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Original article

Assessing students' learning: Replicating, adapting or transforming practices?

Avaliar a aprendizagem dos estudantes: Reproduzir, adaptar ou transformar práticas?

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Abstract

This paper focuses on teachers' assessment practices in remote teaching during the pandemic in Portugal. Data were collected through an online survey with 2,369 teachers from all sectors of education. Findings indicate both shifting and fixed attitudes towards assessment practices carried out in remote teaching when compared with face-to-face teaching. Prior experience with distance teaching and mastery of digital tools are key factors in accounting for differences between teachers who adopted a logic of adaptation or a logic of replication. While the findings reveal some positive changes, more needs to be done in regard to ensuring a more consistent transformation through, for instance, appropriate policies regarding teacher education and professional development.

Keywords: Assessment practices. Teachers. Remote teaching. Assessment methods. Pandemic.

Resumo

Este artigo centra-se nas práticas de avaliação dos professores no ensino a distância durante a pandemia em Portugal. Os dados foram recolhidos através de um inquérito online, que contou com a participação de 2.369 docentes de todos os níveis de ensino. Os resultados evidenciam tanto atitudes de mudança como de continuidade relativamente às práticas de avaliação adotadas no ensino a distância, em comparação com o ensino presencial. A experiência prévia com o ensino a distância e o domínio das ferramentas digitais revelam-se fatores determinantes para explicar as diferenças entre os professores que adotaram uma lógica de adaptação e os que seguiram uma lógica de replicação. Embora os dados revelem algumas mudanças positivas, sublinha-se a necessidade de um investimento mais consistente na transformação das práticas, nomeadamente através de políticas adequadas de formação inicial e contínua de professores.

Palavras-chave: Práticas de avaliação. Professores. Ensino a distância. Métodos de avaliação. Pandemia.

Introduction

Assessment is seen as a key element in teaching and learning in classrooms. Existing literature points to its relevance and direct connection to student learning and school outcomes (cf. Black & Wiliam, 1998, 2018; Wiliam, 2017). Both formative and summative assessment may potentially produce relevant inferences about students' learning (Black & Wiliam, 2018), for example through timely and appropriate feedback. Assessment for learning has been the focus of attention as it has been related to students' commitment to learning and assessment processes, promoting self-regulation and effective and timely feedback (Black & Wiliam, 1998, 2018; Ruiz-Primo & Brookhart, 2018; Hattie & Clarke, 2019). Yet, summative assessment combined with a certifying function is often prioritised in the educational setting (Black & Wiliam, 1998). Policies focusing on outcome-driven approaches to education tend to lead to

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more traditional approaches to teaching and assessment which are usually characterised by written tests and exams within a summative perspective. In such contexts, implementing formative assessment may be challenging due to the pressure to comply with internal and external orientations to meet given goals and to act according to a summative approach (Flores et al., 2017). In this regard, tensions and dilemmas in teachers' practices of teaching and assessment have been identified. These have been amplified with the Covid-19 pandemic, but the experience of remote teaching may also represent opportunities to rethink existing ways of operating.

Concerns about the quality of teaching, learning and assessment have gained prominence during the COVID-19 pandemic as it has exacerbated issues of inequality and exclusion due to problems associated with access to adequate equipment and connectivity (Flores et al., 2021a, 2021b, Harris & Jones, 2020; Zhang et al., 2020), with implications for assessment practices (Huber & Helm, 2020; Flores et al., 2021b). Schools around the world were closed and children and young people in various education sectors had to stay at home during total or partial lockdowns. In such a situation, teachers had to find ways to respond to the challenges of emergency remote teaching (Toquero, 2020; Bozkurt & Sharma, 2020). This involved the reconfiguration of both schools and teachers' work, specifically through the use of technology, management and adaptation of teaching and assessment practices, as well as interaction with students and their families (Flores et al., 2021b).

Problems in interacting with students and a reduction in their learning as well as issues related to teachers' digital skills have been identified (Huber & Helm, 2020; König et al., 2020). Other challenges are associated with limited access to technological means and lack of parental support, the introduction of new content to stimulate learning and assessment of learning (König et al., 2020) as well as the lack of interaction with students (van der Spoel et al., 2020). The main concerns related to access to education from the part of students and to finding ways to interact with them in an attempt that 'no student would be left behind'. Existing literature points to factors that explain the relative effectiveness of adaptation processes to remote teaching, such as training, networking and support on the part of school leadership (Azorín, 2020), balancing work and family life as well as issues of workload and stress (Flores et al., 2021a). Empirical studies have also shown that teachers intend to integrate more ICT into their teaching post COVID-19 (van der Spoel et al., 2020), reporting creative strategies for teaching online along with increased feedback and student autonomy (Bubb & Jones, 2020). In a study carried out in Québec, Barras (2020) found that teachers who clearly communicated learning outcomes to students and clearly defined both pedagogical activities and assessment methods felt less anxious and more confident.

Research by Rahim (2020) suggests a balance between summative and formative assessment in emergency remote teaching since teachers should provide students with useful feedback regarding their achievement of learning goals.

Existing literature identifies concerns regarding the extent to which technology might reduce student/teacher interaction in the assessment process, with implications for issues of equity and inclusion. Equity considerations should be addressed before decisions are taken to move examinations and summative assessment to online environments. When reopening schools, high-stakes examinations may need to be adjusted (Levin & Liberman, 2020). Gibbs & Simpson (2004) found that assessment, not teaching, is what influences students most in the entire learning process. Proficiency in educational assessment is "a core competency for all teachers" (Smaill, 2020, p. 522) and it is expected that, after the remote teaching experience, teachers develop a fairer and more equitable assessment system to enhance students´ learning and achievement. Sandvik et al. (2023) drawing on research conducted in Norway found that during the lockdown period students got little support from the teacher in their learning process and that they worked alone and felt insecure about assessment. Other research has shown that whilst some students report online learning and assessment to require more effort in comparison to traditional methods, other students value the increased flexibility afforded by online learning and assessment (Slack & Priestley, 2022).

