

Article

Portuguese Teachers' Conceptions of the Use of Microsoft 365 during the COVID-19 Pandemic

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Abstract: In 2020, education found itself involved in a whirlwind of metamorphosis, of transformations that required responses to the emergencies dictated by the pandemic. In Portugal, many schools opted for Microsoft 365 as the platform of choice for providing adequate resources for teaching and learning processes, while also ensuring remote teaching in an integrated and inclusive way. In this context, we carried out an investigation with the objectives of knowing the opinion of teachers about the use of Microsoft 365 in their classes and identify their degree of satisfaction with its use. The methodology adopted had a descriptive and exploratory nature, following a mixed paradigm. A total of 101 primary and secondary school teachers from schools in Northern Portugal participated in the study. A questionnaire and an interview were used as data collection instruments. The results showed that the most respondents revealed a high level of satisfaction with the use of Microsoft 365, and that its use was accompanied by the employment of active methodologies. Moreover, despite the lack of initial or ongoing training of teachers in the use of this technology and the students' lack of digital competence, Microsoft 365 proved to be an adequate response to the confinement and ensured students' learning in a safe environment.

Keywords: Microsoft 365; digital platforms; distance learning; active methodologies; good practices



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1. Introduction

In the same way that work contexts have shifted—seeing an increase in teleworking and the use of devices to support remote working—in the last two years, distance learning has proven to be a practical, cheaper, and pedagogically viable option for students and teachers from all corners of the world. The pandemic situation experienced demanded profound changes in education. All citizens felt a deep need to adjust behavior, practices and, in the educational universe, we were invited to reinvent ourselves. Teachers felt the imperative need to change their practices and adapt their way of teaching. In this sense, to promote the development of teachers' digital skills, necessary for the effective use of digital technologies, and to respond to the demands of an increasingly digital society, the Directorate General for Education (DGE) developed the Digital Teacher Training Plan, which is still in progress. In this framework of digital transformation of schools, digital platforms gradually achieve a more evident centrality. In fact, it is no longer possible to delay the curricular integration of technologies into teaching practices, to stop exploring them as allies in the demanding task of increasing students' motivation, arousing in them the desire to search for and build knowledge. Thus, the teacher will have the difficult mission of adapting methodologies that lead an effective learning, promoting the use of active methodologies, and the curricular integration of digital technologies. For this to happen, the teacher will have to maintain availability to receive and train

themselves to learn and continue the path of constant updating. However, the principal objective of teacher training for educational use cannot be limited to the instrumental domain of technological resources. It is imperative to identify needs, to understand the potential of each device, and to develop skills for their use even before their application for educational purposes [1]. Every day, teachers have many teaching platforms at their disposal and use them to better organize students' learning activities, fostering a classroom climate more conducive to knowledge construction and teacher collaboration [2,3]. Digital educational learning platforms are programs that bring together an extensive group of tools that facilitate the activities of teachers and students and are intended to support distance learning [4]. They allow organizing communication processes, interaction between teachers and students, transmitting content, providing activities, or even assessing students' learning. At the same time, by using synchronous and asynchronous communication tools, the platforms facilitate the constitution of virtual learning communities, exploring themes of common interest, carrying out joint activities [5].

Microsoft 365, along with other platforms, gained extraordinary importance and attention from education systems—especially with the pandemic that invaded the world. As a result of the difficulties caused by COVID-19, Microsoft 365 became one of the most chosen supports by Portuguese schools, as it continued to provide tools agile and powerful enough to promote learning, collaboration, and communication. At the same time, it continued to provide a safe and trusted environment for teachers and students to work. However, we must ask: are teachers happy with the uptake of this platform? What kind of use is being made of Microsoft 365 by teachers? Which methodologies are most used with Microsoft 365 by teachers? Our study will seek to answer these questions.

Certainly, technology will continue to gain the recognition of all and will prevail in teaching and teachers will continue the arduous task of integrating it, overcoming the more rigid dimensions of the traditional school. More technology, more practical teaching and assessment methods, and more autonomous and creative students are some of the trends that schools can hardly escape.

2. Microsoft 365 and Education in Times of Pandemic

The presence of Digital Information and Communication Technologies in citizens' daily lives has contributed to their more systematic and critical integration by teachers in educational institutions. In this sense, it is agreed that the use of digital technologies of information and communication can play a relevant role in educational processes, providing new supports and diversified strategies for teaching and learning content established in curricula [6–8]. In the last two years, because of the difficulties of the pandemic context, learning platforms have gained an extraordinary visibility and constitute an essential—even unquestionable—means in the promotion of teaching and learning. The fact that they are hosted on the web makes it easier for teachers and students to access content or software, regardless of space and time, reinforcing their ubiquitous nature. It thus seems unquestionable that the inclusion of platforms in education has become an irrefutable fact. Moreover, the adoption of a learning platform lends greater dynamism to teaching by making it possible to combine different formats in the same space. Currently, the platforms provide a considerable number of resources and tools that can include video, animations, access and participation in forums, chat, tests, assessments, and that enrich the students' experience [5]. It is important to note that these are not only used in the school context, within what is established as the academic period, but also as a central place for complementary learning outside of this context and school time [9]. Learning platforms, especially in the framework of formal education, present more and more possibilities for pedagogical exploration that cannot be ignored, with emphasis on communication, collaboration, inclusion, and innovation processes. Microsoft 365 imposes itself today as a space for pedagogical innovation, where collaborative and inclusive learning takes place. Aware of the pedagogical potential that this platform has, and drawing upon the lessons of the last two years, it has become increasingly urgent that teachers have specific training to

explore the possibilities at its disposal, always inviting students to participate actively in building their learning. The fact that they were born, grew up, and continue to be involved in a digital environment—increasingly global and technological—reinforces a growing confidence in these devices as being suitable for learning. To that extent, they challenge teachers—with each new activity proposal—to investigate its potentialities, to explore the possibilities of students' involvement, interaction, and participation in learning that they provide [10]. This facility with which students deal with technological devices does not correspond—as Cabero-Almenara [11] (p. 3), and Cabero-Almenara and Valencia-Ortiz [12] (p. 224) argue—to the effective existence of digital competencies on their part. In fact, in these authors' studies the students revealed difficulties in adapting to the virtual teaching context, which shows that students lack digital literacy. Wang et al. [13], against the widespread idea that there is some idea of the difference in digital skills between teachers and students, argue that there is no evidence that teachers have less digital competence than students.

Microsoft 365 covers a huge variety of applications, features, and possibilities, so it was and is a powerful ally in distance learning that imposes itself as an extraordinary solution for a learning experience in hybrid contexts, accessible through mobile communications, cell phone, tablet, or computer [14]. Over the past few years, the possibilities of distance learning have been an increasingly present reality in the education system of all countries in the world due to the possibilities of digital platforms, made visible by teachers' practices. These involve different types of tools which guarantee the most suitable conditions for distance learning to take place [4]. Building virtual learning environments supported by Digital Information and Communication Technologies is one of the priority functions of the platforms, in which teachers can carefully manage the contents to be taught, organize communication processes, and carry out tutorial monitoring of students [15]. Exploring the various aspects that the platforms offer, we find that they can be used to transmit content and propose activities, monitor student work, solve doubts by providing appropriate feedback, create spaces for interactive communication, and promote the assessment of student progress. Furthermore, it should not be forgotten that they are also useful for creating discussion and workspaces for research groups or even for implementing virtual communities and wider learning networks that are so relevant at all levels of education [16,17]. The use of the platform reinforced the need for the use of active methodologies to support learning activities and teaching strategies that would better respond to the integration of digital technologies in teachers' practice. The flipped classroom [18], project pedagogy [19], project-based learning, gamification [20–22], and STEAM [23–25], are—among other active methodologies—the ones that received most attention from the teachers we interviewed about the use of Microsoft 365. Thus, we wanted to know the opinion of teachers from some northern Portuguese schools on the use of this platform in their teaching practice. The digital skills they show, the changes in practices resulting from the use of Microsoft 365, the transformation of their conception of teaching, the modification of methodological options and the more systematic use of active methodologies were some of the dimensions that the survey by questionnaire and the survey by interview aimed to explain.

