infrastructure and internet connection, the students' participation, and their training (with regard to online education). The aforementioned Greek studies did not examine teachers' perceptions of online teaching presence and school support or the impact of teacher variables on their views.

In parallel, studies that investigated teachers' perceptions during the pandemic [31–33] indicated a link between teachers' perceptions with demographic characteristics such as years of teaching experience and prior experience with online teaching; e.g., teachers' perceptions of students' coping with remote teaching were related to teachers' prior experience with online teaching but were unrelated to teachers' age or years of teaching experience [33].

The purpose of this study was to investigate the beliefs of a group of Greek secondary school teachers of *online teaching presence* (understood as teachers' responsibilities of design, organization, facilitation, and instruction in the online learning environment) and school support for online learning during the pandemic period. Investigating teachers' perceptions is important because teachers' views affect their practices and consequently students' engagement, motivation, and performance. Our study differs from relevant earlier research conducted during the pandemic in the focus on secondary school teachers; there is little research evidence on this education sector. Moreover, most of the above-mentioned studies were conducted with the “mainstream” school teacher in mind. In this study, we focus on a specific group of teachers who are interested in e-learning, are experienced in ICT, and have some preparation to teach online courses. It is noted that although *online teaching–learning* and *emergency remote teaching* (a new concept proposed by Hodges et al. [34]) are different concepts, both terms refer to the spatial distance between students and teachers, and they include online technologies' usage to provide education [29]. The term *e-learning* is used as

synonym to *online learning* (indicating learning conducted via the internet). Moreover, the terms *digital technology* and *ICT* are used as synonyms.

2. Objectives of the Study

The research objectives are as follows:

1. To investigate secondary school teachers' beliefs on online teaching presence and school support for online learning during the COVID-19 period;
2. To explore the factorial structure of the questionnaire used to measure teachers' beliefs;
3. To investigate the impact of teachers' gender, age, years of teaching experience, and experience with online teaching on their beliefs (regarding online teaching presence and school support).

3. Materials and Methods

3.1. Research Context, Procedure and Sample

This study was carried out in the context of transition to online teaching in secondary education due to the pandemic. The Greek Ministry of Education required secondary schools (as well as for universities and other educational institutions) to implement online teaching during all pandemic waves. During the first wave/lockdown, the schools were closed from early March 2020 for about two months, during the second lockdown from early November 2020 to late January 2021, and during the third one from February to June 2021. Although ICT usage in Greek schools is not something new, mobile devices' utilization is rare and limited [35,36], and the idea of implementing digital technology for online classes is entirely new. The short notice to switch to online teaching and the lack of online teaching experiences created a challenge for many teachers. In parallel, the consecutive lockdowns pushed the state to make rapid decisions on school resources, equipping them with mobile devices (in particular, laptops and tablets); these devices are owned by the school and loaned to digitally excluded students for the pandemic periods. This is an ongoing process, and lately the government announced (i) the distribution of vouchers to students in order to buy their own laptop/tablet and (ii) the beginning of a rapid eight weeks' in-service teacher training program via the usage of suitable digital tools (indicatively, it will include pedagogical principles of utilization of synchronous and asynchronous remote education, development of educational material in e-class, and design of teaching scenarios in a remote learning environment). Within this context, it was considered as crucial to investigate teachers' beliefs of teaching presence and school support for online learning. The findings are expected to have implications for school policy and planning, and for educational policy, to support online teaching–learning.