Although some studies have examined teachers' remote learning experiences (van der Spoel, et al., 2020; Zhang et al., 2020; Sandvik et al., 2023; Slack & Priestley, 2022), remote

assessment is still an unexplored field, especially regarding assessment methods and procedures used and teachers' views of their assessment practices as well as students' responses.

This paper draws upon a wider piece of research aimed at examining teachers' perceptions and experiences of remote teaching, including their adaptation to the closure of their schools and their assessment practices. It aims to analyse the influence of remote teaching on teachers' assessment practices.

A brief overview of assessment in the Portuguese context

Assessment of student learning is regulated by the national legal framework which did not change during the schools' closure because of the COVID-19 pandemic, as well as legislative texts stipulating assessment for elementary school pupils (aged 6-15), for secondary school students (aged 16-18) and for vocational education. Overall, and notwithstanding differences between the various teaching sectors (elementary, secondary and vocational), assessment in Portuguese schools is based on the fact that formative assessment integrates teaching and learning, while summative assessment informs students and parents about progress through grades. Both use school-approved criteria aligned with national standards. Also, the assessment methods must be varied and appropriate and able to encourage students to self-regulate their learning.

In addition to these principles related to internal assessment of student learning conducted by schools, the Portuguese education system also involves an external assessment. In the case of elementary education, external assessment includes national tests and final national exams. The national tests occur in years 2, 5, and 8 and have no impact on pupils' final grades. In turn, national exams – in Mathematics and Portuguese only – take place at the end of elementary education in year 9, with effects on pupils' grades, these exams being mandatory for those who want to continue their studies in secondary education.

As for secondary education, external assessment includes national final exams, the results of which are used for the final grade of each subject. National exams contribute to the final grade (30%), which holds significant weight as admittance to higher education in Portugal relies solely on the grades achieved in secondary education for students pursuing scientific and humanities programmes.

Methods

Research questions

This paper aims to explore teachers' perceptions about their assessment practices during remote teaching. A survey was carried out including open and closed-ended questions. It was designed based on the legislative documents outlining the transition from face-to-face to distance learning in Portugal, as well as studies carried out in this field and theoretical references related to teaching and assessment (Flores, 2014; Flores et al., 2017). The assessment practices considered in closed-ended questions were: feedback provided to students, range of assessment methods, and student participation in self- or peer-assessment. The assessment methods included in the closed-ended questions were tests, multiple choice quizzes, worksheets, essays, portfolios, group work, project work, oral presentations, among others.

Additional questions were included to determine associations between each main question and previous experience in remote teaching, gender, age, teaching experience and teaching sector. Subsequently, the following research questions (RQ) were used to guide the present study:

RQ1. To what extent did teachers change their assessment practices in the context of remote teaching?

RQ1.1. Is there an association between changes in assessment practices and having previous experience in remote teaching?

RQ1.2. Are there any differences in changes in assessment practices according to gender and age?

RQ1.3. Are there any differences in changes in assessment practices with regard to teaching experience and teaching sector?

RQ2. What assessment methods were used in remote teaching?

RQ2.1. Is there an association between assessment methods and having previous experience in remote teaching?

RQ2.2. Are there any differences in assessment methods according to gender and age?

RQ2.3. Are there any differences in assessment methods with regard to teaching experience and teaching sector?

Participants

The sample consisted of 2,369 teachers from different teaching sectors (cf. Table 1). Most participants were female (76.2%) and aged over 50 years old. In addition, 22.7% of the participants were between 46 and 50 years old and only 0.6% were under 30 years of age. The participants are a group of experienced teachers, 46.1% having between 26 and 40 years of experience as teachers, 3.0% having over 40 years and only 2.9% having between 0 and 5 years of experience as teachers.

Table 1. Demographic characteristics of the participants.

	N	%
Gender		
Male	564	23.8
Female	1805	76.2
Age		
21-25	5	0.2
26-30	9	0.4
31-35	36	1.5
36-40	159	6.7
41-45	429	18.1
46-50	537	22.7
51-55	571	24.1
56-60	409	17.3
61-65	201	8.5
Over 65 years old	13	0.5
Experience as teachers		
0-5	68	2.9
6-10	104	4.4
11-15	147	6.2
16-20	290	12.2
21-25	597	25.2
26-30	468	19.8
31-35	412	17.4
36-40	211	8.9
Over 40 years old	72	3.0

In the Portuguese higher education system, "Licenciatura" corresponds to a first-cycle (Bachelor's level) degree under the Bologna Process. "Bacharelato" refers to a pre-Bologna short-cycle higher education qualification. "Postgraduate" refers only to non-degree awarding advanced training

Table 1. Continued...

	N	%
Academic qualifications		
Bachelor's Degree	36	1.5
Licenciatura Degree	1530	64.7
Post-Graduate degree	257	10.9
Master's Degree	488	20.7
PhD	53	2.2
Region in which the school is located		
Alentejo	100	4.2
Algarve	200	8.4
Centre	412	17.4
Lisbon and Tejo Valley	458	19.3
North	1120	47.3
Azores Autonomous Region	37	1.6
Madeira Autonomous Region	42	1.8
School type		
Urban	1358	57.3
Suburban	736	31.1
Rural	275	11.6

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Teachers who responded to the online questionnaire taught different subjects. Additionally, 64.7% hold a bachelor's (*Licenciatura*) degree; 20.7% hold a master's degree and 2.2% a PhD. The participants taught in all sectors of education (from preschool to secondary school). In the case of secondary school teachers, 12.4% returned to face-to-face teaching activities in May 2020 (teachers who taught year 11 and year 12 in final exam subjects).

