Being a teacher in a time of pandemic

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ABSTRACT

This study was conducted in the context of the COVID-19 pandemic and, more specifically, within the research project 'Teaching and Learning in Times of COVID-19: Teachers' and Students' Perceptions in Cross-border Regions'. This study—conducted in Portugal—intended to diagnose the perceptions of basic education teachers and students regarding distance learning (D@L), considering a wide range of variables. This study was developed based on a multi-perspective approach, and data were collected via questionnaire surveys with open- and close-ended questions. In this study, we only intend to understand teachers' perceptions and, more specifically, issues pertaining to teaching professionalism. The results reflect teachers' perceptions of the transformations and challenges of D@L, the affirmation and recognition, and the ethical and deontological issues associated with the teaching profession following the educational changes imposed by the pandemic. More concretely, they suggest that D@L was accompanied by transformations or challenges that led to the reconfiguration of teaching and learning processes and contributed to the professional development of the study participants. However, the response trends differed because D@L has enabled the affirmation and social recognition of the teaching profession and raises ethical and deontological questions regarding the participants' professionalism.

1. Introduction

The COVID-19 pandemic led to the biggest disruption in the history of education, impacting students and teachers worldwide and at different levels [1]. Schools and teachers had to respond to this challenge and were forced to find an answer that would penalise students less for their learning trajectories. Such an answer did not seem straightforward, as it is challenging to conduct online teaching and appeal to personal, social, and cognitive interactions while promoting student involvement in learning situations.

In numerous countries, because of the rapid transition to distance learning (D@L) in a space of few days, there was minimal

preparation for the new forms of teaching, while the concern for professional development regarding how and what to do only occurred later. Therefore, numerous teachers had to learn independently, which was challenging [2].

This study was conducted in the context of teaching during the pandemic. Notably, it was part of a larger project through which an approach was sought to diagnose the perceptions of basic education teachers and students regarding D@L in Portuguese. This study focuses on teachers' perceptions, centred on the variables considered, focusing on teaching professionalism. Therefore, this study reviews the literature, followed by a more in-depth contextualisation and clarification of the methodological options, the presentation of the results, and their discussion. Further, this study had some limitations, which have been noted.

2. Literature review

2.1. The teaching profession

The teaching profession is complex, multifaceted, and marked by human and ethical relationships anchored in human values and situated in a relationship between two subjects—namely, the teacher and students.

Notwithstanding the scope of the teaching profession in different readings and research works, delimiting numerous aspects of exercising this profession to teaching, institutional, and professional components is possible [3]. According to these authors, the scientific, didactic and relational dimensions are associated with the first component, the teaching *versus* learning process; the second component is associated with the organizational dimension and respective performance of functions in this context (management and coordination), as well as the relationship with the school community (other professionals, parents of students, among others). The third component concerns the deontological and ethical dimensions and their professional development. Additionally, Bonifácio [4] highlighted the deontological and ethical dimensions associated with teachers' professional development, emphasising the importance of including the ethical dimension in training processes.

In response to such components and dimensions, teachers build their profession throughout their lives; this (re)construction occurs in complexity, often in uncertainty, and challenges, interactions, and reciprocities between staff and the collective, the contextual, the local, and the global. This associates the teaching profession with the need to respond with innovation and creativity—but based on professional knowledge—to the challenges in everyday life [5].

Frequently, teachers must make decisions in the immediate and unforeseen and not invariably with the time and distance necessary for reflection and the affirmation of 'an attitude and criticism of teaching practice and identity' [6, p. 2]. In this emergency, teaching professionalism must be critical, reflective, collaborative, shared, and empowered between the individual and the collective, wherein the intellectual competencies associated with autonomy, accountability, and ethics respond to the urgency of the teaching and learning process, teamwork, research, and the growing use of technologies (ICT) as a teaching and learning strategy and resource.

However, considering these characteristics in the abrupt context of a global pandemic, such as the COVID-19 pandemic, we examine the interventions implemented by teachers under D@L. Further, we evaluate their responses, non-responses, and conceptions regarding professional practice in a pandemic situation, for which they were unprepared and wherein it was necessary to establish communication with their students and support them in different teaching and learning paths. 'Covid-19 revealed the strengths and weaknesses of the global education atmosphere in developed and developing countries' [[7], p. 1].

2.2. Challenges faced during the pandemic

On March 16, 2020, the pandemic led to the closure of schools in Portugal, leaving students at home to minimise the virus' spread. The decision—taken on 13th March 2020—took effect three days later. A new era commenced, which was almost unthinkable to most of the population, for which there was no time to prepare. This situation demanded responses from policymakers, to which teachers could adapt immediately by moving from face-to-face to online teaching [8]. Several guidelines aiming to organise teaching emerged. The publication 'Roteiro – 8 Princípios orientadores para a implementação do Ensino a distância (E@D) nas Escolas' (8 Guiding Principles for the Implementation of Distance Learning (D@L) in Schools') is noteworthy [9]. This document—published on March 27, 2020 on the General Directorate of Education webpage—allowed schools to organise themselves by suggesting 'different stages of preparation, internal debate, reflection, survey and definition of technological means, among many other factors, assuming itself as a dynamic process of constant improvement' [9, p. 1]. This publication highlighted the following principles.