Data were collected via an online questionnaire in June 2021; this period was the end of the consecutive lockdowns, since face-to-face education was applied from autumn 2021. Ethical issues were considered according to the new General Data Protection Regulation (GDPR) and the participation in the survey was voluntary. The teachers were informed that the questionnaire is anonymous and the data collected will be used solely for research purposes. The questionnaire was provided openly through a Facebook group to teachers who were interested. The Facebook group addresses issues on e-learning and mobile learning, and it is maintained by the second author. Teachers numbering 238 out of the 550 members responded (i.e., response rate 43.3%). Demographic and individual characteristics of the sample (gender, age, years of teaching experience, specialization, training in ICT, preparation to teach online courses, experience with online teaching, and devices used) are shown in Table 1. Men comprised 37.8% and women comprised 62.2%; their age ranged from ≤ 40 to 60+ years, while the years of teaching experience were from one to 20+ years. Science, Greek language and literature, foreign languages, information technology, and mathematics teachers mainly participated. Teachers' experience with online teaching varied (46.2% less than one year; 32.8% 1–2 years; and 21.0% more than two years), and most of them had some preparation to teach online courses (66.8% via online learning communities,

56.3% informal on-the-job training, and 34.0% attended certification course/seminar). Over half of the sample (57.0%) have attended pedagogical training in ICT.

Table 1. Characteristics of the sample ($n = 238$ teachers).

Gender	Years of Teaching Experience	Ages
Female (62.2%)	1–10 (11.8%)	≤40 (12.6%)
	11–20 (45.3%)	41–50 (27.7%)
Male (37.8%)	21+ (42.9%)	51–60 (50.4%)
		61+ (9.3%)
Experience with Online Teaching	Preparation to Teach Online Courses	Training in ICT (pedagogical)
<1 year (47.1%) 1–2 years (31.9%) >2 years (21.0%)	Online learning communities (67.2%)	Yes (57.1%) No (42.9%)
	Informal on-the-job training (56.3%)	
	Certification course/seminar (34.5%) None (7.6%)	
Specialization	Devices Used for Online Teaching (from March 2020 onwards)	Mobile Devices Used in Class before March 2020
Science (40.3%)	Laptop (100%)	Laptop (80.6%)
Greek Literature (21.0%)	Desktop computer (42.0%)	Mobile phone (27.7%)
Foreign languages (10.1%)	Mobile phone (24.4%)	Tablet (15.1%)
Inform. Technology (8.4%)	Tablet (10.9%)	Other (10.9%)
Mathematics (7.6%)		None (1.7%)
Other (12.6%)		

3.2. Research Instrument

An online self-report 19-item questionnaire was administered, and it consisted of two sections. The first section aimed to collect information regarding teachers' demographic and individual characteristics (see Table 1). The second section involved nineteen statements/items that were used to investigate teachers' beliefs of online teaching presence (thirteen items) and school support for online learning (six items). In particular, the thirteen items that assessed teachers' beliefs of online teaching presence were taken from Gurley [16] (overall perceived teaching presence scale) and were grouped into three key dimensions/factors: The first dimension is related to perceived teaching presence of design and organization and involves four items (S1–S4); the second dimension is related to perceived teaching presence of facilitation and involves six items (S5–S10); the third dimension is related to perceived teaching presence of direct instruction and involves three items (S11–S13). The six items (S14–S19), which assessed teachers' beliefs of school support for online learning, were taken from Howard et al. [6] (institutional support for online learning scale, developed by Philipsen [37]) and constituted a single factor; this scale addressed various aspects of school support, including the school's vision and professional development for online teaching.

The above two scales were chosen as most appropriate for this study because of the following reasons: (i) both scales were administered to a sample of 222 secondary school teachers from 20 countries [6], and the internal consistencies were high (Cronbach's alpha for the three subscales of the online teaching presence scale ranged from 0.82 to 0.90, while for the institutional support scale Cronbach's alpha was 0.95; see [38] for Cronbach's alpha), and (ii) within the Greek context, research on teacher online teaching presence is in its embryonic stage. All items were initially translated into the Greek language by the authors with the help of a linguistic expert. The instrument was then pre-tested for comprehension

and cultural validity with an ICT expert and eight teachers who did not participate in the main survey.

The teachers were asked to indicate their agreement with the items on a five-point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree).