The participants are from all regions of Portugal, including the Autonomous Regions of Madeira and the Azores. Almost half of teachers are from the North region (47.3%), mostly working in state schools (96.8%) in urban (57.3%) or suburban areas (31.1%).

Data collection procedures and ethical issues

A link to the survey was created through Googleforms and sent out to the teachers via the directors of the Schools' Association Training Centres with a request to forward it to associated teachers. Teachers from all sectors of education were invited. The questionnaire was administered between May 26 and June 12, 2020. A non-probability convenience sample was used.

The research project was carried out according to international educational research ethics standards, specifically in terms of data confidentiality, informed consent, voluntary participation, and the use of data only for research purposes. The project was approved by the Ethics Committee for Research in Social Sciences and Humanities at the University of Minho (CEICSH050/2020). Participants were informed about the goals of the project prior to giving their consent. The link to complete the questionnaire and the research protocol was sent to all participants all of whom confirmed their voluntary informed consent to participate in the study.

Data analysis

Data obtained from closed-ended questions were analysed with IBM SPSS Statistics v.24. Frequency analyses were used to investigate whether there have been changes in assessment

practices in remote teaching, compared to classroom teaching (RQ1), and what assessment methods were used in remote teaching (RQ2). To explore the association between having previous experience in remote teaching to changes in assessment practices (RQ1.1.), and assessment methods (RQ2.1.), the Spearman´s rho correlation coefficient was used. To test differences across groups (RQ1.2., RQ1.3., RQ2.2., and RQ2.3.) data were analysed with descriptive statistics, ANOVA and MANOVA methods. Multivariate effects were evaluated using Pillai´s Trace test, as this statistic is considered the most robust to violations of multivariate normality and homogeneity of variance–covariance matrices, particularly in the presence of unequal group sizes (Field, 2018). Effect sizes were reported using partial eta squared for multivariate analyses (Cohen, 1988). When significant multivariate effects were observed, follow-up univariate analyses were conducted. The Bonferroni-adjusted post hoc comparisons tests were used to explore differences among the groups with more than two categories (Tabachnick & Fidell, 2007).

Data collected through open-ended questions was analysed through content analysis according to two phases: an analysis of data gathered in each questionnaire followed by a comparative or horizontal analysis (cross-case analysis) (Miles & Huberman, 1994). In this phase, it was possible to look for similarities as well as differences. Qualitative data were analysed according to a thematic analysis. Key themes and sub-themes arising from the data were identified looking for the views of the participants. The categories were obtained through an iterative process which included separate coding, comparing results and reaching agreement. This process interacted with the data display and from which conclusions were drawn and verified in an interactive process with data display and data reduction (Miles & Huberman, 1994). For the purpose of content analysis, the definitions of more general categories were privileged (Bardin, 2009), articulating an inductive (emergent character of the data) (Cho & Lee, 2014) and a deductive perspective through the definition of categories in light of the research goals and theoretical framework (Ezzy, 2002). The categories of analysis were semantic (Miles & Huberman, 1994).

Results

Perceived changes in assessment practices in remote teaching

Compared to face-to-face teaching, changes in the frequency of feedback provided to students were as follows: decreased a lot (7.0%), decreased (19.8%), increased (26.6%) or increased a lot (14.6%). However, 32.1% of the participants reported no change in feedback frequency. More than one-third of teachers reported the range of assessment methods having increased or increased a lot (36.6% and 8.2%, respectively). In this regard, 25.3% reported a decrease in the range of assessment methods, 9.1% said it decreased a lot, and 20.7% reported no change. Teachers reported that students' participation in self- or peer-assessment decreased a lot (16.6%), decreased (39.7%), increased (10.3%) or increased a lot (1.1%). Nevertheless, 32.3% reported no change in students' participation in self- or peer-assessment.

Regarding previous remote teaching experience, most teachers reported having no experience or little experience (46.9% and 31.9%, respectively). Other teachers reported having some, quite a lot or a great amount of experience (6.8%, 10.5% and 3.9%, respectively). Findings show that having less experience in remote teaching was associated to frequency decrease in several assessment practices, specifically, in feedback frequency (r_s= .08, p < .001), range of assessment methods (r_s= .06, p = .004), and students' participation in self- or peer-assessment (r_s= .15, p < .001). Nevertheless, caution is required when interpreting these findings due to the very small coefficient values.

Table 2 presents descriptives for changes in assessment practices, namely in feedback provided to students, diversity of assessment methods and students' participation in self- or peer-assessment, by gender and age. For both male and female teachers, and across all group ages, the assessment practice showing the greatest increase was feedback provided to students. On the other hand, students' participation in self- or peer-assessment decreased in all groups.

Table 2. Means and Standard Deviations in Assessment Practices by Gender and Age.

		Assessment Practices					
		1. Feedback		**2. Diversity**		**3. Participation**	
		M	**SD**	**M**	**SD**	**M**	**SD**
Gender	Male	3.05	1.17	2.96	1.17	2.35	0.92
	Female	3.27	1.11	3.14	1.13	2.41	0.92
Age	<46	3.18	1.09	3.13	1.15	2.39	0.91
	46-55	3.27	1.15	3.16	1.13	2.43	0.92
	>55	3.17	1.14	2.95	1.14	2.34	0.92

Note. 1= Feedback provided to students; 2= Range of methods; 3= Students' participation in self- or peer-assessment. Likert scale options: 1= decreased a lot; 2= decreased; 3= no change; 4= increased; 5= increased a lot.