1 - *Mobilisation for change* (Involve the educational community in the search for the most appropriate D@L Plan for the school.)
2 - *Network communication* (Establish an efficient communication circuit aimed at all stakeholders in the school community.)
3 - *Deciding on the D@L model* (Decide the weekly timetable to be followed by the students: fixed or flexible, including the necessary break times.)
4 - *Collaboration and articulation* (Promote mutual help between teachers.)
5 - Teaching methodologies (The teaching methodologies developed in D@L must be appealing and mobilise students for action, be diversified and framed, present examples, and encourage self-reflection and autonomous work.)
6 - *Selecting the technological means of D@L* (Find the technological means that help distance learning without flooding students with multiple communication solutions.)
7 - *Taking care of the school community* (Develop activities that promote belonging to the class.)
8 *Following and monitoring* (Predict forms of monitoring.)

Notably, these eight principles were clarified in detail to provide schools with support and encouragement to adhere to this new reality, which requires a response within a short period. Simultaneously, a website was created to support schools (https://apoioescolas.dge.mec.pt/) aiming to monitor the process in due time and provide the most up-to-date information, as well as a wide range of resources and educational materials intended to fill and respond to these abrupt changes. As of April 20, 2020, this support was enhanced by a wide range of educational resources broadcast by radio and television in Portugal (*RTP Memória*) and made available by *RTP Play* and the Directorate-General for Education website (among others). This emblematic resource became *#EstudoEmCasa* and was designed specifically for students who could not attend classes online (lack of computers and Internet access). In this case, the Ministry of Education also designed the information principles known as '*9 Princípios Orientadores Para Acompanhamento dos Alunos que recorrem ao #EstudoEmCasa (2020/2021)*' (9 Guiding Principles for Monitoring Students who use *#EstudoEmCasa* (2020/2021)) [10]. Notably, the document explained that *#EstudoEmCasa* would occupy the 'programming schedule from 9 a.m. to 4.30 p.m. The daily contents have a limited time (30-min sessions) and are organised for different school years, being a complementary tool for teachers to work with their students' [10, p. 1].

In this course, a new challenge emerged for teachers, for which they were unprepared. Therefore, 'to maintain education, large parts of the teaching world had to convert to digital distance teaching' [[11], p. 1] and, as mentioned by Minihan et al. [12], '(…) teachers experienced unprecedented and sudden changes in their work practice' (p. 1).

Constant challenges characterise the teaching profession and continually demand adapting knowledge and compliance with official curricula to the educational needs of students in the 21st century, a student body conditioned by the turmoil of digital technology. School is supposedly a privileged place to acquire knowledge and civility to live together in society. However, ICT has posed a challenge to schools, considering that students can access knowledge in other contexts. This fact represents a challenge for teachers, demanding more training and updating of their knowledge to ensure that they do not feel questioned by students and filter all the information available on the Internet; consequently, their role is not distorted or replaced by digital technologies [13,14].

However, motivated by COVID-19, this contingency situation has 'forced' education professionals to readjust their teaching methods, referring to the urgency of D@L for several months. 'The focus on challenges related to digital distance learning has become particularly relevant since educational institutions have had to close due to the COVID-19 pandemic' [11, p. 1]. It required new ways of teaching and learning, adopting new methodologies and resources, and establishing a new educational relationship mediated by a screen–a fact that not everyone was prepared, aware of, or motivated. Life in the face-to-face classroom was full of moments wherein the teacher asked questions, warned and motivated students, and immediately noticed the students' interest or lack of attention. However, this was no longer possible in the digital format (D@L) and allowed the student to disconnect after a few minutes, become demotivated, and cut the communication chain between the teacher and peers.

Considering all the challenges caused by the pandemic, D@L, or remote teaching, is perhaps among the biggest challenges for schools in our times — despite the paradox that arises if we believe believe that today's schools should keep up with the development of the digital era that characterizes the world [15]. However, as stated by Flores and Swennen [16], schools and teachers (and students) did not have time to learn and adapt to the new reality dictated by the pandemic.

Some studies have already been conducted in this regard ([17,18]) corroborating the statement by Flores and Swennen [16], and highlighting other associated difficulties, such as techniques, networks, lack of equipment, and even inequalities between teachers in accessing and using the technological resources necessary for remote teaching. As Huber and Helm [19] and König et al. [20] stated, these difficulties can also be associated with teachers' lack of digital skills, which results in different professional performances with different levels of adaptation to the demands posed by the pandemic, especially in terms of the teaching and learning process. Alves et al. [21] highlighted that teachers were overloaded with work, stress, and anxiety, reducing well-being and increasing teachers' concerns.