3.3. Data Analysis

The statistical software SPSS version 24.0 (2016) was used for managing the data and conducting the statistical analyses (descriptive statistics, factor analysis). JASP tool version 0.14.1 (2020) was used for implementing Confirmatory Factor Analysis (CFA).

4. Results

4.1. Descriptive Measures for Teachers' Perceptions of Online Teaching Presence and School Support

To explore teachers' beliefs regarding online teaching presence and school support, a descriptive analysis was performed. Table 2 shows teachers' response rates (%) on the 19 items of the questionnaire ($n = 238$ teachers). The last column added together the percentages of those who "agree" and "strongly agree" and the nineteen items were sorted in descending order according to this column (i.e., items with the highest percentage of agreement appear at the top, for a more cohesive description of the responses). The majority of the teachers expressed strong-positive views of online teaching presence, and more specifically, over 63% of the sample "agree and strongly agree" with all items of the online teaching presence scale. The highest percentages of agreement were expressed for items S3, S8, S4, S11, and S1; "Overall, I provide clear instructions on how to participate in course learning activities" (for S3: 78.1%), "Overall, I help keep the course participants on task in a way that helps students learn" (for S8: 77.3%), "Overall, I clearly communicate important due dates/time frames for learning activities" (for S4: 76.5%), "Overall, I help to focus discussion on relevant issues in a way that helps students to learn" (for S11: 76.4%), and "Overall, I clearly communicate important course topics" (for S1: 75.6%).

In parallel, the perceived school support for online teaching–learning was mainly associated with disagreement and neutral views; over 50% of the teachers surveyed either disagree or express neutral views for all items of this scale. More specifically, the highest percentages of disagreement were expressed for the items "In our school, there is a professional development strategy towards online learning" (S19) and "In our school, there are clear objectives as regards online learning" (S16) (47.9% and 40.3% "strongly disagree and disagree", respectively). Over 30% of the sample expressed neutral views (neither agree nor disagree) for the school support scale.

4.2. Factorial Structure of the Questionnaire

Initially, we implemented a Confirmatory Factor Analysis (CFA) in order to fit a model of four factors supposing that the items load on the factors as in the original studies, using five indices and thus evaluating many aspects of the model [39–41], as stated below.

Comparative Fit Index (CFI) index, with a recommended value of 0.90 or higher.

Root Mean Square Error of Approximation (RMSEA); a value of less than 0.10 indicates a good model fit.

Standardized Root Mean Square Residual (SRMR), with a recommended value to be less than 0.05.

A normed chi-square that is obtained by dividing chi-square by the degrees of freedom (χ^2/df); the recommended value is between 1.0 and 3.0.

Goodness of Fit Index (GFI), which indicates a good model fit when its value is 0.90 or higher.

The analysis of our sample data ($n = 238$) yielded fit indices as follows: CFI = 0.892, RMSEA = 0.094, SRMR = 0.057, $\chi^2/df = 3.08$, and GFI = 0.836, indicating that the measurement model does not fit our data well.

Table 2. Teachers' response rates (%) on the 19 items ($n = 238$ teachers).