A two-way MANOVA was performed to explore differences in the changes to assessing students, depending on gender and age. Pillai´s Trace test results revealed significant differences in the changes to assessing students, by gender [Pillai's Trace=.008, $F(3,2361)=6.465$, $p<.001$, $\eta^2=.008$] and age [Pillai's Trace=.008, $F(6,4724)= 3.164$, $p= .004$, $\eta^2=.004$]. Additionally, there was a statistically significant interaction effect of gender and age [Pillai's Trace=.009, $F(6,4724)=3.593$, $p= .001$, $\eta^2=.005$]. Although significant, the effect sizes of these relationships were weak, as indicated by partial eta-squared values. Univariate between-subjects tests showed that gender was significantly related to feedback provided to students [$F(1)=17.013$; $p<.001$; $\eta^2= .007$] and range of methods [$F(1)=10.174$; $p<.001$; $\eta^2= .004$], but not to students' participation in self- or peer-assessment [$F(1)=0.738$; $p=.390$; $\eta^2= .000$]. These findings indicate a greater increase in feedback provided to students and in range of assessment methods in female teachers' responses when compared to their male counterparts ($M_{female}= 3.27$; $M_{male}= 3.05$; $M_{female}= 3.14$; $M_{male}= 2.96$, respectively). When age is considered, the univariate between-subjects tests showed a significant association between age and range of assessment methods [$F(2)=7.802$; $p<.001$; $\eta^2= .007$] but not in feedback provided to students [$F(2)=2.996$; $p=.052$; $\eta^2= .003$] nor in students' participation in self- or peer-assessment [$F(2)=2.530$; $p=.080$; $\eta^2= .002$]. Age post hoc comparisons reveal that the two younger groups showed a greater increase in range of assessment methods ($M_{<46}= 3.13$; $M_{46-55}= 3.16$) when compared to the older group ($M_{>55}= 2.95$).

The interaction effects of gender and age are displayed in Figures 1A-C. Male and older teachers were the only ones to show a decrease in feedback provided to students and in range of assessment methods (Figures 1A and 1B, respectively). Additionally, male and younger teachers showed the lowest decrease in students' participation in self- or peer-assessment (Figure 1C).

In the next analyses, only the 1,498 participants who taught exclusively in only one education sector were considered (i.e. secondary education, primary education, second cycle education, etc. as teachers in Portugal may teach in different teaching sectors[1]). Means and standard deviations for changes in assessment practices, by teaching experience and teaching sector are presented in Table 3.

A two-way MANOVA was performed to explore changes in assessment methods, depending on teaching experience and teaching sector. Pillai´s Trace test results revealed significant differences by teaching experience [Pillai's Trace=.011, $F(6,3342)=3.194$, $p=.004$, $\eta^2=.006$] and teaching sector [Pillai's Trace=.028, $F(9,5016)=5.280$, $p<.001$, $\eta^2=.009$]. No interaction effect between teaching experience and teaching sector was found [Pillai's Trace=.010, $F(18,5016)=0.964$, $p=.499$, $\eta^2=.003$]. Despite the statistical significance, the

[1] The Portuguese education system includes preschool, elementary school and secondary school. Elementary school comprises 3 cycles: first cycle (year 1 to year 4); second cycle (years 5 and 6), third cycle (year 7 to year 9). Secondary education lasts for three years (year 10 to 12).

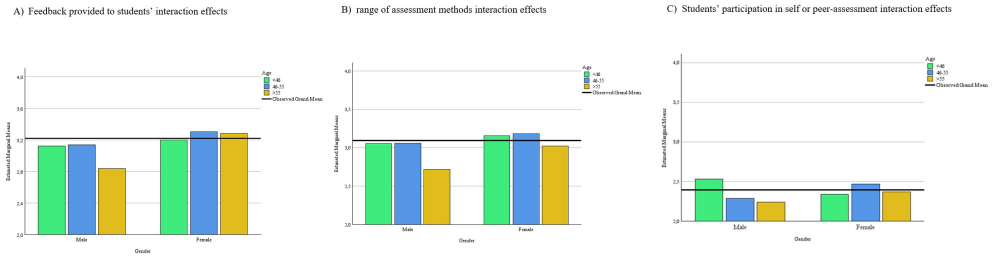

Figure 1. Interaction effects of gender and age.

Table 3. Means and Standard Deviations in Assessment Practices by Teaching Experience and Sector.

		Assessment Practices					
		1. Feedback		**2. Diversity**		**3. Participation**	
		M	***SD***	***M***	***SD***	***M***	***SD***
Teaching experience *(years)*	<26	3.12	1.05	3.02	1.11	2.41	0.88
	26-35	3.25	1.13	3.15	1.13	2.36	0.90
	>35	3.19	1.15	2.95	1.14	2.36	0.92
Teaching Sector	1st Cycle	2.95	1.11	2.89	1.14	2.28	0.89
	2nd Cycle	3.17	1.12	2.98	1.12	2.28	0.88
	3th Cycle	3.38	1.10	3.12	1.13	2.39	0.90
	Secondary	3.28	1.12	3.20	1.11	2.56	0.90

Note. 1= Feedback provided to students; 2= Range of methods; 3= Students' participation in self- or peer-assessment. Likert scale options: 1= decreased a lot; 2= decreased; 3= no change; 4= increased; 5= increased a lot.

low partial eta-squared values indicate that the effect size of the associations between variables is small. Univariate between-subjects tests showed that teaching experience was significantly related to range of methods [$F(2)=4.993$; $p=.007$; $\eta^2= .006$], but not to feedback provided to students nor to students' participation in self- or peer-assessment [$F(2)=0.598$; $p=.550$; $\eta^2= .001$; $F(2)=1.223$; $p=.294$; $\eta^2= .001$, respectively]. Results of post hoc comparisons suggest that teachers with 26 to 35 years of experience showed increased range of assessment methods while the most experienced teachers showed a decrease in range of assessment methods (>35 years of experience; $M_{26\text{-}35}=3.15$, $M>35=_{2.95}$). Additionally, univariate between-subjects tests revealed that teaching sector was significantly related to feedback provided to students, range of methods and students' participation in self- or peer-assessment [$F(3)=9.862$; $p <.001$; $\eta^2= .017$; $F(3)=6.390$; $p <.001$; $\eta^2= .011$; $F(3)=5.757$; $p=.001$; $\eta^2= .010$, respectively]. Teaching sector post hoc comparisons suggest a greater increase in feedback provided to students and range of assessment methods in 3rd cycle and secondary teachers when compared to their 1st cycle counterparts ($M_{3^{rd}\ cycle} = 3.38$; $M_{secondary} = 3.28$; $M_{1^{st}\ cycle} = 2.95$; $M_{3^{rd}\ cycle} = 3.12$; $M_{secondary} = 3.20$; $M_{1^{st}\ cycle} = 2.89$; respectively). Furthermore, secondary school teachers showed an increase in students' participation in self- or peer-assessment, compared with teachers teaching the 1st and 2nd cycles of elementary education ($M_{secondary} = 2.56$; $M_{1^{st}\ cycle} = 2.28$, $M_{2^{nd}\ cycle} = 2.28$).