This paper aims to analyze the ways in which Microsoft 365 has been used during the last two years with regard to pedagogical dimensions and the organization of teaching and learning processes.

3. Methods

3.1. Methodological Options

In order to analyze the way of Microsoft 365 has been used during the last two years, with regard to pedagogical dimensions and the organization of teaching and learning processes, we conducted one study with Portuguese teachers. The methodology selected to carry out the study is based on a mixed paradigm [26–28], combining both quantitative and qualitative dimensions. They are used and articulated data collection instruments adjusted

to the selected paradigm and methodology, as is the case of the survey by questionnaire and the survey by interview.

In this context, we formulated the following research objectives:

1. To understand how the schools in the northern interior of Portugal that chose Microsoft 365 made use of it;
2. To appreciate the level of teacher satisfaction with the use of Microsoft 365;
3. To understand teachers' perceptions about the advantages or disadvantages of using the platform to organize the teaching and learning processes;
4. To understand teachers' perceptions about the advantages and disadvantages of using the platform to improve results and practice;
5. To analyze if the use of Microsoft 365 has been accompanied by the use of active methodologies;
6. To analyze if the use of Microsoft 365 has facilitated the teachers' actions;
7. To identify the type of training needs experienced by schools and teachers in using Microsoft 365 over the past two years.

3.2. Participants

As for the research context, we chose schools in the northern interior of Portugal. In total, 101 teachers from all study cycles of the Portuguese education system participated in this study, 69 of whom were female and 32 males. Regarding the age of the participants in the study, we have: 34.7% of the teachers between 41 and 50 years of age; 17.8% from 31 to 40 years of age; and 26.7% in the 51 to 60 age bracket. At the extremes, we note that only 3% are under 30 years of age and 17.8% are over 60. If we consider between the age of 41 and retirement age (67 years) we find that almost 80% of the teachers who participated in the study are in this range.

The Portuguese education system consists of four study cycles:

- Basic education: first cycle, from first to fourth year (ages 6 to 10); second cycle, from fifth to sixth year (ages 11 to 12); third cycle, from seventh to ninth year (ages 13 to 15).
- Secondary education consists of three years: 10th, 11th, and 12th years (ages 16 to 18).

It should be noted that 63.3% of the participants in the research belong to the female gender and, in terms of age, most of them are over 40 years old. Teachers who participated in the research were from all study cycles of the Portuguese education system—13.9% from the first cycle of basic education, 23.8% from the second cycle of basic education, 35.6% from the third cycle of basic education, and 26.7% from secondary education.

Regarding teachers' professional situation, the data reveal a relatively high degree of stability, since 80.8% have an indefinitely labor contract with the state. Nineteen participants (18.8%) have a fixed-term contract with the state, and only one participant is in pedagogic internship.

A large majority of teachers (91.1%) are linked to teaching in public education, and only 8.9% work in the private sector.

Regarding their academic qualifications, 49.5% of teachers report having a degree. In addition, 36 teachers (36%) also hold a Master's degree, and 7 teachers (6.9%) also hold a Ph.D.

3.3. Procedures and Instruments

In the research design, we established three essential moments in the development of the process. In the first moment, a questionnaire was given to teachers in schools in the northern interior of Portugal. In the second moment, the questionnaires were analyzed in order to identify teachers, distributed among the various study cycles of the Portuguese education system, who showed a better knowledge of the Microsoft 365 platform and who had good practices with this platform. From the analysis of the questionnaire, we identified eight teachers (here identified as E1, E2, E3, . . . , E8), two for each study cycle, purposely concealing their identity.

In the third moment, a survey by interview was carried out with the chosen teachers.

Regarding the questionnaire, it was structured in two parts. The first part includes 10 closed-ended questions, called “Characterization of teachers and their school environment” and these questions aimed to collect information on aspects and dimensions that allow characterizing teachers—such as age, education, professional situation, and their school environment. The second part consisted of 15 questions which aimed to understand how teachers make use of the Microsoft 365 platform and, at the same time, to judge their level of satisfaction.

The questionnaire was specially designed for this study, having been subject to a validation process by two national and two international experts in the scientific field of Education Sciences, belonging to higher education institutions to understand the relevance of its content and the suitability of the established items. In the process of validating the questionnaire, we followed the guidelines of researchers Almeida and Freire [29], who recommend submitting the questionnaires to experts to check if the data collection instrument was properly designed; if the questions were carefully formulated so as to collect the desired information; if the information is available to be collected; if information is missing; and finally, if there is a lack of questions that may be essential to the achievement of the research objectives.

Within any research, the issues of credibility and validity—although they have different meanings—go hand in hand. In fact, the data collection instrument used in this research considered a series of requirements that fundamentally determine whether it is adequate and whether it serves to measure what is intended. For the data coming from the application of a data collection instrument to be interpreted, the data collection instrument must, according to Ribeiro and Ribeiro [30], have reliability and validity because they determine the quality of any measuring instrument. To correctly assess the accuracy of the applied questionnaire, we chose to use statistical analysis to obtain a coefficient of internal consistency also called Cronbach’s alpha since the ‘ideal’ is almost impractical, given the time restrictions of our research. In our opinion, it makes sense to assess internal consistency by calculating Cronbach’s Alpha when it comes to a set of items on the same Likert scale. Therefore, using the items in the question where they were asked to indicate their level of satisfaction with each of the components, the results show a good internal consistency of the questionnaire, with the alpha value equal to 0.869. According to Pestana and Gageiro [31] the alpha value that guarantees a good internal consistency of a questionnaire should be between 0.8 and 0.9. Thus, the alpha value found allows us to conclude that our questionnaire has a good internal consistency.

The survey by interview, applied to eight teachers that resulted from the analysis of the questionnaire, was organized into eight dimensions: (a) identification elements, (b) Microsoft 365 use context, (c) resource domain, (d) objectives for use, (e) description of the practice, (f) difficulties experienced, (g) results, and (h) future perspectives. For the analysis of the interview data, the content analysis [32] was used and the following categories were established a priori: academic training, professional experience, continuous training in the use of digital devices, digital skills, contexts of use of Microsoft 365, technical competences of use, purposes in the use of the Microsoft 365, good practices, difficulties/obstacles in the use of Microsoft 365, learning outcomes, and prognosis.

Table 1 presents the organization of the content analysis where in addition to the dimensions and categories, the respective indicators are listed.

For data analysis, we used Microsoft Excel 2010 software, which allowed us to process and prepare charts and tables, since it is an adequate tool for research and does not require complex statistical models which are not included in this study. We also used descriptive statistics to consider not only the frequencies, but also the percentages reached in each answer. For the analysis of the interviews, we used content analysis [32] employing the qualitative analysis software, Nvivo (Creator: QSR International, Version number: 13 (free version)).