In a synthesis including several studies, Flores et al. [22] grouped the impact generated according to three dimensions—specifically, the conditions for facilitating remote teaching (in access and use of means and resources), training for digital teaching (teachers' digital skills, support for the work of teachers by leaders, political decision-makers and parents), and the 'strategies developed to implement remote teaching and its effects on the student's learning, aspects that appear associated with the experiences and adaptation processes of teachers and students' (p. 7).

Specifically, in the case of Portugal, Flores et al. [22] highlighted the primary difficulties faced by teachers in D@L, highlighting students' lack of equipment; difficulty in involving students in the learning process; and lack of time, training for online teaching, and support from parents. Moreover, they highlighted that most teachers had to resort to their technological resources and needed more time than face-to-face teaching, and that their students participated less in the assessments.

In this sequence, a (re)configuration of pedagogies and teaching resources is inferred, which requires a different pedagogical interaction as suggested by concerns arising at the teaching and learning process and the inclusion and justice from the perspective of equal opportunities for teachers and students. Thus, teachers found themselves trying to find a balance between a pedagogical practice that they had to reconfigure owing to the emerging online environment and maintaining a pedagogical practice as if the online environment was a face-to-face environment wherein they had always taught. Balancing in real time was among the biggest challenges that the teachers had to face. Changing the pedagogical processes—from their planning to implementation and evaluation—became imperative. Mobilising all the professional knowledge and critical spirit, capacity for resilience, and ability of each collective to adapt to the unpredictability and uncertainties of a period with no clear end was necessary.

Despite the profession calling for a constant construction of knowledge and skills known to characterise such a practice, studies have highlighted that schools and teachers invest their best efforts, but teachers are not prepared for the demands of D@L and the use of new technologies as a context, means, and resource of the teaching and learning process [23]. However, Flores and Gago [24] argued that the different experiences of learning to teach in remote teaching depended on the context; further, they held that the

manner in which teachers were providing a quick response, though differentiated, to a new and emergency scenario allows for reflection and questioning whether teachers should be understood as mere 'executors' or reflective professionals, capable of acting under new challenges and which shape their actions in research and reflection.

König et al. [20] mentioned the importance of expanding teachers' knowledge of ICT (technological knowledge) and associating it with the teaching and learning processes. They highlighted that in the D@L responses driven by the pandemic, teachers needed knowledge, skills, and confidence in their skills and the success of this emerging type of teaching. Regarding the pandemic, the aforementioned authors found that younger teachers from the digital-natives generation guaranteed an adequate response to the demands of emerging distance learning. This implies that teacher training—initial and ongoing—cannot be alienated from ICT and that we must focus on this new area of professional knowledge for teachers as a response to improving the quality of teaching.

Huber and Helm [19] highlighted the fragility of teachers' digital skills, which interfere with the online teaching process. Therefore, the authors referred to the need to improve the digital means and technological resources suitable for online teaching. However, improving teachers' digital skills is also necessary; when they have more digital skills, they value the means and resources more.

Allen et al. [25] recalled that teachers found themselves in a particularly uncertain period of transition in terms of their professional life. However, the certainty was that the rapid change would pass through, guaranteeing the involvement of students in this new form of teaching–learning, which implied a significant increase in the workload. It involved mobilising content and resources for D@L and becoming competent in using and managing new teaching platforms.

3. Contextualisation of the study

In this context, the project 'Teaching and Learning in Times of COVID-19: Teachers' and Students' Perceptions in Cross-border Regions' sought to focus on real professional and personal processes, believing that the lived experience precipitated discomfort(s), considering the lack of knowledge of the new circumstances of professional practice. These new challenges for teachers implied demands regarding pedagogical practice as it was necessary to move from the usual face-to-face model to the online version and adopt new intervention strategies, technology, and digital platforms.

The study was developed by researchers in Portugal and emerged from the experience of the initial and continuing teacher training of the researchers who constituted the research team. It intended to diagnose the perceptions of basic education teachers and students regarding D@L. Therefore, this project primarily aimed to infer the opportunities and difficulties of D@L in cross-border regions in basic education (in Portugal) from the perspective of students and teachers.

The study was conducted among students and teachers from the final years of the 1st, 2nd, and 3rd cycle of basic education and, as explained in the sample, belonged to two regions, considering the Portuguese hierarchical system of dividing the territory into regions: NUTS 3. Students and teachers belonged to the same school. The choice of these educational territories was intentional because of the professional location of the researchers; hence, it was a selection of convenience to become acquainted with the nearby reality. The research did not intend to generalise the collected data because they agreed that these were specific circumstances and would hardly be replicated with the same intensity and doubts regarding the profession as the challenge of an unknown context and the duration and evolution of the pandemic stood out.

The specific objectives of the general research were as follows.

a) Considering the students
   - to diagnose students' perceptions of D@L
   - to diagnose students' perceptions of the transition to distance learning
   - to diagnose students' perceptions of 'EstudoEmCasa'
b) Considering the teachers
   - to diagnose teachers' perceptions of D@L, - to diagnose teachers' perceptions of the transition to D@L, - to diagnose teachers' perceptions of 'EstudoEmCasa' in the context of D@L

Although the study is comprehensive and focused on students and teachers, the authors only mobilised data on teachers' perceptions in this study and selected some variables under study. Noteworthily, the research—considering only the dimension referring to teachers—contemplated a wide range of variables. Therefore, in the impossibility of presenting all the results, the following objectives were established.