Understanding the changes and challenges of remote assessment

One of the issues addressed in the open-ended questions was that of changes brought about by remote teaching. Qualitative data suggest changes in assessment purposes, clearly shown by the greater importance attached to formative assessment. Some teachers chose to articulate "*formative and summative assessment methods*" (Q481). In some of the reported cases, formative assessment "*performed a very important role*" (Q1776) to the detriment of summative assessment:

> *Decline of summative assessment; more individualised student monitoring; the use of more diversified tools* (Q2150).

Teachers' accounts point to a greater diversity of assessment methods and moments, often with the aid of available digital resources and self-correction tools "*giving students even more autonomy*" (Q1462):

> *Adjustment of the range of materials produced in accordance with the development of students' autonomous work; research, selection and adaptation to new digital tools; search for and adjustment to different assessment tools; weekly reorganisation* (Q823).

Other teachers expressed concerns about students' workload, changing the type of activity proposed to overcome difficulties in assessing all students:

> *The concern of not overloading students with work, using group work* (research, readings and feedback)*, with a script or autonomously, accompanied by rubrics, during 2/3 weeks, essentially formative assessment* (Q814).

Other teachers also highlighted a greater "interactivity with the students" and a more regular "use of feedback" (Q3), individualised and ongoing assessment, using different strategies and taking advantage of digital resources such as platforms or emails:

> *I correct students' work every day and I give feedback to incorrect answers. I respond via email or platforms, several times a day. I choose different activities on different platforms to make it easier to explain the contents, I spent many hours doing online questionnaires...* (Q1420).

Teachers also identified several problems, especially in terms of feedback. Opinions regarding the success of feedback are divided between range of practices and qualitative changes in feedback practices as well as difficulties in the feedback provided to and obtained from students, particularly those who experienced more difficulties:

> *Among many other aspects that are no longer possible (e.g. immediate positive feedback and reinforcement, students' motivation to commit to tasks), individual support for students with more difficulties is not possible in this type of teaching. These students need face-to-face teaching.* (Q915).

Some teachers highlighted the difficulties, and the reduction in feedback provided to students, due to the nature of the activities developed, the impossibility of providing more individualised and timely feedback or the absence of face-to-face interaction with students:

> *Difficulty in following the students' performance with appropriate feedback* (Q2337).

Furthermore, difficulties in obtaining feedback from students were identified. These are related to constraints associated with the online environment, the teaching sector and the age of the students. Additionally, teachers also mention the fact that the students kept their webcams turned off during online classes.

> *I cannot get feedback from students regarding their understanding of the lesson contents. Also, it bothers me that the students always have their cameras turned off during classes* (Q1468).

In addition to issues of feedback, other concerns emerged, such as the excessive attention given to summative assessment, the weaknesses and limitations of the methods used to assess learning and their reliability:

> *Excessive concern with summative assessment* (Q483).

Moreover, teachers also identified difficulties in correcting all work carried out by the students, in diagnosing their difficulties and in getting in touch with some of the students, due to the scarcity of resources:

> *I cannot assess students' knowledge due to difficulties in communication (scarcity of resources on the part of some students)* (Q1228).

Finally, concerns were identified regarding authorship of assessment tasks, with an emphasis on students' autonomy:

> *I'm not comfortable assessing students because I'm not sure about who performed the assessment tasks* (Q1109).

Assessment methods used in remote teaching

The most used assessment method in the context of remote teaching was worksheets, followed by multiple-choice quizzes (Table 4; 72.5% and 51.5% reported using them regularly, very frequently or always, respectively). Conversely, tests and group work were the least used assessment methods (90.2% and 84.4% reported never or sometimes, respectively).

These results are in line with the responses from the open-ended questions in the questionnaire. Participants highlighted the use of new methods, and the suppression of others used normally in classroom teaching. Teachers emphasised using observation of activities, worksheets, simulations, short answer tests, multiple-choice tests, quizzes, group work, or rubrics:

Table 4. Assessment methods used in remote teaching (%).

	Never	Sometimes	Regularly	Very frequently	Always
Tests	58.0	32.2	7.1	2.2	0.5
Multiple-choice quizzes	17.9	30.9	21.9	24.1	5.1
Essays	43.6	29.5	15.2	10.2	1.5
Worksheets	8.1	18.4	25.1	35.2	13.2
Portfolios	60.6	18.6	8.6	7.3	4.8
Group work	53.7	30.7	8.1	6.4	1.1
Project work	47.5	28.5	9.6	10.1	4.3
Oral presentations	22.2	29.5	20.9	19.4	7.9
Other	63.4	12.7	10.0	7.5	6.4

> *More systematic application of tools for formative assessment* (Q1912).