	SD	D	NA ND	A	SA	A and SA
S3. Overall, I provide clear instructions on how to participate in course learning activities.	1.7	6.7	13.4	57.1	21	78.1
S8. Overall, I help keep the course participants on task in a way that helps students learn.	0.8	5.1	16.8	59.7	17.6	77.3
S4. Overall, I clearly communicate important due dates/time frames for learning activities.	0.0	3.3	20.2	49.6	26.9	76.5
S11. Overall, I help to focus discussion on relevant issues in a way that helps students to learn.	0.9	5.9	16.8	63.0	13.4	76.4
S1. Overall, I clearly communicate important course topics.	0.9	5.9	17.6	64.7	10.9	75.6
S9. Overall, I encourage course participants to explore new concepts in courses.	1.7	3.3	21.0	55.5	18.5	74.0
S6. Overall, I am helpful in guiding the class towards understanding course topics in a way that helps students clarify their thinking.	1.7	5.8	20.2	56.3	16.0	72.3
S7. Overall, I help to keep course participants engaged and participating in productive dialogue.	0.9	5.0	23.5	51.3	19.3	70.6
S12. Overall, I provide feedback that helps students understand their strengths and weaknesses relative to the course's goals and objectives.	0.9	9.2	20.2	52.1	17.6	69.7
S10. Overall, my actions reinforce the development of a sense of community among course participants.	0.8	7.6	21.8	51.3	18.5	69.8
S13. Overall, I provide feedback in a timely fashion.	0.8	4.2	26.1	49.6	19.3	68.9
S5. Overall, I am helpful in identifying areas of agreement and disagreement on course topics that help students to learn.	0.0	5.9	30.2	55.5	8.4	63.9
S2. Overall, I clearly communicate course goals.	0.8	5.1	31.1	53.8	9.2	63.0
S17. In our school, the current ICT possibilities and infrastructure as regards online learning are taken into account.	4.2	16.0	30.2	42.0	7.6	49.6
S15. In our school, there is a supportive environment as regards professional development for online learning.	5.8	26.9	34.5	24.4	8.4	32.8
S16. In our school, there are clear objectives as regards online learning.	10.9	29.4	35.3	21.0	3.4	24.4
S18. In our school, attention is paid to the teacher change processes inherent to changing to online or blended learning.	7.6	28.6	40.3	19.3	4.2	23.5
S14. In our school, there is a clear vision towards online learning.	12.6	25.2	45.4	13.4	3.4	16.8
S19. In our school, there is a professional development strategy towards online learning.	12.6	35.3	35.3	15.1	1.7	16.8

(SD: Strongly Disagree; D: Disagree; NA ND: Neither Agree nor Disagree; A: Agree; SA: Strongly Agree).

The covariances among the four factors corresponding to the original two scales (overall perceived teaching presence scale and institutional support for online learning scale) were also examined (first factor/dimension: items S1–S4; second factor: S5–S10; third factor: S11–S13; fourth factor: S14–S19). Although the covariances between each of the first three factors and the fourth one were acceptable (values between 0.379 and 0.431), we found very high covariances among the first three (original) factors: first factor with second factor: 0.865; first factor with third factor: 0.916; and second factor with third factor: 0.991; the values should be less than 0.85 [41]. For the above reasons, we implemented an Exploratory Factor Analysis (EFA). The scree plot and the parallel analysis results support a three-factor solution, which we retain for interpretation; there was a redistribution of the 19 items in three factors, henceforth called F1, F2, and F3. In the three-factor model, the Kaiser–Meyer–Olkin (KMO) coefficient of sampling adequacy was satisfactory (0.909), and the Cronbach's alpha values per factor also improved. Table 3 indicates the values of Cronbach-a for the four-factor and three-factor models.

Table 3. Cronbach-a values for the 4-factor and 3-factor models (applied in our sample, $n = 238$).

4-Factor Model (Factors from Original Scales)	Cronbach's Alpha	3-Factor Model	Cronbach's Alpha
First factor of perceived teaching presence scale * (S1–S4)	0.822	F1 (S1–S5, S13)	0.863
Second factor of perceived teaching presence scale * (S5–S10)	0.883	F2 (S6–S12)	0.909
Third factor of perceived teaching presence scale * (S11–S13)	0.784		
Single-factor of institutional support scale ^ (S14–S19)	0.902	F3 (S14–S19)	0.902

(*) after Gurley [16]; (^) after Howard et al. [6].

The first factor (F1), labeled “instruction and organization”, was associated with six items: S4, S1, S2, S5, S13, and S3. The second factor (F2), labeled “facilitation and cognitive activation”, was associated with seven items: S7, S9, S10, S8, S11, S6, and S12. The third factor (F3), labelled “school support”, was associated with six items: S16, S14, S19, S18, S15, and S17. Table 4 displays the loadings and the Chronbach-a coefficient for internal consistency for each factor (F1 to F3), as well as the means and standard deviations for each item. All factors show a high internal consistency: Chronbach-a coefficient ranged from 0.863 to 0.909.