1) to analyse whether D@L has implied changes and challenges for teachers based on their perceptions;
2) to verify teachers' perceptions of professional recognition in times of pandemic;
3) to assess whether, in their perception, this new work context contributed to professional development;
4) to infer whether, in their perception, the D@L raised ethical and deontological questions regarding their teaching professionalism.

The project results are shared as a contribution to the discussion and reflection on teaching professionalism, especially regarding its complexity and the constant demand to respond to emerging challenges.

4. Materials and methods

Regarding the method, this study was developed from a multi-perspective perspective, ensuring the methodological complementarity of quantitative and qualitative nature. This study is characterised by its interpretative-critical trend.

A questionnaire was prepared, produced, and made available online to collect data from participating teachers. The teachers' questionnaire in the validation phase was pre-tested to assess its functionality and comprehension. A group of six teachers conducted the pre-test from a school group that was not part of the study sample. Teachers were asked to answer the questionnaire and report the response time, any ambiguities or doubts that emerged during the response, and any suggestions for improving the questionnaire. After rigorously analysing these data and the teachers' responses, the research team considered the need to reformulate some items because they were not accurately understood by the respondents in the pre-test. However, the reworded aspects were related to linguistic issues of form rather than content; therefore, no significant changes were needed.

Before distributing the questionnaires among the participants, we requested authorisation to administer surveys from the Portuguese Ministry of Education on the respective platform for Monitoring Surveys in School Environments (http://mime.dgeec.mec.pt/) and approval of the Ethics Committee of the Polytechnic Institute of Portalegre (https://www.ipportalegre.pt/pt/sobre-nos/qualidade/sistema-de-gestao-da-responsabilidade-social/etica/). The study and questionnaires were evaluated according to the Code of Ethics of the Polytechnic Institute of Portalegre (https://pae.ipportalegre.pt/repositoryStream/317977).

Further, formal contact was made with the management boards of the school groups to request their collaboration. The questionnaires were delivered after obtaining the directors' consent, requesting their dissemination to teachers in compliance with the previously defined sample and application conditions. A declaration of informed consent preceded teachers' responses.

The questionnaire comprised open- and closed-ended questions. For the latter, it was decided to list response alternatives using a Likert scale whose indicators were as follows: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. Open-ended questions were added to allow for a freer response, allowing participants to clarify or complement the answers that they provided in the close-ended questions. However, the ope-endedn answers were few and did not always help researchers delve deeper into the participants' opinions, as they generally proved to have only an affirmative meaning of the close-ended responses noted earlier.

The questionnaire structure included the following five blocks: participant identification, resources for D@L, content of D@L and 'EstudoEmCasa', educational relationship, and profession and teaching professionalism. In this study, the researchers only analysed and presented the answers to the close-ended questions associated with four variables because of the variables selected for analysis; there were no associated open-ended questions, or the participants' answers were only confirmation of the answer provided to the close-ended question without any other relevant information. Considering this study's specific purposes, the analysis focused exclusively on the following variables.

a) D@L brought transformations and challenges that obliged teachers to rethink their pedagogical practices.
b) D@L has allowed the affirmation and social recognition of 'teachers'.
c) D@L contributes to the professional development of teachers.
d) D@L raises ethical and deontological questions regarding their teaching professionalism.

Further, variables were cross-checked, considering the following four context variables as a reference: age of respondents, academic degree, geographical origin, and level of teaching.

The sampling technique that optimally fit the study was stratified group random sampling, as follows.

(a) It is a probabilistic sampling technique that allows the generalisation of the results obtained by studying the sample's constituent elements. For this to become possible, the sample's elements must be representative of the universe. (b) It allows a sample to be selected such that the subgroups or strata previously identified in the universe of the study are represented in the sample in identical proportions.

Thus, the sampling unit was the school group, and 20 % of the total number of School Groups in each of the regions studied were used as a reference in the sample: Alto Alentejo/Portalegre and Terras de Trás-os-Montes/Bragança. This value was used to ensure the subjects' representativeness and diversity in the study population. The indicated NUTS 3 was selected based on convenience, as these are the regions wherein the researchers conduct their professional activities. School Groups randomly selected each NUTS III, which was alphabetically listed and numbered, and then a random number generator was used (http://www. random. org/). Table 1 presents the study sample.

Table 1
Constitution of the study sample.

NUTS 3	School Groups		
	Total (N)	Sample (n)	Sample (%)
Alto Alentejo	18	4	22
Bragança	14	3	21
Total	32	7	22

Thus, the 4th, 6th, and 9th-grade students and their teachers constituted the study sample.