Results of the Spearman correlation indicated that there was a significant positive association between experience in remote teaching and frequency in using several assessment methods. The greater the experience in remote teaching, the higher the frequency in using the following assessment methods: tests (r_s = -.11, p < .001), multiple choice quizzes (r_s = .04, p = .043), essays (r_s = .04, p = .042), portfolios (r_s = .13, p < .001), group work (r_s = .13, p < .001), project work (r_s = .15, p < .001) and oral presentations (r_s = .05, p = .008). There was no association between remote teaching experience, the use of worksheets and the use of other assessment methods (r_s = -.01, p = .644, and r_s = .00, p = .88, respectively). Nevertheless, the correlation coefficients values vary from .04 to .15 which indicates weak associations.

Descriptives for assessment methods by gender and age are presented in Table 5 and Table 6, respectively. For both male and female teachers, and in all group ages, worksheets were the most frequently used assessment method. Meanwhile, tests were the least used method.

A two-way MANOVA was performed to explore associations between assessment methods, gender and age. Pillai´s Trace test results revealed that there are significant differences in the assessment methods, depending on gender [Pillai's Trace=.032, F(9,2355)=8.554, p<.001, η^2=.032] and age [Pillai's Trace=.019,

Table 5. Means and Standard Deviations in Assessment Methods by Gender.

	Male		Female	
	M	***SD***	***M***	***SD***
Tests	1.66	0.84	1.51	0.73
Multiple-choice quizzes	2.68	1.21	2.67	1.16
Essays	1.77	1.02	2.03	1.07
Worksheets	3.14	1.24	3.31	1.11
Portfolios	1.69	1.05	1.80	1.20
Group work	1.76	0.99	1.69	0.93
Project work	2.01	1.24	1.93	1.14
Oral presentations	2.39	1.26	2.68	1.23
Other	1.80	1.27	1.81	1.25

Note. Likert scale options: 1= Never; 2= Sometimes; 3= Regularly; 4= Very frequently; 5= Always.

Table 6. Means and Standard Deviations in Assessment Methods by Age.

	Age					
	<46 years old		**46-55 years old**		**>55 years old**	
	M	***SD***	***M***	***SD***	***M***	***SD***
Tests	1.54	0.77	1.54	0.73	1.57	0.79
Multiple-choice quizzes	2.65	1.17	2.76	1.17	2.56	1.17
Essays	1.91	1.07	1.99	1.07	1.97	1.05
Worksheets	3.22	1.22	3.25	1.14	3.37	1.08
Portfolios	1.76	1.19	1.75	1.14	1.82	1.19
Group work	1.61	0.90	1.72	0.92	1.78	1.02
Project work	1.95	1.19	1.93	1.15	1.98	1.17
Oral presentations	2.62	1.29	2.63	1.22	2.57	1.23
Other	1.79	1.26	1.83	1.27	1.78	1.22

Note. Likert scale options: 1= Never; 2= Sometimes; 3= Regularly; 4= Very frequently; 5= Always.

$F(18,4712)=2.548$, $p<.001$, $\eta^2=.010$]. The interaction of the two independent variables has no statistically significant effect [Pillai's Trace=.006, $F(18,4712)=0.849$, $p=.642$, $\eta^2=.003$]. Subsequently, a univariate ANOVA for each of the dependent variable was conducted and followed by post-hoc tests.

Univariate between-subjects tests showed that gender was significantly related to the following assessment methods: tests, essays, worksheets and oral presentations [$F(1)=16.264$; $p<.001$; $\eta^2= .007$; $F(1)=24.174$; $p<.001$; $\eta^2= .010$; $F(1)=7.829$; $p=.005$; $\eta^2= .003$; $F(1)=23.049$; $p<.001$; $\eta^2= .010$, respectively], but not to any other methods. These findings indicate that female teachers used tests less often than their male counterparts ($M_{female}= 1.51$; $M_{male}= 1.66$). However, essays, worksheets, and oral presentations were most frequently used by female teachers ($M_{female}= 2.03$; $M_{male}= 1.77$; $M_{female}= 3.31$; $M_{male}= 3.14$; $M_{female}= 2.68$; $M_{male}= 2.39$, respectively).

Multiple-choice quizzes were the only assessment method showing a significant association with age [$F(2)=5. 333$; $p=.005$; $\eta^2= .004$]. Age post-hoc comparisons revealed that the older group used multiple-choice quizzes less frequently than the 46-55 age group ($M_{46-55}= 2.76$; $M_{>55}= 2.56$).

all teachers reported that worksheets were the most frequently used assessment method. Tests were the least used method in all groups.

A two-way MANOVA was performed to explore assessment methods, according to teaching experience and teaching sector. Pillai´s Trace test results revealed significant differences by teaching experience [Pillai's Trace=.019, F(18,3330)=1.781, p=.022, η^2=.010] and teaching sector [Pillai's Trace=.241, F(27,4998)=16.158, p<.001, η^2=.080]. No interaction effect between teaching experience and teaching sector was found [Pillai's Trace=.037, F(54,10014)=1.144, p=.218, η^2=.006].

Table 7. Means and Standard Deviations in Assessment Methods by Teaching Experience.

	Teaching experience (years)					
	<26		26-35		>35	
	M	*SD*	*M*	*SD*	*M*	*SD*
Tests	1.53	0.76	1.52	0.73	1.57	0.78
Multiple-choice quizzes	2.52	1.08	2.74	1.15	2.63	1.16
Essays	2.07	1.09	1.99	1.07	2.08	1.08
Worksheets	3.20	1.16	3.30	1.12	3.42	1.07
Portfolios	1.79	1.19	1.77	1.17	1.84	1.17
Group work	1.59	0.88	1.67	0.91	1.77	1.02
Project work	1.95	1.16	1.94	1.17	1.91	1.11
Oral presentations	2.73	1.32	2.63	1.22	2.62	1.22
Other	1.86	1.29	1.83	1.28	1.71	1.17

Note. Likert scale options: 1= Never; 2= Sometimes; 3= Regularly; 4= Very frequently; 5= Always.

Table 8. Means and Standard Deviations in Assessment Methods by Teaching Sector.