In the three-factor model, we performed a CFA (to test the fit of the structure revealed by EFA) and we found the following: CFI = 0.907, RMSEA = 0.089, SRMR = 0.050, $\chi^2/df = 3.08$, and GFI = 0.857, which indicates that the measurement model fit our data well. Additionally, the covariances between the three new factors had the following values: F1 with F2: 0.85; F1 with F3: 0.406; and F2 with F3: 0.388; these values are between 0.35 and 0.85 [40]. The above-mentioned correlations among factors support the acceptable discriminant validity of the three-factor structure. The loadings of the 19 items were between 0.559 and 0.869, and their values were statistically significant ($p < 0.05$).

Table 4. Factor loadings, mean and standard deviation per item (19 items: S1–S19).

	F1	F2	F3	Mean	SD
S4. Overall, I clearly communicate important due dates/time frames for learning activities.	0.738			4.00	0.779
S1. Overall, I clearly communicate important course topics.	0.738			3.79	0.745
S2. Overall, I clearly communicate course goals.	0.736			3.66	0.751
S5. Overall, I am helpful in identifying areas of agreement and disagreement on course topics that help students to learn.	0.715			3.66	0.715
S13. Overall, I provide feedback in a timely fashion.	0.578			3.82	0.818
S3. Overall, I provide clear instructions on how to participate in course learning activities.	0.567			3.89	0.869
S7. Overall, I help to keep course participants engaged and participating in productive dialogue.		0.841		3.83	0.825
S9. Overall, I encourage course participants to explore new concepts in courses.		0.787		3.86	0.814
S10. Overall, my actions reinforce the development of a sense of community among course participants.		0.745		3.79	0.861
S8. Overall, I help keep the course participants on task in a way that helps students learn.		0.705		3.88	0.781
S11. Overall, I help to focus discussion on relevant issues in a way that helps students to learn.		0.655		3.82	0.765
S6. Overall, I am helpful in guiding the class towards understanding course topics in a way that helps students clarify their thinking.		0.639		3.79	0.841

Table 4. *Cont.*

	F1	F2	F3	Mean	SD
S12. Overall, I provide feedback that helps students understand their strengths and weaknesses relative to the course's goals and objectives.		0.559		3.76	0.878
S16. In our school there are clear objectives as regards online learning.			0.869	2.76	1.01
S14. In our school there is a clear vision towards online learning.			0.839	2.70	0.968
S19. In our school there is a professional development strategy towards online learning.			0.822	2.58	0.950
S18. In our school attention is paid to the teacher change processes inherent to changing to online or blended learning.			0.801	2.84	0.963
S15. In our school there is a supportive environment as regards professional development for online learning.			0.792	3.03	1.04
S17. In our school the current ICT possibilities and infrastructure as regards online learning are taken into account.			0.675	3.33	0.973
Cronbach-a	0.863	0.909	0.902		

All responses ranged from 1 (strongly disagree) to 5 (strongly agree); Factor 1 (F1): "instruction and organization", Factor 2 (F2): "facilitation and cognitive activation", Factor 3 (F3): "school support". Extraction Method: Principal Axis Factoring [42,43]. Rotation Method: Varimax [42–44].

4.3. Impact of Teachers' Characteristics on the Perceptions Factors

To identify the possible impact of teachers' characteristics (gender, years of teaching experience, experience with online teaching, and age) on their beliefs, one-way ANOVA analyses were performed. A significance of $p = 0.05$ was accepted as a conventional level. Regarding gender, there was a statistically significant difference only for factor F2 "facilitation and cognitive activation"; female teachers expressed more positive beliefs ($F(1, 236) = 8.45$, $p = 0.004$, see Table 5). With regard to years of teaching experience, a statistically significant difference occurred only for factor F3 "school support" ($p = 0.031$, see Table 6). Pairwise mean comparisons using the Bonferroni test [45] revealed that teachers with more than 20 years of teaching experience expressed more positive perceptions on school support for online learning. Similarly, with regard to experience with online teaching, a statistically significant difference occurred only for factor F3 "school support" ($F(2, 235) = 7.3$, $p < 0.001$, see Table 7). Pairwise mean comparisons using the Bonferroni test revealed that increased experience with online teaching was linked to more positive views on school support. No significant differences were indicated with regard to age group (Table 8).