Table 1. Dimensions, categories, and indicators for analysis.

Dimensions	Categories	Indicators
Identification elements	Academic training	Bachelor's degree Graduation Master's PhD
	Professional experience	Internship; time of service
	Continuous training in the use of digital devices	Did training on Microsoft 365 Did ICT training No training
Microsoft 365 use context	Digital skills	Basic user; Advanced user; Develops innovative resources.
	Contexts of use of Microsoft 365	Use: - less than 1 year ago - one year ago - two years ago - over 3 years ago Uses synchronous times Uses asynchronous times Uses with other platforms Use on computer Use on mobile phone
Resource domain	Technical competences of use	Know all the Microsoft 365 applications Knows some Microsoft 365 applications Uses all Microsoft 365 applications Use some Microsoft 365 applications
Objectives for use	Purposes in the use of the Microsoft 365	Organize teaching and learning materials Provide learning materials to students Assessing students Contacting students Contacting parents
Description of the practice	Good practices	Using Microsoft 365 synchronously and asynchronously Using Microsoft 365 together with other platforms Use of Microsoft 365 to develop teaching resources
Difficulties experienced	Difficulties/obstacles in the use of Microsoft 365	Difficulty in installation Difficulty in using some applications Difficulty sharing documents Difficulty in synchronous sessions Difficulty in asynchronous sessions. No difficulties
Results	Learning outcomes	Facilitates learning outcomes Improves learning outcomes Difficulties in achieving learning outcomes
Future perspectives	Prognosis	Continue to use Microsoft 365 Continue to use Microsoft 365 and increase your usage

4. Discussion and Results

The results of this research are collected, considering the results obtained in the survey by questionnaire and the survey by interview.

4.1. Survey by Questionnaire

Regarding the degree of satisfaction of teachers regarding the use of the Microsoft 365 platform, the results reveal that—regarding the level of competence in the use of Microsoft 365 education—most of the responding teachers (75.3%) consider that their level is not beginner, but medium (63.4%) or advanced (11.9%), and that they have not undergone adequate training for the use of this platform. The issue of training, specifically in relation to the lack of specific training for the use of distance learning platforms, is in concordance with the national results presented in other studies [2,3,33,34]. The teachers who received training in this area did so mainly during the period of confinement in which distance learning was used. 30% had training before the confinement, 66.7% during the period of confinement, and only 3.3% after this period. In fact, the results show that in the context of the pandemic, the teachers had not had specific training for a teaching context such as this, i.e., they had no training to respond to such a challenging circumstance for the entire school community. In such an adverse and emergency context, there is a clear need to create the conditions and structures that can respond to an adequate teacher training program. In line with Moreira and Schlemmer [35], we argue that the demands of the “new normal” show the imperative need to adjust to a complex reality where the multicultural, multidisciplinary, and multidimensional character is evident.

From the analysis of the participants’ answers, we can see that when teachers needed help using the Microsoft 365 platform, 32.7% turned to someone in the school support structure, 30.7% looked for information on YouTube, 27.7% stated that they had the support of a colleague, and only 8.9% revealed that they had resorted to the help of the ICT coordinator of their school group. These results are in consonance with the study by Marôco [3], where 74% of the teachers stated that they had not appealed to the support of formal, institutional networks (ICT Coordinator of the School), and 90% of the respondents stated that they had not requested any help from specialized technical services or even consultants external to the school. In the same line, Escola [33] noted that the fact that teachers had not received initial or continuing training on distance learning platforms had not stopped them from continuing their teaching activities even when they were confined. Teachers kept in contact with students by using informal groups, social networks, colleagues, friends, or even family members. This context also helped the dialogue and collaboration between teachers [33].

From the point of view of the time when the teachers started using the Microsoft 365 platform, it can be seen from Figure 1 that most of the teachers participating in this study (42 respondents) only started using Microsoft 365 at the beginning of the confinement period imposed by COVID-19.

From the analysis of the data in Figure 2, the Microsoft 365 applications that teachers use the most are Teams, “synchronous interaction tool” [14], Word, Forms, Outlook, and PowerPoint. Skype is the tool that reaped the least use from the teachers who participated in the study.

The question about the advantages of using Microsoft 365 in education provided a set of data presented in Table 2 and worth reflecting on. Note that each participant could choose more than one option. For 26.3% of the teachers, the use of Microsoft 365 allows for proper management of classes and individual students, through the Notepad, a tool that allows for scheduling of activities, notes, communications with students or parents, among others. 21.2% of the teachers consider that the platform simplifies the organization of teaching and learning materials, and a very close percentage of teachers (19.2%) argue that it facilitates communication with students and promotes greater contact with them. 16.2% think that it allows additional learning material to be made available to students. Security issues attracted the attention of 15.1% of the teachers, who are convinced that the platform provides greater security for both teachers and students, since only registered teachers and students can access class content. A very small percentage of teachers (2%) consider that Microsoft 365 offers a suitable environment for conducting online tests or quizzes.

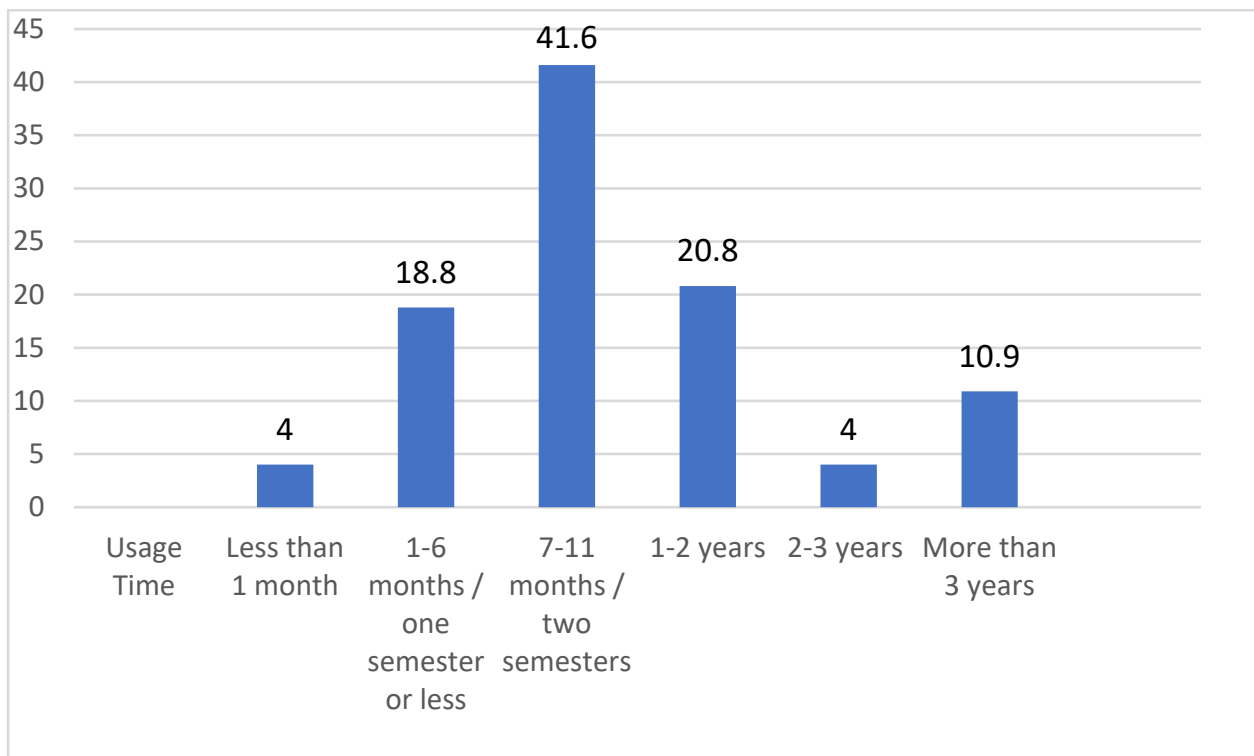


Figure 1. Microsoft 365 usage time.