As it focuses on analysing answers related to close-ended questions, this study assumes an eminently quantitative nature, and the data were treated using the statistical analysis program *Statistical Package for the Social Sciences*. Inferential or inductive statistical analysis allows the assessment of the different factors linked to chance when concluding one or more data samples. Thus, this type of statistical analysis was associated with statistical significance, whose level in this study was set at $p = 0,05$, according to recommendations in the literature on educational research [26]. Additionally, it is recommended that the practical significance of a given result be assessed. As Field states, simply because a statistical test is significant does not mean the effect it measures is significant or important [27]. According to this author, the effect size is a standardised measure of the magnitude of the effect observed. Therefore, it allows the effect size to be compared across studies that measure different variables or use different scales.

In this sense, this study presents Cramer's V correlation coefficient as a measure of effect size because the statistical tests measure the strength of the association between two nominal variables (chi-square test). These effect size measures were evaluated between a minimum value of 0 (no effect) and a maximum value of 1 (perfect effect), thus making comparison easier. Pearson's chi-square test ($\chi 2$) was used to test the degree of association between the categorical variables under study. This test is generally used to compare two categorical variables and test whether two or more independent populations (groups) differ for a characteristic, and whether the frequency with which the sample elements are distributed among the classes of a categorised nominal variable is (or is not) random [28], which is exactly the case in this study. The results of the four variables were cross-checked, considering four context variables as references—namely, age of respondents, academic degree, geographical origin, and level of teaching. The X^2 test results are presented for each of these crossings.

5. Results

This study included 73 participants from Bragança and Portalegre (Table 2). The teachers belonged to school groups in the identified regions—specifically, three from Bragança and four from Portalegre.

The participants comprised 20 men (27.4 %) and 53 women (72.6 %). Their ages varied across four intervals (Table 3).

Their academic qualifications included the first cycle of a two-stage bachelor's degree (5.5 %), bachelor's degree (67.1 %), and master's degree (27.4 %). Regarding the educational level, 20.5 % had taught in the 1st Cycle of Basic Education, 23.3 % in the 2nd, and 56.2 % in the 3rd.

The results were presented considering the variables (D@L brought transformations and challenges that obliged teachers to rethink their pedagogical practice; D@L has allowed the affirmation and social recognition of the profession 'teacher'; D@L contributes to teachers' professional development; D@L raises ethical and deontological questions regarding their teaching professionalism) and maintaining the order of exposure.

Regarding the variable 'D@L brought transformations and challenges that obliged teachers to rethink their pedagogical practice', most respondents (94.5 %) agreed with the expressed statement. Only 5.5 % of the individuals disagreed, belonging to the Portalegre district and the teachers of the 3rd Cycle of Basic Education; 2.7 % had a bachelor's degree, and 2.7 % had a master's degree. A more detailed analysis allowed us to verify that no significant differences existed ($p < 0,05$, regarding the geographical origin, level of teaching, or academic degree; Table 4).

Regarding the variable 'D@L has allowed the affirmation and social recognition of the teaching profession', although most respondents disagreed with the statement (52.0 %), a considerable percentage (48.0 %) agreed. Considering the cross-checking with the age variable, in the age ranges of 30–39 and 40–49 years, the trend was to disagree (66.7 % in both cases), and in 50–59 years, the trend was for agreement (58.3 %). In the 60–69, trends were divided equally. However, there was no statistically significant association between the variables under analysis and context variable of age (see Table 5).

However, cross-checking between the variable in question and the academic degree context variable indicated that these variables were significantly related ($p < 0.05$) from a statistical perspective, and the effect size was high ($V = 0.30$). Of those disagreeing with this statement, 75.0 % of individuals held the first cycle of a two-stage bachelor's degree, 51.0 % held a bachelor's degree, and 50.0 % held a master's degree. It is inferred that, as the academic degree increased, the tendency to consider that D@L allowed affirmation and social recognition of the teaching profession also increased. Regarding cross-checking with the geographical origin context variable, most respondents from the Bragança district (58.6 %) disagreed with the statement. In comparison, most from the Portalegre district (53.5 %) agreed. Even so, the response trends from respondents in both districts were approximately 50 %, with no statistically significant associations observed (see Table 6). Additionally, considering the context variable of the level of teaching and variable under analysis, no statistically significant associations were found (Table 5). Most respondents in the 1st and 3rd basic education cycle disagreed (53.3 % and 58.5 %, respectively). Regarding the 2nd Cycle of Basic Education, more than one-third (35.3 %) of students followed the same trend. In sum, we only found a significant association ($p < 0.05$) with 'academic degree'.

Regarding the variable 'D@L contributes to teachers' professional development', most individuals (83.1 %) agreed with the statement, and 16.9 % disagreed. Like the previous variable, statistical significance was observed in the cross-check with an academic degree (Table 6). In this case, the effect size was large ($V = 0.31$).

Table 2
Distribution of teachers by region.

Region	Bragança	Portalegre	Total
N	30	43	73
%	41,1	58,9	100 %

Table 3

Distribution of teachers by age range.