Table 5. Perception factor scores by gender ($n = 238$).

Factors	Male		Female		<i>p</i>
	Mean	SD	Mean	SD	
F1	3.78	0.75	3.72	0.88	0.438
F2	3.80	0.80	3.85	0.85	0.004
F3	2.98	0.91	2.70	1.07	0.256

F1: instruction and organization; F2: facilitation and cognitive activation; F3: school support.

Table 6. Perception factor scores by years of teaching experience ($n = 238$).

Factors	1–10 years		11–20 years		21+ years		<i>p</i>
	Mean	SD	Mean	SD	Mean	SD	
F1	3.61	0.95	3.82	0.71	3.83	0.78	0.283
F2	3.85	1.08	3.79	0.74	3.84	0.83	0.243
F3	2.76	1.07	2.81	0.89	2.97	1.05	0.031

F1: instruction and organization; F2: facilitation and cognitive activation; F3: school support.

Table 7. Perception factor scores by experience with online teaching ($n = 238$).

Factors	Less than 1 year		1–2 years		More than 2 years		<i>p</i>
	Mean	SD	Mean	SD	Mean	SD	
F1	3.63	0.82	3.88	0.77	4.07	0.58	0.844
F2	3.71	0.86	3.84	0.83	4.02	0.66	0.154
F3	2.78	0.93	2.83	1.04	3.13	0.97	<0.001

F1: instruction and organization; F2: facilitation and cognitive activation; F3: school support.

Table 8. Perception factor scores by age group ($n = 238$).

Factors	≤40		41–50		51–60		61+		<i>p</i>
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
F1	3.74	0.97	3.69	0.75	3.80	0.70	3.80	0.96	0.948
F2	3.82	1.04	3.86	0.77	3.80	0.79	3.84	0.80	0.631
F3	2.84	1.09	2.84	1.02	2.92	0.94	2.76	0.96	0.923

F1: instruction and organization; F2: facilitation and cognitive activation; F3: school support.

5. Discussion and Implications

The COVID-19 pandemic outbreak forced secondary school teachers to adapt to online teaching, and there are very few studies in the context of secondary education sector (e.g., in comparison to higher education, see [46]). This study contributes and extends the literature by offering new evidence on secondary school teachers' beliefs of teaching presence and school support in online learning environments in a confined mode. Teachers implement curricular and pedagogical decisions, and when they believe they are prepared to teach online and their schools provide support, their teaching practices are expected to be positively affected. Caskurlu et al. [47] reported that teaching presence predicts student outcomes in fully online courses.

The findings of this study with regard to the first research objective show that secondary school teachers' beliefs on online teaching presence (during the COVID-19 period) were, in general, positive-strong. It was found that over 63% of the sample "agree and strongly agree" with all items of the overall online teaching presence scale. The items with the highest percentages of agreement are associated with clear instruction, communication of time frames and course topics (e.g., for S3, S4, and S1, agreement over 75%), and facilitation and encouragement that helps students learn (e.g., for S8, S11, S9, S6, agreement over 72%). The forced switch to online teaching as a consequence of the COVID-19 pandemic and its continuation over a period of time could lead to students' demotivation. Thus, the processes of facilitating and guiding students in remote learning are essential in the absence of face-to-face interactions. Engaging students is a key task for teachers because online interaction is still not a comparable replacement for face-to-face interaction [17]. Student engagement, especially in online learning, is important since it may improve learning, performance, and persistence [48].