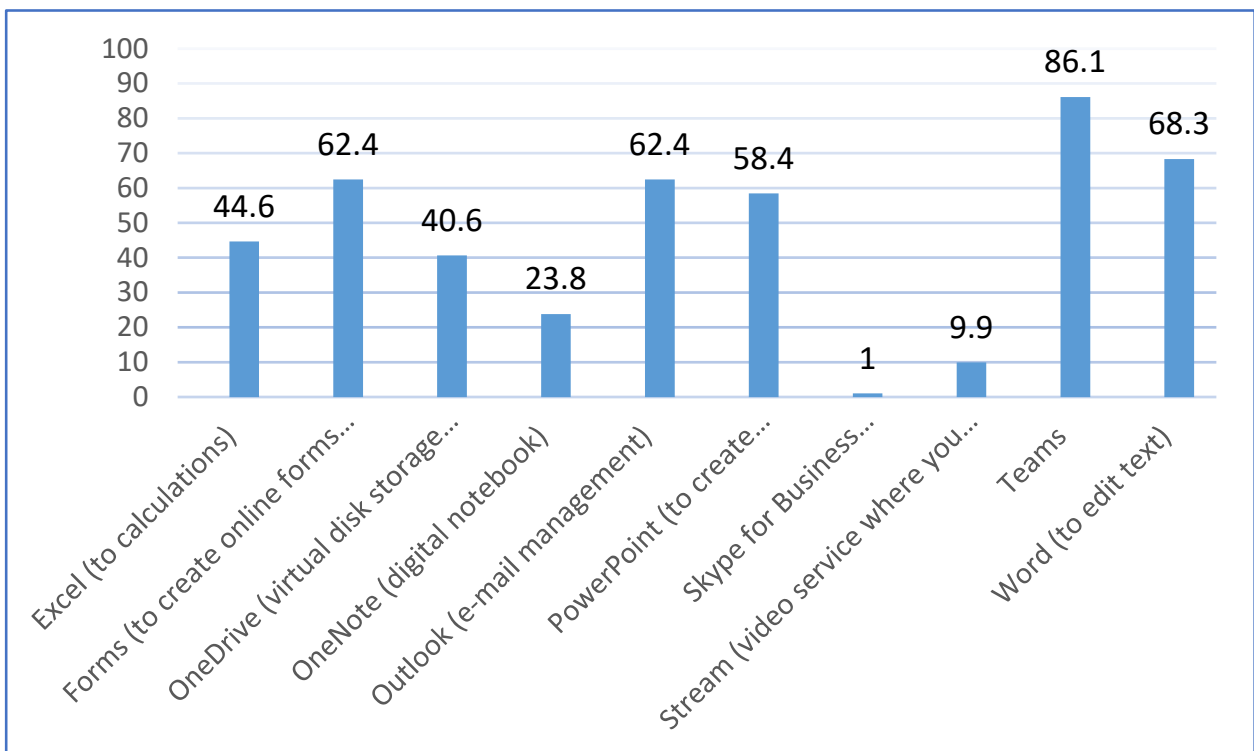


Figure 2. Microsoft 365 applications to carry out teaching activities.

Table 2. Most significant pedagogical advantage of using Microsoft 365 Education.

Most Significant Advantage of Using Microsoft 365 Education	Fr.	%
Gives security to students and teachers (only registered teachers and students have access to class contents)	15	15.1
Provides a suitable environment for conducting online tests or questionnaires	2	2
Provides an adequate management of classes and individual students (Notepad) (ex.: scheduling of activities, notes, communications to students or guardians, . . .)	26	26.3
It facilitates greater contact with students	19	19.2
Organizes teaching and learning materials	21	21.2
Allows additional learning material to be made available to students	16	16.2
TOTAL	99(*)	100

(*) Total number of responses from 101 participants of this study.

A very relevant fact is that, with the end of the confinement and the return to face-to-face teaching, even if maintaining security measures and physical distance, digital platforms continued to be used, although at a lower level. It is important not to forget that, according to the results of Marôco's study [3], 35% of the teachers surveyed declared that they had never used a distance learning platform, (Moodle, Classroom, MSTeams, or any other) [34]. This study reinforces precisely this perception of ours (Cf. Table 3), since more than half of the responding teachers—equivalent to 45.6%—continued to use Microsoft 365 to support or complement face-to-face teaching (supplementary material is made available online for teaching or study); 27.2% use it for classes in mixed format, hybrid teaching (in some cases there are teaching units that are organized online); and 20.8% used it to contact parents. Only 6.4% use it to support and clarify students' doubts and to contact students and other teachers. Once more, we recall that each participant could choose more than one option.

Table 3. Use Microsoft 365 when teaching face-to-face.

Now that We Are in Face-to-Face Teaching, Use Microsoft 365:	Fr.	%
Just to contact the guardians	26	20.8
For mixed-format classes (some program units are taken online)	34	27.2
To complement face-to-face teaching (additional material is posted online)	57	45.6
Other	8	6.4
TOTAL	125(*)	100

(*) Total number of responses from 101 participants of this study.

The results obtained are in line with the results of some national research. Ribeirinha and Silva [2] consider that teaching in the future will tend to be hybrid, where we will be able to observe distance learning tools being integrated into teachers' teaching practices; in the research of Marôco [3] it is clear the intention to continue to use it in the future in a mixed regime. The interviews conducted with some of the teachers who responded to this questionnaire survey, already in the year 2022, confirm the continuity in the use of the Microsoft 365 platform.

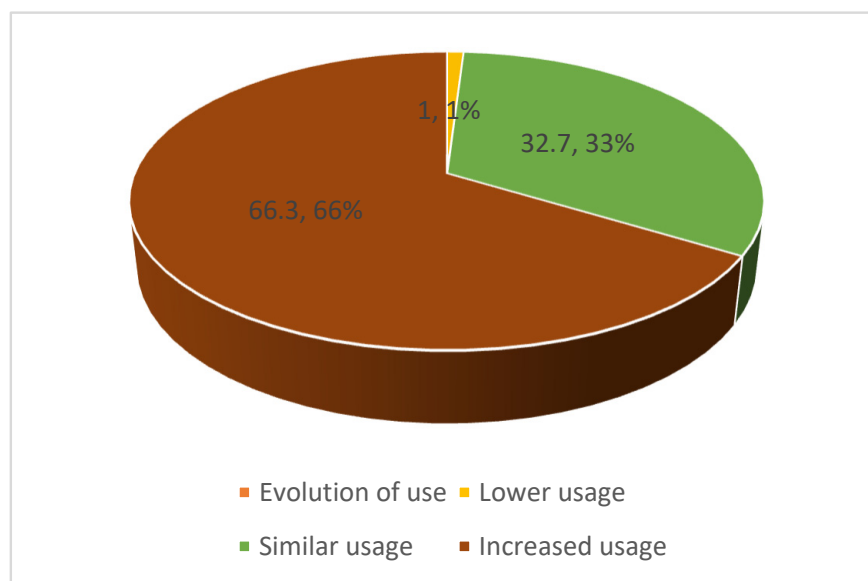
It should be noted that teachers who responded to the questionnaire survey stated they use other platforms in addition to Microsoft 365. In fact, the data in Table 4 show that 14.2% of teachers also used Google Classroom, 19.1% used Leya's Aula Digital, 28.4% used Porto Editora's Virtual School, and 38.3% of teachers used Zoom/Colibri. This latter platform is very popular with Portuguese teachers. As we have mentioned before, each participant could choose more than one option.