Age range (years)	[30, 39]	[40, 49]	[50, 59]	[6,60]9	Total
N	6	21	36	10	73
%	8.2	28.8	49.3	13.7	100.0

Table 4

Transformations obliged teachers to rethink practice – X^2 results.

Context variables	χ^2 Results
Age	χ^2(6, N = 73) = 12.970; p = 0.044; V = 0.30
Academic degree	χ^2(4, N = 73) = 5.029; p = 0.402; V = 0.17
Geographical origin	χ^2(4, N = 73) = 4.197; p = 0.380; V = 0.17
Level of teaching	χ^2(4, N = 73) = 3.603; p = 0.462; V = 0.16

After cross-checking the variable in question and the context variable age, an association with statistical significance was evident ($p < 0.05$). Despite the tendency for agreement to remain in all age ranges, 30–39 and 40–49 years were identified as individuals who disagreed (2.7 % each). All individuals aged 50–59 and 60–69 agreed with this statement. Therefore, the discordant perspective was observed in individuals belonging to the lower age ranges, with no individuals from the more advanced age ranges exhibiting the same. Considering the number of degrees of freedom, the effect size for age was large ($V = 0.30$).

Table 5

Teaching profession's affirmation and social recognition: X^2 results.

Context variables	χ^2 Results
Age	χ^2(9, N = 73) = 9.192; p = 0.420; V = 0.21
Academic degree	χ^2(6, N = 73) = 12.969; p = 0.044; V = 0.30
Geographical origin	χ^2(6, N = 73) = 11.903; p = 0.064; V = 0.29
Level of teaching	χ^2(6, N = 73) = 6.164; p = 0.405; V = 0.21

Table 6

Teachers' professional development contributions: &KHgr;^{2} results.

Context variables	χ^2 Results
Age	χ^2(9, N = 71) = 11.686; p = 0.232; V = 0.23
Academic degree	χ^2(6, N = 71) = 13.390; p = 0.037; V = 0.31
Geographical origin	χ^2(6, N = 71) = 6.932; p = 0.327; V = 0.22
Level of teaching	χ^2(6, N = 71) = 2.058; p = 0.914; V = 0.12

Notably, no individual holding the first cycle of a two-stage bachelor's degree disagreed, and 10.6 % of those who did held a master's degree. More than one-fifth of the respondents who disagreed held a bachelor's degree (20.8 %). Therefore, individuals with the first cycle of a two-stage bachelor's degree and the lowest qualifications were those who most considered that D@L contributed to their professional development. Regarding the educational level (Table 6), most teachers from the three levels agreed with the statement (1st Cycle of Basic Education: 80.0 %; 2nd Cycle of Basic Education: 82.4 %; 3rd Cycle of Basic Education: 84.6 %). The same was registered in the context of the age variable (Table 6), with 75.0 % or more agreeing across all the age ranges considered. Regarding geographic origin (Table 6), most respondents from both districts agreed (Bragança: 71.4 %; Portalegre: 90.5 %). Therefore, we only found a significant association with 'academic degree'.

Finally, in the variable 'The D@L raises ethical and deontological questions regarding their teaching professionalism', there was a greater division in the respondents' perspective; 46.6 % disagreed, and 53.4 % agreed. No statistically significant associations were found after cross-checking this variable with the context variables (Table 7).

Nevertheless, it is important to highlight that although the differences were not statistically significant, interesting trends

Table 7

Professionalism's ethical and deontological issues: X^2 results.

Context variables	χ^2 Results
Age	χ^2(9, N = 73) = 14.618; p = 0.102; V = 0.26
Academic degree	χ^2(6, N = 73) = 4.602; p = 0.596; V = 0.18
Geographical origin	χ^2(6, N = 73) = 2.200; p = 0.900; V = 0.12
Level of teaching	χ^2(6, N = 73) = 5.719; p = 0.455; V = 0.20

existed—particularly regarding age. In the age ranges 30–39 and 40–49 years, the trend was in agreement (83.3 % and 76.2 %, respectively). The trend was reversed in the 50–59 years, with 63.9 % disagreeing. The positions were divided equally at intervals of 60–69. Regarding geographical origin (Table 7), most respondents from both districts (Bragança: 51.7 %; Portalegre: 55.8 %) agreed. Considering the context variable level of teaching (Table 7), in the 3rd Cycle of Basic Education, most individuals (61.0 %) agreed, but the same did not occur in the other cycles of education (1st Cycle of Basic Education: 40.0 %; 2nd Cycle of Basic Education: 47.1 %). Therefore, it is inferred that as one advances in teaching level, the percentage of teachers considering D@L to raise ethical and deontological questions regarding their teaching profession increases. Cross-checking with the last context variable (academic degree; Table 7) revealed that most respondents held the first cycle of a two-stage bachelor's degree, and those with a master's degree agreed with the statement (75.0 % and 60.0 %). For respondents holding bachelor's degrees, the percentage of agreement decreased to 49.0 %.