	Teaching Sector							
	1srt Cycle		2nd Cycle		3th Cycle		Secondary	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Tests	1.53	0.72	1.50	0.68	1.51	0.73	1.62	0.84
Multiple-choice quizzes	2.45	1.06	2.77	1.10	2.88	1.16	2.54	1.19
Essays	2.47	1.02	1.87	1.06	1.83	1.01	1.94	1.10
Worksheets	3.57	0.93	3.12	1.14	3.24	1.15	3.29	1.19
Portfolios	2.13	1.32	1.63	1.03	1.69	1.14	1.69	1.08
Group work	1.40	0.68	1.45	0.77	1.69	0.92	2.12	1.13
Project work	1.90	1.01	1.83	1.09	1.80	1.09	2.17	1.33
Oral presentations	2.96	1.24	2.42	1.20	2.48	1.21	2.68	1.25
Other	1.86	1.28	1.67	1.14	1.79	1.25	1.82	1.28

Note. Likert scale options: 1= Never; 2= Sometimes; 3= Regularly; 4= Very frequently; 5= Always.

For the next analyses, we only included the 1,498 participants who taught exclusively in one teaching sector. Means and standard deviations for assessment methods by teaching experience and teaching sector are presented in Tables 7 and 8, respectively. Regardless of their teaching experience and sector,

Univariate between-subjects tests showed that teaching experience was significantly related only to worksheets [$F(2)=5.720$; $p=.003$; $\eta^2= .007$], but not to any other method. Results of post-hoc comparisons suggest that the least experienced teachers used worksheets less frequently than the most experienced group ($M_{<26}= 3.20$; $M_{>35}=3.42$). The assessment methods that showed a significant association with teaching sector were multiple-choice quizzes, essays, worksheets, portfolios, group work, project work and oral presentations [$F(3)=11.847$; $p<.001$; $\eta^2= .021$; $F(3)=34.070$; $p<.001$; $\eta^2= .058$; $F(3)=12.609$; $p<.001$; $\eta^2= .022$; $F(3)=16.630$; $p<.001$; $\eta^2= .029$; $F(3)=52.076$; ; $p<.001$; $\eta^2= .085$; $F(3)=8.986$; $p<.001$; $\eta^2= .016$; $F(3)=15.470$; $p<.001$; $\eta^2= .027$, respectively]. Post-hoc comparisons revealed that 1st cycle and secondary school teachers used multiple-choice quizzes less frequently than those teaching 2nd and 3rd cycles ($M_{1^{st}\ cycle} = 2.45$, $M_{secondary} = 2.54 < M_{2^{nd}\ cycle} = 2.77$, $M_{3^{rd}\ cycle} = 2.88$). First cycle teachers used the following assessment methods more frequently than the other groups: essays ($M_{1^{st}\ cycle} = 2.47 > M_{2^{nd}\ cycle} = 1.87, M_{3^{rd}\ cycle} = 1.83, M_{secondary} = 1.94$), worksheets ($M_{1^{st}\ cycle} = 3.57 > M_{2^{nd}\ cycle} = 3.12$, $M_{3^{rd}\ cycle} = 3.24, M_{secondary} = 3.29$), portfolios ($M_{1^{st}\ cycle} = 2.13 > M_{2^{nd}\ cycle} = 1.63, M_{3^{rd}\ cycle} = 1.69, M_{secondary} = 1.69$) and oral presentations ($M_{1^{st}\ cycle} = 2.96 > M_{secondary} = 2.68 > M_{2^{nd}\ cycle} = 2.42, M_{3^{rd}\ cycle} = 2.48$). Additionally, when compared only to 2nd and 3rd cycles, secondary teachers used oral presentations more frequently. Group work was most used by secondary school teachers and in comparison, with only 1st and 2nd cycles, 3rd cycle teachers used group work more frequently ($M_{secondary} = 2.12 > M_{3^{rd}\ cycle} = 1.69 > M_{1^{st}\ cycle} = 1.45, M_{2^{nd}\ cycle} = 1.40$). The use of project work was most frequent among secondary school teachers when compared to the other groups ($M_{secondary} = 2.17 >, M_{1^{st}\ cycle} = 1.90, M_{2^{nd}\ cycle} = 1.83, M_{3^{rd}\ cycle} = 1.80$).

Discussion

This study set out to examine teachers' perceived changes in their assessment practices in remote teaching. Such changes were explored in comparison with classroom teaching prior to the pandemic including issues of methods, approaches and use of feedback. In a nutshell, the most important changes in assessment practices in remote teaching were an increase of feedback frequency and greater importance attached to formative assessment, but, at the same time, a decrease of student's participation.

Regarding changes in assessment practices in remote teaching findings suggest that the shift from face-to-face to remote teaching in Portugal, as an emergency response to the closure of schools, was marked by two different logics: a logic of replication and a logic of adaptation. The former suggests that teachers tried to replicate their face-to-face teaching in online environments, without any kind of change or with little change in their practices. The latter, meanwhile, means that, to a lesser or greater extent, teachers changed their assessment resources, practices and strategies as a result of using digital tools and online environments in their teaching.

This study indicates that both logics are equally prevalent, and, to a certain extent, this explains the paradoxical nature of the findings, which simultaneously show elements of both change and permanence in assessment practices in remote teaching. In addition, remote teaching accentuated the gap between more traditional practices centred on teaching, written tests and grades, the so-called 'assessment of learning', and more innovative ones, oriented towards students' learning and support, i.e., 'assessment for learning' (Black & Wiliam, 1998, 2018; Ruiz-Primo & Brookhart, 2018; Hattie & Clarke, 2019). As such, elements of a more transformational approach may be discussed, one which includes not only changes in terms of tools and methods of assessment but also the focus and purpose of assessment as well as the role of the teachers and of the students in the assessment process.