Table 4. Other platforms used.

Other Platform(s) You Have Already Used, as A Student/Trainee or as a Teacher/Trainer	Fr.	%
Leya's Digital Class	39	19.1
Google Classroom	29	14.2
Porto Editora Virtual School	58	28.4
Zoom/Colibri	78	38.3
TOTAL	204(*)	100

(*) Total number of responses from 101 participants of this study.

As time goes by and despite the return to face-to-face teaching, the idea that the use of platforms will remain [2,31,32] is being consolidated. Regarding the question about the progression in the use of Microsoft 365 since the time it was implemented, it is perhaps important underlining very relevant data: only 1% of respondents reported making a lesser use of Microsoft 365 and, 66.3% of respondents state that they increasingly use this platform. Only 32.7% claim to make a similar use to the one they did in the initial period of the pandemic (Figure 3).

**Figure 3.** Evolution of the use of the Microsoft 365 platform since its implementation.

These results corroborate those of the study by Ribeirinha and Silva [2] who argue that, due to the needs imposed by the pandemic, we would see a reinforcement of the use of distance learning resources. The position of Cabero-Almenara [11], although referring to the Spanish educational context, considers that the pandemic led to profound transformations in the educational system, making it possible to observe the passage from a model centered on the transmission of information, with the emphasis on the face-to-face dimension, to a model strongly centered and mediated by technologies.

Concerning the possibilities offered by the Microsoft 365 platform, we can say that the satisfaction level of participants is very high. In fact, more than three fourth of the teachers (78.2%) are satisfied with what they can do with the platform. Teachers are of the opinion that the platform provides schools, teachers, and students with the resources they need to continue learning in a remote learning context, as shown in Figure 4. Only 3% are very dissatisfied.

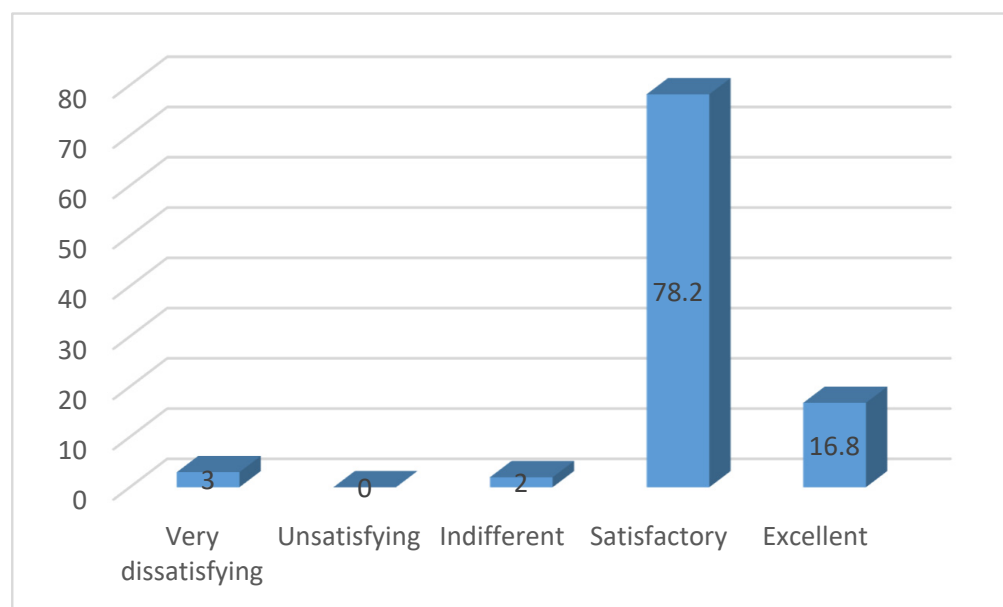


Figure 4. Overall satisfaction with the activities you can do with Microsoft 365.

To understand more clearly the degree of teachers' satisfaction about the dimensions: Intuitiveness and way of organizing materials on the platform; quickness/speed of learning the interface and way of navigating; assessment tools (tests, questionnaires, ...); help/Guidance Tools; collaborative features (sharing files and other resources; agenda, calendar, ...); communication features with other teachers from the same educational community; communication features with students; access to the educational contents of the course (materials format, e.g., flash, html, pdf); integration with mobile communication devices (e.g., tablet, mobile phone); integration with other collaborative applications (e.g., online whiteboards, forums, ...), we present Tables 5–8. To evaluate the degree of teachers' satisfaction regarding the different dimensions of Microsoft 365, a five-level Likert scale was used with the correspondence: 1—very dissatisfying; 2—unsatisfying; 3—indifferent; 4—satisfactory; and 5—excellent.

Table 5. Teachers' satisfaction regarding the intuitiveness and ways of organizing materials and quickness/speed of learning the interface and the way of navigating.

	Fr.	%	Fr.	%
	Intuitiveness and Way of Organizing Materials on the Platform		Quickness/Speed of Learning the Interface and Way of Navigating	
Very dissatisfying	2	2	0	0
Unsatisfying	2	2	3	3
Indifferent	8	7.9	7	6.9
Satisfactory	79	78.2	80	79.2
Excellent	10	9.9	11	10.9
TOTAL	101	100	101	100
Mean		3.92		3.98
Standard deviation		0.66		0.55

Table 6. Teacher satisfaction with assessment and help/guidance tools.

	Fr.	%	Fr.	%
	Assessment Tools (Tests, Questionnaires, ...)		Help/Guidance Tools	
Very dissatisfying	1	1.0	1	1
Unsatisfying	8	7.9	3	3
Indifferent	10	9.9	12	11.9
Satisfactory	66	65.3	76	75.2
Excellent	16	15.8	9	8.9
TOTAL	101	100	101	100
Mean	4.21		3.88	
Standard deviation	0.62		0.64	

Table 7. Teacher satisfaction regarding collaborative features, communication with other teachers, and students.

	Fr.	%	Fr.	%	Fr.	%
	Collaborative Features (Sharing Files and Other Resources; Agenda, Calendar, ...)		Communication Features with other Teachers from the Same Educational Community		Communication Features with Students	
Very dissatisfying	1	1	1	1	0	0
Unsatisfying	1	1	0	0	1	1
Indifferent	2	2	4	4	1	1
Satisfactory	69	68.3	67	66.3	67	66.3
Excellent	28	27.7	29	28.7	32	31.7
TOTAL	101	100	101	100	101	100
Mean	4.21		4.22		4.29	
Standard deviation	0.62		0.61		0.54	

Table 8. Teachers' satisfaction in accessing the contents of the subjects, integration with mobile communication devices and collaborative applications.