On the other hand, teachers' perceptions regarding school support for online learning were not (so) positive; over 50% of the sample expressed either disagreement or neutral beliefs for all items of the school support scale. In particular, the highest percentages of disagreement regarded the existence of a professional development strategy or of clear vision towards online learning (e.g., for S19, S16, and S14, over 37.8% disagreement). Neutral views were expressed by over 30% of the sample. Online teaching was a forced transition (not an option) and the completely unexpected situation caused by the pandemic found schools unprepared for adequate support. Processes of change in schools cannot be understood in isolation because they are constrained or enabled by the policies of national education systems and national cultures [11]. Since the school context often constrains individual efforts, teachers' perceived disagreement and uncertainty–neutrality about

school support has implications for professional development and educational policy (discussed later on).

The findings of this study are in partial agreement with aforementioned studies [6,10,26]. Howard et al. [6] indicated mixed beliefs of teachers' readiness to teach online; in particular, medium and high profiles reflected "teachers' positive perceptions, resulting in 59.9% of participants reporting positive perceptions about their readiness to teach online" (pg. 11). Judd et al. [10] reported on teachers' agreement and also uncertainty, while Ladendorf et al. [26] reported that secondary/high school teachers felt successful when instructing their students online during the pandemic.

With regard to the second research objective, the analysis indicated three factors for the 19-item questionnaire: "instruction and organization" (F1), "facilitation and cognitive activation" (F2), and "school support" (F3). More specifically, in our study, the 13 items of the overall perceived teaching presence scale were grouped into two factors (F1 and F2), instead of three groups as in studies [6,16]. A possible explanation for this may lie in the context; i.e., the redistribution of the items may be attributed to the different perceived meaning of the same item-question among populations due to the difference in cultural background and context. With regard to factor "school support" (F3), this was identical with the original single-factor scale [6]. The three-dimensional questionnaire is a reliable and valid instrument, and we recommend its administration across countries and cultures to detect similarities and differences.

With regard to the third research objective, isolated significant differences occurred only for (i) gender with regard to "facilitation and cognitive activation" (F2), and (ii) years of teaching experience, and experience with online teaching, with regard to "school support" (F3). Female teachers' perceived facilitation of the online courses (and consequently activating students to learn) was higher in comparison to their male colleagues. Other studies [49] indicated that primary to tertiary education male teachers had more positive experiences from online teaching, but the effect of gender differences is inconclusive [50]. In this study, teachers with more than 20 years of teaching experience and those with greater experience with online teaching expressed stronger-positive perceptions on school support for online learning. There is a disagreement with other studies that found older teachers, with many years of teaching experience, were often more reserved to use and/or adopt technology in their teaching; e.g., high school teachers' attitudes towards using online platforms, during the pandemic, were negatively associated with years of experience [31], while years of teaching experience act as a barrier in transformation to online teaching [32]. Our finding may be due to the sample in that it was more amenable to technology (interested in e-learning and experienced in ICT). It also seems that experience with online teaching makes teachers more independent from school support (i.e., less negative/neutral views). Age had no significant effect on teachers' perceptions.

The findings of this study have implications for teacher professional development, education stakeholders (policy makers, school principals, and consultants), as well as for the design/use of educational computer systems. Initially, teacher training can empower teachers to maintain and enhance their online teaching presence. Among others, they may develop/exercise skills to design, adapt, and implement interactive online content-activities, to organize the online learning environment, to manage the virtual classroom (e.g., using resources, monitoring activities and students), and to facilitate communication (e.g., by encouraging students' participation). Studies indicated that even experienced teachers struggled with making the transition to online education and, in particular, on how to use platforms/tools in pedagogically effective ways [51]. Jimoyiannis et al. [29] identified teachers' needs for professional development and support (in terms of learning design abilities necessary to integrate synchronous and asynchronous learning in online classrooms), while van Dorresteijn et al. [17] reported that teachers must be more explicit regarding the design-structure of the course in online environments. This study indicated that although teachers had, in general, positive-strong beliefs of online teaching presence, their perceived school support for online teaching was weak. Targeted training-support