The transition to remote teaching occurred as an emergency response to an unexpected situation (Toquero, 2020; Bozkurt & Sharma, 2020), in most cases without any kind of preparation and without institutional support. This shift has revealed a number of predictors regarding capacity for change, resilience and management of uncertainty on the part of teachers with implications for teacher education – both initial and in-service – and professional development. Although several factors need to be considered, the key element in determining whether teachers followed a logic of replication or adaptation related to prior experience in distance teaching. This is associated with informal and self-training practices but also to more formal and intentional practices particularly in contexts of in-service education and professional development.

In other words, teachers who adopted a logic of replication had little to no experience of distance teaching and/or in the use of digital tools. Conversely, teachers who adopted a logic of adaptation have prior experience of distance teaching and in the use of digital tools. Whilst the former tended to have reduced their feedback practices and their use of a range of assessment methods including peer assessment, the latter, on the other hand, tended to have increased their use of a range of assessment methods, as well as their use of feedback and peer assessment. This lends support to earlier empirical studies which have identified the mastery of digital competencies and access to training in ICT as key factors explaining different adaptation processes to remote teaching on the part of teachers (Huber & Helm, 2020; König et al., 2020; van der Spoel et al., 2020; Flores et al., 2021b).

The adoption of a logic of replication or a logic of adaptation is also associated with the teaching sector in which teachers worked. While teachers involved in the third cycle of elementary education (students aged 13-15) and in secondary schools (students aged 16-18) promote feedback, use a range of assessment methods and foster students' participation in self and peer assessment, teachers teaching in the first cycle (primary school) and second cycle of education (students aged 11-12) show much less use of such practices. This may be explained to some extent by the characteristics of these teaching sectors (younger student population) and by the existence of different cultures and practices of digitalisation occurring at a different pace in the Portuguese education system.

Such findings may also be examined considering the existing policies in in-service education and professional development and their effectiveness in terms of the digital proficiency of Portuguese teachers and the availability of technological resources for schools and teachers.

Regarding age and years of experience, older teachers showed the lowest increase in range of assessment methods and in feedback practices. This may be associated with beliefs about teaching and assessment as well as different digitalisation cultures and practices. Challenges associated with teachers' digital skills have also been reported in previous studies (e.g. Huber & Helm, 2020; König et al., 2020; Azorín, 2020). Although feedback practices and self and peer assessment do not vary as a function of age or years of experience, the findings do show, however, that the influence of age and years of teaching experience impacts on the range of assessment methods. Older teachers and those with more years of experience tend not to use a wide range of assessment methods in contrast to their younger and less experienced counterparts. In fact, the range of assessment methods and tools is dependent upon the digital proficiency of teachers, as they need to be designed, implemented and returned to students exclusively online. Developing appropriate digital competencies and providing teachers with adequate training for distance teaching emerged as key aspects of this study which corroborates previous research (Huber & Helm, 2020; König et al., 2020) suggesting that teachers who develop their digital literacy have the intention of integrating technology in their teaching once teaching returns to normal (van der Spoel et al., 2020).

As far as the most used assessment methods in remote teaching are concerned, findings suggest that the shift from face-to-face to remote teaching has impacted on assessment, leading to an inversion of practices employed in the context of classroom teaching. The participants highlighted the use of new methods, and the suppression of others normally used in the classroom context. Worksheets and multiple-choice quizzes were identified as the most used methods to the detriment of tests and group work, which were the least used methods. The decrease in group work may be explained by the limited availability of tools for remote teaching and by difficulties in developing online devices to support peer work. However, in the case of written tests, other reasons can be identified in teachers' responses. The fact that teachers use much fewer written tests in remote teaching stems not only from a deliberate option towards a more formative assessment based on a range of methods, but also from difficulties related to teachers' digital proficiency and the need to avoid problems of "online cheating". Adequate and reliable assessment has been identified as a key concern of teachers in remote teaching (Flores et al., 2021b).

Findings from this study also point to an increase in formative assessment practices, with teachers' accounts essentially revealing more formative assessment, and less summative assessment. Teachers reported changes in their assessment purposes by highlighting the importance of formative assessment, allowing for a greater balance between summative and formative assessment (Rahim, 2020) for example, through

the implementation of feedback practices and mobilising digital-ready formative assessment strategies. In this regard, it is important to question whether the logic of adaptation that characterises assessment practices in remote teaching is merely a reactive response to this mode of teaching or whether, on the contrary, it entails a substantial transformation considering "assessment for learning". In other words, it remains to be seen whether the changes identified in the data (more feedback, diversified assessment methods, more student participation), which are aligned with existing literature and the legislative texts in the Portuguese context, encompass a substantive change within a logic of transformation or, on the other hand, merely correspond to a contingent and temporary adaptation as a result of the limitations imposed by the conditions for remote teaching. Such a discussion is relevant in the international context. Supported by the findings reported in this paper, it is important to explore whether teachers' experience during remote teaching is likely to be a catalyst for transforming their approaches and practices of assessment beyond the pandemic. Issues of diversity, differentiation, purpose and the role of the stakeholders need to be considered.

The scope of this study does not allow such questions to be answered, regarding the consistency and depth of the changes in assessment practices. Nevertheless, it is possible to identify trends that point to a process of change that needs to be reinforced and consolidated to prevent the positive aspects of remote assessment being lost and replaced by crystallised assessment practices that characterise overall assessment practices in Portuguese schools. While the findings reveal some positive changes, some of which are even quite surprising, as in the case of written tests, more needs to be done in regard to ensuring a more consistent transformation through, for instance, appropriate policies regarding teacher education and professional development.

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Conflict of interest

None

Use declaration of AI and/or AI-assisted technologies

The authors declare that they did not use artificial intelligence tools or any other AI-assisted technologies in the preparation of this manuscript. All stages of the research, analysis, writing, and revision processes were carried out exclusively by the authors, without the use of automated text generation systems, AI-assisted writing tools, or any form of AI-supported content processing.

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