6. Discussion

Notably, nearly all individuals considered D@L to be accompanied by transformations or challenges that led to a reconfiguration of the teaching and learning process, as mentioned in the corpus theory shaped by this study. This finding aligns with the conclusions of several studies conducted in the Portuguese context by Flores et al. [22], wherein the results revealed that the participants were forced to manage a complex set of difficulties related to the abrupt transition to D@L, implying a rethinking of pedagogical practice at various levels. Second, the age context variable found that the age ranges of 30–39 and 40–49 years disagreed with this perspective. Therefore, the younger teachers considered that D@L did not imply transformations or challenges. This was perhaps because, in their pedagogical practice, they had already resorted to some strategies in the field of ICT or because, from the outset, they had better train-ing/preparation for D@L—either through formal training or through greater contact with technologies and digital literacy in their day-to-day/professional careers. This inference is related to the idea that, throughout their lives and during their teacher training, they had greater proximity to the current possibilities that technology could provide, facilitating their professional path. This implies that they have grown up and realised their training in a digital society. By contrast, all the oldest teachers who participated in the study (50–59 and 60–69 years) considered D@L to be accompanied by transformations or challenges that led to rethinking pedagogical practices. König et al. [20] precisely highlighted the challenges related to ICT, considering it as the least achieved in the adaptive process of D@L, shaping itself into differentiated performances by teachers. Nevertheless, contrary to this study's results, these authors concluded that teachers who belonged to the generation of digital natives at the beginning of their careers did not guarantee digital skills that would allow them to better respond to this challenge. The other contextual variables did not assume particular relevance in the analysis framework. However, in defining recommendations on D@L during the pandemic, the Commonwealth of Learning [15] highlighted the importance of training teachers to adopt D@L approaches supported by more experienced peers and providing learning/training incentives. König et al. [20] provided the same warning, immediately referring to rethinking this aspect during teachers' initial training. Moreover, the Organization for Economic Cooperation and Development (OECD) comprehensively advo-cated creating professional development mechanisms to respond to new challenges through collaboration between professionals and fostering teachers' autonomy [23].

Regarding the variable 'D@L has allowed the affirmation and social recognition of the teaching profession', the response trends were more divergent, with the majority (52.0 %) disagreeing. This trend (disagreement) was particularly evident among younger respondents. The teachers aged 50–59 years predominantly considered that D@L had contributed to professional affirmation and recognition. Nevertheless, the cross-checking of this variable with the academic degree context variable is noteworthy (as it has statistical significance), because as the academic degree increased, the percentage of disagreement decreased. Indeed, individuals with the lowest academic degree (first cycle of a two-stage bachelor's degree) were the ones who disagreed the most; at the master's degree level, an equitable division in the trends existed. Eventually, teachers having a higher academic degree prepare better or can manage new challenges, such as D@L, in response to an emergency, translating into a greater possibility of affirmation and social recognition. In an OECD study, Reimers and Schleicher [8] warned about the importance of fostering and supporting innovation, resilience, and change in educational contexts resulting from the uncertainty generated by the pandemic. The same authors referred to teachers as agents of change—key elements in this process. Mobilising content and resources for D@L and teachers competent to use and manage new ways and platforms of teaching was emphasised [25].

The analysis of 'D@L contributes to the professional development of teachers' revealed that most individuals (83.1 %) agreed with the statement, identifying a cross-checking with statistical significance at the academic degree context variable. Considering that the agreement trend was evident globally, notably, all individuals with the lowest academic degrees (first cycle of a two-stage bachelor's degree) considered that E@D had contributed to their professional development. The fact that they were 'obliged' to become involved in some updating—namely, in terms of knowledge, which previously was not imposed—may have represented an opportunity for professional development and, consequently, for constructing their professionality. Moreover, these findings may be related to the interpretations presented in the context of the analysis of the previous variable, as well as academic degree. A study by the United Nations [1] warned precisely that, in the pandemic context, teachers worldwide were sufficiently prepared to continue the teaching-learning process and adapt to new teaching methodologies. Further, these results refer to the questioning previously explained by Flores and Gago [24] regarding the role of teachers, understood as mere executors or reflective professionals who base their actions on research and reflection and are capable of intervening and responding to new challenges, such as the pandemic's effect in schools. The abrupt manner in which teachers were forced to facilitate this change process—with all the effort and strain implied—constituted an opportunity for a series of learning experiences that contributed to their professional development [2].

The variable 'D@L raises ethical and deontological questions regarding their teaching professionalism' had a greater discrepancy in

response trends (46.6 % disagreed and 53.4 % agreed). Although no statistically significant association was found, we emphasise that younger individuals (30–39 and 40–49) predominantly agreed that D@L raises ethical and deontological questions regarding their teaching professionalism. This observation can be interpreted considering the previous ones: Younger teachers considered that D@L implied challenges/transformations that forced them to rethink the practice and those who least agreed that D@L had allowed the affirmation and social recognition of the profession 'teacher'. Therefore, the age variable seems to have particular nuances when considering the issues of teaching professionalism. Concerning the teaching level variable, it should be highlighted that as one advances in the teaching level, a greater percentage of teachers defend that D@L raises ethical and deontological questions regarding their teaching professionalism. Possibly, this situation results from greater dispersion in subjects, with a consequent increase in the number of teachers teaching in the same class, contributing to greater difficulty in managing situations—specifically, those of an ethical and deontological nature.