	Fr.	%	Fr.	%	Fr.	%
	Access to the Educational Contents of the Course (Materials Format, e.g., Flash, html, pdf)		Integration with Mobile Communication Devices (e.g., Tablet, Mobile Phone)		Integration with Other Collaborative Applications (e.g., Online Whiteboards, Forums, ...)	
Very dissatisfying	1	1	0	0	2	1.98
Unsatisfying	2	2	3	3	2	1.98
Indifferent	18	17.8	19	18.8	25	24.75
Satisfactory	71	70.3	61	60.4	62	61.39
Excellent	9	8.9	18	17.8	10	9.9
TOTAL	101	100	101	100	101	100
Mean	3.84		3.93		3.75	
Standard deviation	0.64		0.7		0.74	

Almost 10% of respondents considered Microsoft 365 an excellent platform with respect to the intuitiveness and organization of the materials on the platform, and 78.2% were satisfied with the platform in this dimension. Only 4.0% are unsatisfied or very unsatisfied. Regarding the speed/celerity of learning of the interface and form of navigation, four out of five teachers (79.2%) mentioned that they are satisfied and only 3% state that they are dissatisfied. About two-thirds of the respondents (65.3%) are satisfied with the assessment tools as well as the help and guidance tools (Table 6). However, if we look at the results where the question “What was the biggest educational advantage of Microsoft 365” was answered, a residual percentage considered that this platform provides a suitable environment for conducting online tests or quizzes. The study of Marôco [3] also indicated the difficulties revealed by teachers in the use of distance learning platforms for assessment tasks: 14% of the respondents reported experiencing difficulties in using software/digital applications to carry out the assessment.

The data in Table 7 illustrates a very positive perception of Microsoft 365’s features in the collaborative, communication, and communication dimensions, both between teachers and between teachers and students. “Satisfactory” and “excellent” together aggregate 95% of the respondents, which shows the teachers’ very positive representation of these features.

Regarding the question about teacher satisfaction regarding the educational content of the subject, only 3% of teachers say they are dissatisfied; for 17.8% they reveal that it is indifferent, and the majority confirms that they are satisfied as shown in Table 8. About the integration of mobile communication devices, whether tablet or mobile phone, most teachers (78.2%) say they are satisfied. With identical values (71.29%) of teachers considered the integration of Microsoft 365 with other collaborative applications (e.g., online whiteboards, forums, among others) as “satisfactory” or “excellent”.

The data on teachers’ level of satisfaction—given the results from the answers to the previous questions—helps explain that 60.4% of teachers said they would probably recommend Microsoft 365 to a friend and 35.6% would do so without doubt or hesitation. Only 4.0% are unlikely to recommend the Microsoft 365 platform to a friend.

4.2. Survey by Interview

The interview results are presented following the eight dimensions considered: (a) identification elements, (b) Microsoft 365 use context, (c) resources domain, (d) objectives for use, (e) description of practice, (f) difficulties experienced, (g) results, and (h) future prospects.

All translations of the interviewees’ answers were made by the authors.

(a) Identification Elements

Regarding Professional experience, we found a considerable variation for each of the subjects. The minimum length of service is three years, and the maximum is 32 years of service. Regarding contractual situation and professional stability, only one of the interviewees has a fixed-term contract with the state. Most interviewees have an indefinite labor contract with the state. From the point of view of the analysis of the results, this data is very relevant since through it we can see that the situation of these professionals confers considerable professional stability to the interviewed teachers.

Concerning Academic training, four of the interviewees hold a bachelor’s degree, and the remaining ones hold a master’s degree. One of the respondents has a Ph.D. and another is still studying for a Ph.D.

(b) Microsoft 365 Use Context

All interviewees confirm their ability and competence to install Microsoft 365 on both computer and mobile devices, making use of it to support their teaching practice. What is at issue here is the technical competence to work with the hardware. The ability to perform software installation falls under this category.

Regarding the media for using the platform, all respondents mention that they use Microsoft 365 from various devices, giving as an example the school computer, laptop, tablet, or mobile phone.

E3 highlights the importance of using Microsoft 365 from mobile devices, highlighting the dimensions of interactivity and ubiquity. The comfort of use regardless of space and support facilitates ubiquitous learning. The mastery of devices allows for the development of digital skills that are facilitators of students' learning. In this regard, teacher E3 says:

"Yes. I installed it because it is easy and practical. It is practical because sometimes we must attend a department meeting and we still go on a trip, and we can attend the meeting. When the student has a question and puts it in the chat, I can answer it even though I am not at home and so solve the problem quickly to the student." (E3)

Concerning the full use of the Microsoft 365 features, all interview respondents confirm a very extensive use of them. The answers clearly fall within the domain of teachers' digital competences. The teachers' perception of the usability of the Microsoft 365 features is explored. Referring to the full use of the features E3 states:

"I use the ones I think are useful for my work as a teacher." (E3)

To the question regarding the production of innovative resources based on Microsoft 365 tools/applications all interviewees replied in the affirmative.

E3 answers:

"Yes, without a doubt. I launch assignments to be developed by students in Word, I create Quizzes in Forms, I organize and process data in Excel and PowerPoint. . . ." (E3)

Regarding training in the use of Microsoft 365, none of the interviewees revealed having received specific training in its use.

In this respect, E3 says:

"No, because I didn't have the opportunity. I would like to because I would like to improve my performance." (E3)

However, the reasons given to justify this absence relate to the fact that there was no opportunity before the actual need arose, from the closure of schools in March 2020 and the requirement to maintain the teaching activity in distance learning. It is very revealing to recall that Portuguese teachers were invited to use distance learning platforms as soon as the period of confinement began. Remote emergency teaching required the use of the platform by teachers and students; however, no training had been provided. The need for remote emergency teaching imposed the use, regardless of whether there had been training in the use of the platform.

In all interviewees, there is a clear recognition of the importance of training in the use of Microsoft 365. While on the one hand they recognize the relevance of training in teaching practice, on the other they draw attention to specific aspects that need to be addressed in the training domain. The respondents identified some tools that, in their opinion, needed improvement, be it OneNote, Excel, or network management software, among others.

Some interviewees' responses addressed the importance of training in the use of Microsoft 365:

"I think it is always important to have training, because we always learn and the sharing of experiences that usually occurs is very important. In the case of 365 I think it is essential to improve the mastery of OneNote which is a tool with a lot of potential and which many still don't use and can be a good alternative to the daily notebook." (E2)

"If you do not have previous relevant experience, you should carry out general training in productivity tools such as Excel and file management on the network." (E4)

"Yes. I think it is very important because we need to use it more and more with the students and we need to master its use to use it." (E1)

(c) Resource Domain

Regarding the mastery of the resource all respondents confirmed having Microsoft 365 installed on their school computer, personal computer, tablet, or their own mobile phone.

Considering its functionalities, all respondents consider that they know all the functionalities.

Regarding preferences for any of the tools, we found some variability in the answers:

"In the day to day, I use many tools: Word, Excel, Outlook, Forms, SharePoint, Teams, OneDrive, among others." (E1)

“OneDrive because I can put all the documents and access them anywhere. SharePoint is a document sharing tool where we can always add something which is good for those who work in collaboration and in group . . . Teams, word, excel . . . ” (E8)

(d) Objectives for Use

As for the objectives for the use of Microsoft 365, the purposes centered on the bureaucratic activities that teachers develop linked to the students are indicated.