could encourage them to (continue to) experiment with new online strategies and tools; i.e., for those with stronger perceptions, support may aid to extend their online practices. Teachers with positive perceptions could also be utilized to support their colleagues through, for example, communities of practice; collaboration and communication with colleagues are strongly suggested. Recommendations reported by a systematic review on K-12 research during the pandemic [9] included the provision of funding for professional development and equipment, designing collaborative activities, and clear policy and direct guidance for schools. Our suggestion, based on our findings, is that teachers' beliefs on school support may be strengthened via appropriate professional development, support, and also adequate infrastructure.

Education stakeholders (educational policy makers, school principals and consultants, and curricula developers) should be aware of teachers' perceptions and also provide practical support; e.g., for designing and implementing online teaching. Schools should provide opportunities for teachers to further develop their digital technical competencies, as well as their understanding of online pedagogies [52,53]. In addition, school principals' experiences during the pandemic are expected to impact on school policy and practice [28]. Educational policy makers are suggested to plan in-service training programs that support online teaching and learning. The development of such programs needs to emphasize the pedagogy of online education so as to enhance online teaching presence. Policy makers could also modify the existing ban of smartphones and tablets within classrooms; such devices could be utilized under conditions [54]. School principals and leaders have an essential role to support teachers for online teaching [14]. Recognition from leadership and fair expectations are suggested as important for teachers. Teachers' perceptions could be a "force" to facilitate school leaders in strengthening digital teaching-learning, in supporting staff and student wellbeing, and in communicating objectives among stakeholders.

In parallel, some suggestions that relate (indirectly) to this study are mentioned, since these may affect teachers' perceptions. The design of educational computer systems is suggested to incorporate features that support online (remote) teaching and learning, e.g., supporting clear teacher-student communication, one-to-one feedback and/or support, multitasks (online tests, forum, chat, etc.), and multiple student assessment. More open design of online tools and platforms could allow teachers to make their own decisions on how to utilize the system during online teaching. Online teaching-learning tools are particularly useful when these support and encourage interactions, quality of engagement, communication, and collaboration [55]; these tools could be designed for different devices including smartphones and tablets.

6. Limitations and Future Research

This study has been implemented a few days before and during the sudden confinement of the third pandemic wave lockdown, and there are some limitations in the methodology and the results obtained. The data were collected only via a questionnaire and the impact of other individual characteristics (such as specialization or self-efficacy) on teachers' views was not examined. Moreover, the sample cannot be considered as representative of the "mainstream" Greek teacher and the results are not generalizable. It is suggested to conduct the survey with a larger and more representative sample, to also collect qualitative data (interviews with teachers and school leaders could supplement quantitative data), and to examine teachers' views in relation to other variables (e.g., perceived self-efficacy, digital tools/devices used).

Due to limited earlier research, it is suggested for future studies to utilize the three-factor questionnaire with other populations and to build on current findings. The issue of whether new pedagogical practices should be applied in the post-COVID era [56] is worth examination. We plan to examine teachers' perceptions about online challenges, affordances, and the role of digital technologies during the confinement, as well as their suggestions for the improvement of online teaching. Teachers' perceptions need to be considered to support (future) transitions to online and blended education. Online teaching

requires a careful preparation by the teacher (to guarantee proper student learning), while the adaptation of face-to-face to online teaching is a challenge for many teachers. Research suggests preservice teachers' training for online, blended, and face-to-face contexts [57]. Teacher experience with online teaching might prove useful for future crises and blended teaching; new pedagogies, learning tools, and learning models such as blended learning and online learning have become the new norm worldwide [58]. Since online and offline approaches could be combined in the post-COVID era [59] and online education is a step towards blended learning, teachers' perceptions and practices constitute issues for future investigation.

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