7. Conclusions, implications, and future directions

As defended by the United Nations [1], the efforts undertaken in a short period to respond to the rapid changes resulting from the pandemic remind us that change is possible and that it must be understood as an opportunity to face the crisis of learning and provoking a set of solutions that are considered difficult or impossible to implement. In this sequence, and considering the study's results, we consider it an opportunity to (re)configure the teaching profession in the face of the transformations and challenges that forced teachers to rethink their praxis, translating into an incentive to their professional development and the construction of professionalism. This was based on action research and logical reflection on educational practice and, equally, on the way the professional manages to articulate the technical, scientific, communicational, and relational competencies, considering the different real contexts and the critical way in which professional performance is permanently re-elaborated and, therefore, build and continue (re)configuring their approach of being a teacher [5].

Ethical and deontological aspects are relevant in a profession marked by human relationships that require an exercise anchored in universal principles and values. D@L in times of social change (COVID-19) implied the profession's increase and complexity—for example, in educational relationships, methodologies, and student assessment, as well as in privacy and public exposure of the professional who could not confine the educational activity to the students, considering that families often viewed the class. This implied the possibility of various readings and interferences.

Therefore, education professionals lived through the pandemic, assuming their ethical and deontological commitments. Uniquely, they overcame obstacles, challenges, and emerging transformations with the same common intention of responding to the designs of the times in which they had to live in professional terms. Therefore, training processes (teacher professionalisation) 'need to include this ethical dimension, since education, as a relational process, becomes eminently ethical' [4, p. 13]. Furthermore, the affirmation of the profession and its professionalism resulted in the fact that they did not deny their students the right to education, taking the school outside its walls, aligned with the public trust conferred on them and the idea that technology can mediate the teaching process, but not enough to replace the teacher.

The team of researchers who conducted the study was aware of its limitations owing to the number of responses obtained and the geographical dimension of the study because it was confined to teachers working in school groups located only in the Portuguese NUTS previously identified (Bragança and Portalegre). Additionally, the fact that we selected to collect data online may have inhibited the participation of a greater number of teachers. However, Portuguese schools were in lockdown, and there was no other possibility to develop the study. However, these micro-level investigations are relevant for encouraging new studies, even if they do not address the totality of educational reality.

Considering these limitations, and because schools and teachers must be prepared to exercise their functions in contexts that are increasingly complex, unstable, unpredictable, and even vulnerable, conducting research studies that demonstrate the initial and continuous training of teachers and that encourage critical reflection on teachers' professional knowledge in its different components—including those that have emerged in the modern world, such as technological evolution—is important. However, other studies must focus on the teaching *versus* learning interface and seek to understand and discuss how D@L interferes with the pedagogical relations between students and teachers, and how the pedagogical processes influence students in their academic dimensions and personal and social training. In April 2020, the Portuguese government recognised the importance of digitally preparing Portuguese society and schools by creating a Digital Transition Action Plan [29]. However, the lessons learned from D@L during the pandemic can prepare for the future design and implementation of face-to-face, blended, or hybrid learning approaches; therefore, policymakers must design initial and ongoing digital literacy training options that empower teachers for the future.

It is important to emphasise that the scientific nature of an investigation depends on the richness of its sources. Therefore, the participants in this study constituted themselves as witnesses essential contributors to the construction of knowledge. Regarding the study's social impact, the authors believe that any social innovation/intervention can only be consistent when based on the knowledge that begins from its actors as (co)participants and alers of their weaknesses and potentialities. Furthermore, this research is relevant because it refers to the educational practices, making known the efforts made during this period of the pandemic, a fact that Portuguese society recognised and valued, favouring a positive public image of the profession.

In conclusion, we reiterate the importance of research on the teaching profession because it allowed us to realise that teaching has been marked, since the 20th century, by significant wear and tear, largely the result of the informational and technological world that appears as an alternative field to the teacher's role and place in education; however, it could reinvent itself and incorporate this digital world effectively in its praxis, even with the urgency and constraints caused by the COVID-19 pandemic and despite the progressive and accentuated ageing of Portuguese teachers [30].

Data availability statement

The datasets supporting the current study have not been deposited in a public repository because some data, at this moment, remains raw, and its analysis is ongoing, but are available from the corresponding author on request.

Ethical approval consent

This study was reviewed and approved by the Portuguese Ministry of Education (registration number 0739900001) and Ethics Committee of the Polytechnic Institute of Portalegre. All the participants provided informed consent to participate in the study. All participants provided informed consent for the publication of their anonymised case details.

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CRediT authorship contribution statement

Evangelina Bonifácio: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Luísa Carvalho:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Amélia Marchão:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Álvaro Ratero:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Fernando Rebola:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2023.e22069.

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