Some answers:

“To give synchronous lessons through Teams e.g., to share information with students, to propose activity to students, to receive assignments, to assess students through quizzes e.g., to communicate with students and parents. . . . ” (E3)

“Streamline/simplify daily tasks and promote greater communication and interaction with students and work colleagues.” (E4)

With regard to the tools that respondents use most with their students, Teams was identified:

“Sharing materials, tutorial guidance of students, to communicate with them and parents/careers.” (E1)

Other responses:

“Teams, Word, Excel, Outlook, Forms.” (E3)

“Teams for communicating with students and answering questions; Microsoft OneNote— for filing information, carrying out work, monitoring and giving feedback; Forms for formative assessment.” (E2)

“Microsoft OneNote—To archive information, carry out work, monitor and give feedback.” (E4)

When analyzing the interviews, using the qualitative analysis software NVivo, regarding the dimension “objectives for use” of Microsoft 365 and its functionalities we obtained the following results which can be seen in Figure 5.



Figure 5. Objectives for use of Microsoft 365 and its functionalities.

From the analysis of Figure 5, the emphasis on communication, sharing and cooperation provided by the use of Microsoft 365 is quite evident.

(e) Description of the Practice

Regarding their practice as Microsoft 365 users, the interviewees stated that the platform fulfilled the following functions: as a basic user to produce simple documents for daily and mandatory use; as an advanced user to produce, store, and share information documents and resources; receive documents and information; receive and change information or resources for sharing; receive and change information or resources for personal

use; develop innovative and different pedagogical resources for students all interviewees stated that they positively fulfilled these dimensions.

Concerning the dimension of specific moments when Microsoft 365 is used, the interviewees did not consider that a specific moment could be established for the use of Microsoft 365. In some cases, the interviewees referred that it is used at the beginning of the lesson, it is used for the organization of contents at different moments of the lesson or even to perform assessment moments. The situations of isolation and the consequent need to communicate with isolated students also dictated different moments for the use of Microsoft 365.

E1 said:

“No. I use it when I consider it important and essential. Of course, when I have sick students at home, so I necessarily use 365 for synchronous and asynchronous lessons.” (E3)

All interviewees considered that since they started using Microsoft 365 their practice has become easier, there has been a simplification. E3 and E4 stated in this regard:

“Undoubtedly more streamlined. I have everything more organized.” (E3)

“The work is more simplified but requires some preparation time that is easily recovered in the monitoring and feedback processes.” (E4)

Regarding the methodologies used, there is a consensus among the interviewees about the need to use active methodologies with Microsoft 365. They all state that they use active methodologies in their practice. As stated by E2, E3, and E4:

“No doubt active methodologies.” (E2)

“Active methodologies because my students are protagonists. The teaching process does not happen without their intervention and participation. Students don’t just sit and listen, taking notes. They debate, criticize, do. They help build knowledge together with the teacher and with their colleagues. Hybrid teaching methodologies are conceptions that make use of the technological possibilities of current times. Among them is the flipped classroom, which as the name says, reverses the whole traditional classroom logic. In it, learning begins at home rather than at school. The student does his own research on the internet and online materials about previously passed themes, and arrives in class with knowledge in his baggage, which is then debated with teachers and colleagues. This method allows for the optimization of class time, which is then used to deepen the knowledge on the subject and answer questions. After class, the student can still do more learning with multimedia resources that can be made available by the teacher.” (E3)

“Active methodologies, namely project-based learning, Design Thinking, and STEAM methodology. To create a stimulating and motivating environment that allows working on several skills simultaneously.” (E4)

Concerning the question “Considers your practice with Microsoft 365 to be good practice”, all the teachers interviewed maintained that they had good practice, although it was naturally subject to improvement processes (E5, E7, and E8). We can see the options that legitimize teachers’ assessment from the descriptions:

“A good practice is one that leads the student to achieve essential learning, and as my practice has led them down that path then it is a good practice. So, I use it to get them to look for information, to get them curious and that to me is good practice.” (E1)

“It’s a good pedagogical practice because I provide information and materials for the student to work on at the time, he/she thinks is best. In addition, as I can clear up doubts by chat, video conference or call, the student feels more accompanied.” (E2)

“Microsoft 365 allows me to perform active and flipped classroom methodologies, so I think it’s a good practice.” (E3)

“It is a good pedagogical practice because it allows planning and designing a strategy to reach an end. In a dynamic/interactive way the student autonomously, or accompanied, travels the defined path to achieve an objective/competence.” (E4)

(f) Difficulties Experienced

Regarding the difficulties they experienced and the options to overcome them were similar. On the one hand, they warned about the difficulties of using Microsoft 365 due to

lack of training and the support strategies that centered on seeking help not so much in the schools' support structures, but mainly seeking help from colleagues or even YouTube tutorials. We transcribe the statements of E1:

“Watching videos on YouTube or asking colleagues.” (E1)

This practice is confirmed by Marôco's study [3]. Although institutions have provided support structures for teachers, focusing on the ICT coordinator for this function, most teachers sought help in informal groups on social networks, with colleagues from the institution or outside the institution, in YouTube tutorials.

E2 mentions the lack of digital literacy of parents and students, to be able to consistently support the teachers' effort to ensure teaching activities in distance learning context. Faced with difficulty, interviewee E2 explains what the strategy was chosen to overcome the lack of literacy: “I seek to increase the digital literacy of students and parents with short webinars.” (E2)

Within the framework of the difficulties pointed out, the obvious lack of conditions for distance activities also merited negative comment, with the lack of quality of the network being a constant. The issues of digital divide became more evident during the pandemic period. The scarcity of equipment, the lack of Internet access, the lack of network quality in educational institutions, or low network quality in inland areas are effective dimensions of the digital divide. E3's statements attest to these difficulties when he says:

“Sometimes it is the internet network failure.” (E3)

And E4:

“Security policies instituted by the institution that condition the sharing and easy transport of documents. And access difficulties in case of deficient internet networks. To overcome the difficulties, the options are to resort to local storage units and use offline applications.” (E4)

About the difficulties experienced by participants while using Microsoft 365, the content analysis provided by NVivo generated the following responses (Figure 6).

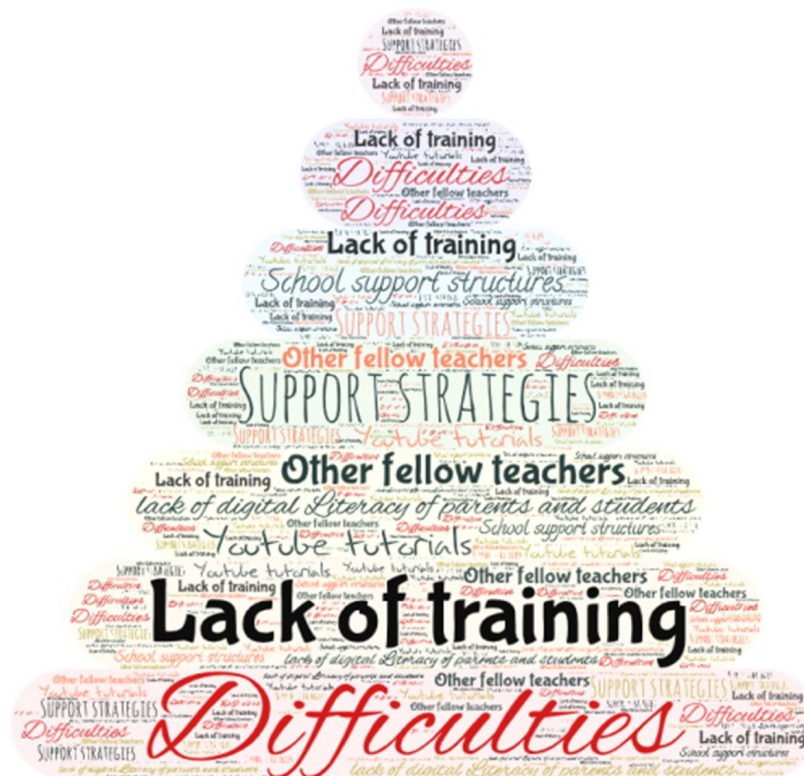


Figure 6. Difficulties experienced in using Microsoft 365.

(g) Results

When asked about the results obtained, the interviewees argued that students achieve better results and in less time with the use of this tool. Interviewee E2 is less categorical or at least retains some caution on the issue of obtaining better results in less time, although he leans towards this perception:

“I haven’t used 365 for that long to say for sure if I need more or less time, but it seems to me that less time, as it is a platform with a lot of potential and very intuitive.” (E2)

Regarding the changes in learning resulting from a more systematic use of Microsoft 365 with students, these seem evident. Increased autonomy (E1, E2), possibility to participate in online working groups, where the teacher guides, shares information, monitors and provides feedback (E1, E7, E8).

About changes in teachers’ work, E1 said: “sharing of strategies and resources is highlighted.” (E1)

The interviewees considered that the use of Microsoft 365 did not change the concept of teacher (E1, E2, E3, E4, E5, E6, E7, E8), but in the case of E1, it ensured a deepening of the concept of teacher. The traditional vision of the educational action was largely overcome by teachers when they assumed the centrality of the student in the learning processes, when they privileged learning over teaching, when they bet on the student as the builder of his/her own learning, using digital media as mediators in the communication processes. As teachers who stood out for their practice in the use of digital media, the answers confirm the deepening of the concept of teaching and teacher (E1).

E6 states that the use of Microsoft 365 “has not changed my belief of what it is to be a teacher, but it has improved it” (E6); and that the increased use of the platform “made me use more digital resources to teach the lessons, allowing me to organize the lessons in a less traditional way” (E6).

Regarding the level of usefulness of Microsoft 365, on a scale where 1 was not at all useful and 5 was very relevant, the answers were mostly between 4 and 5, with the majority at 5. Only E1 scored 4.

(h) Future Perspectives

In relation to the questions focusing on future perspectives on the continuity of a practice where the use of Microsoft 365 is integrated, all interviewees were unanimous in stating their intention to continue using this platform. At the same time, they expressed the expectation that some changes would be introduced—in a word, improvements allowing “facilitating and saving work” for the teacher and “allowing for pedagogical differentiation” (E1).

Within the framework of future perspectives, we also highlight the issue of digital literacy. The pandemic issue brought to the agenda the issue of literacy not only of teachers, but also of students.

E3 answers “I hope students will be more active and improve their digital literacy” (E3).

Regarding the ideal practice for using Microsoft 365 the interviewees highlighted some dimensions such as promoting students’ autonomy, developing communication skills among peers and between students and teachers, facilitating students’ learning. We transcribe some of the positions of the interviewees:

Some answers:

“One that promotes more autonomy, improves communication between students and teachers and teachers and students, facilitates the teacher’s work and enhances students’ learning.” (E2).

“It would be one that allows all teachers and students to make learning.” (E3).

“The development of greater autonomy and transversal skills.” (E4).

5. Conclusions

In the last two years, teachers have resorted, as never before, to the aid of technological devices to promote the organization of the didactic processes in remote and hybrid learning contexts. This situation has highlighted the constraints and obstacles of the main actors in the teaching process and in the education system, in a very clear way in public education. However, learning platforms are today an unavoidable need to meet the challenges of 21st century education. To continue supporting teachers and students in creating a more integrative learning environment and raise the quality standards of Education, Microsoft 365 presented and explored new features for teachers, educators, and students that are important to understand if they were being useful in teaching and learning processes. It was in this sense that it was decided to proceed with the study previously presented [14].

We will now present some conclusions that emerged from the results obtained, taking into account the research objectives we formulated for this study.

Considering Objective 1: "To understand how the schools in the northern interior of Portugal that chose Microsoft 365 made use of it", the results obtained confirm that in the schools that have participated in the study, teachers have made very extensive use of Microsoft 365. All available tools were used; however, Teams, Forms, Outlook, Word, and Power Point were the most used.

Considering Objective 2: "To appreciate the level of teacher satisfaction with the use of Microsoft 365", we noticed that the respondents revealed a very high level of satisfaction, since 95% of the participants consider themselves satisfied or with an excellent level of satisfaction. It is also important to add that 60.4% of teachers stated that they would probably recommend Microsoft 365 to a friend and 35.6% stated that they would do so without any doubt or hesitation.

Considering Objective 3: "To understand teachers' perceptions about the advantages or disadvantages of using the platform to organize the teaching and learning processes", the survey and interview responses were very positive. With regard to the functionalities of Microsoft 365, two-thirds of the respondents are satisfied and more than a quarter consider the functionalities for cooperative communication, communication with colleagues, or even communication with students as excellent.

Considering Objective 4: "To understand teachers' perceptions about the advantages and disadvantages of using the platform to improve results and practice", all respondents argued that the use of the platform has improved student academics outcomes and express a positive perception about the change in practices.

Considering Objective 5: "To analyze if the use of Microsoft 365 has been accompanied by the use of active methodologies", we have seen that all the interviewees confirmed the need to adjust the methodologies in the teaching and learning processes, especially in hybrid teaching contexts. They also refer to the need to use active methodologies, identifying the flipped classroom, project-based learning, design thinking, and STEAM.

Considering Objective 6: "To analyze if the use of Microsoft 365 has facilitated the teachers' actions", all interviewees were unanimous in noting that Microsoft 365 facilitated the teachers' action in the pandemic period and stated that they intended to continue using it even in the face-to-face mode. This intention confirms the recognition that Microsoft 365 continues to provide conditions facilitating the teacher's actions.

Considering Objective 7: "To identify the type of training needs experienced by schools and teachers in using Microsoft 365 over the past two years", the results obtained in the survey and interviews are in accordance with the national studies cited [2,3], and confirm that teachers had not had specific training in the use of Microsoft 365 before the pandemic and felt they needed it for teaching. In the interviews we carried out, we noted that all interviewees considered it very relevant to obtain specific training in order for teachers to be able to do a more adequate teaching of the challenges involved in the use of Microsoft 365.

It is understood that the conclusions of the research presented should be interpreted with some caution. In fact, the type of research design presented, and the size of the sample imply some restrictions for the generalization of the results. In terms of future research, it

is our intention to obtain a larger sample and carry them out in a wider geographical area. Thus, considering that many Portuguese schools have chosen Microsoft 365, our objective is to continue the research by getting answers from the majority of schools in Portugal that use Microsoft 365.

Considering the previously discussed, we are convinced of the importance of the results achieved by the study, in the sense that they show how the platform has been used, its integration in the teaching and learning processes, in the communication strategies, in the continuous teacher training, in the digital transition plan, and in the changes in teaching practices and methodologies.

Some relevant implications emerged from the study: Teacher training should include a distance learning curricular unit, with special attention to Microsoft 365. In this curricular unit, the construction of learning objects should be addressed. In didactic curricular units, active methodologies more adequate to distance education should be addressed. The offer of continuous teacher training should include assessment themes in distance learning platforms.

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