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The Impact of the COVID-19 Pandemic on Teachers' Perception of Online Teaching and Their Buoyancy in a BYOD International School

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Abstract

We present a retrospective comparative study on the impact of the COVID-19 pandemic on secondary teachers' perceptions of their online lessons and of teacher buoyancy, in a Bring Your Own Device (BYOD) international school in the Netherlands. The research employed an online questionnaire that included both closed-ended and open-ended questions. This was distributed to the teaching staff in May 2023, two years after the pandemic had ended. The results include a descriptive analysis of qualitative data on teaching online and for teacher perception of buoyancy. By applying the chi-square test of independence, we investigated the impact of campus closure and remote learning on "years of teaching experience" and the perception of "***confidence in the use of technology***". Our results showed that: a) teachers reporting "**confidence in the use of technology**" were more able to navigate remote learning successfully, and b) teachers with fewer "**years of teaching experience**" required additional support on innovative teaching methodologies and student engagement to better cope with unexpected circumstances such as those experienced during calamities like the COVID-19 pandemic.

INTRODUCTION

In this study, we report the impact of the COVID-19 pandemic on secondary school teachers who were forced to work remotely during enforced campus lockdowns. We investigate teachers' perceptions of their ability to utilise technology to navigate this unfamiliar situation and how the lockdown impacted their capacity to manage daily frustrations that arose from the unusual teaching environment. This work builds on Nambiar (2020), Anderson et al. (2021), and Putwain et al. (2023). Our research questions may be summarised as follows:

“What was the impact of a prolonged campus closure on teachers' attitude to using technology to support learning and on their ability to maintain a sense of buoyancy throughout the closure periods?”

Data collection for this study employed an online survey shared with secondary teachers from an international school during the period from Tuesday, May 16, 2023, to Wednesday, May 27, 2023. We include in the **appendix I** an extract of the email announcing the questionnaire. Survey participants gave their consent for the generated data to be used in any potential research article. Sixty-six (66) teachers completed the questionnaire; 34% of the secondary teaching staff at the time.

The questionnaire was divided into three sections. In the first section, we collect demographic data relating to the participants. The second section examines the contrast between online lessons and face-to-face lessons during the COVID-19 pandemic. The research is based on a comparative study developed by Nambiar (2020) set in colleges and universities in India during the first part of the Pandemic in May 2000. That study encompassed 70 educators working in colleges and universities. The results presented in this study generally align with those reported in Nambiar (2020). The third section of our research focused on the impact of the pandemic on teacher perceptions of buoyancy. We included this section in the questionnaire to align with Collie's (2021) suggestion, which proposed the need to examine teachers’ perceptions of their buoyancy during the COVID-19 pandemic. Collie (2021) describes workplace buoyancy as an attribute that enables teachers to overcome adverse conditions in the workplace. Buoyancy is a form of resilience associated with low-level annoyances and setbacks. Buoyancy differs from resilience in that, whereas resilience is most often associated with severe adversity, buoyancy focuses on the smaller challenges that teachers face on a day-to-day basis. By collecting data on buoyancy and technical competence, we find that teachers who rate their technology competence positively also rate their perceived buoyancy positively.

By applying the chi-square test of independence at a 95% significance level (Kazmier & Pohl, 1987), we investigate how the variables, “**years of teaching experience**” and teachers' perception of their “**confidence in the use of technology**”, were affected by the COVID-19 pandemic. Our results indicate that confidence in using technology has a positive impact on teachers' ability to successfully navigate the challenges associated with remote and asynchronous learning models. Teachers who ranked their technological competence as high were more confident in their ability to modify and innovate their teaching approaches. We also found that teachers with more experience were better able to cope with the altered reality imposed by the campus lockdown. Thus, this work further supports the statement by Ertmer et al (2012) that providing professional development to teachers in using technology will alleviate barriers to technology integration. In a recent study by Ma et al. (2024) on secondary schools in Shenzhen, China, teachers expressed concern that a lack of adequate technology training would hinder digital efficacy in their lessons.

Throughout the paper, we refer to a variety of different technology-mediated teaching modes. For clarity, we include here a definition of each, based on the work of Johnson (2020).

Online learning refers to a combination of synchronous and asynchronous learning that takes place online.

Remote teaching and learning - refers in this context to Learning, usually in an online context, either synchronously or asynchronously.

Distance learning implies that students are not on a campus, and in the higher education context, learning is self-paced.

Hybrid learning - replaces most face-to-face learning with online learning.

In the paper, we have used these terms interchangeably to describe all teaching and learning processes carried out off campus, which included synchronous online meetings and asynchronous learning accessed via digital learning resources or activities, such as online quizzes, online post-boards, or other online interactive activities.
In this current work, we build upon a previously published study on the implementation of a Device-Free Lunch programme in secondary schools (Andreadis & Watts, 2022). That publication researched the perceptions of first-year secondary students regarding the impact of iPad use on their learning in a BYOD Secondary International School (Watts & Andreadis, 2022). Hence, this work applies Action Research approaches (Feldman & Minstrell, 2020) by providing hands-on study cases from secondary schools.

LITERATURE REVIEW

In this review, we provide a concise summary of recent research on the impact of COVID-19 on online teaching. Several studies have addressed the influence of the pandemic on online teaching. Previous work by O'Malley and McCraw (1999) identified two different approaches to distance learning. Firstly, an asynchronous model, where lesson materials are provided in advance, and students work outside of the class and send their solutions at a later stage. Synchronous teaching is a model in which learning activities occur in real-time. During the COVID-19 lockdown, teachers were able to conduct real-time remote lessons. This is a synchronous model of online learning made possible using internet-based or online platforms. The current study highlights an important distinction between online learning and distance learning. Ertmer et al. (2012) examined the significance of professional development in addressing teachers' reluctance to utilise technology. Before the COVID-19 pandemic, Vivolo (2019) provided an overview of aspects of online learning. During the COVID-19 emergency, remote teaching was not a planned online learning approach (Hodges et al., 2020). Thus, various models were applied to address the COVID-19 pandemic.

In 2020, Nambiar (2020) conducted a research study involving 70 teachers in colleges and universities in India. In the current work, we build upon a study inspired by the first part of Nambiar's work, which examined factors influencing teachers' approaches to online teaching during the pandemic. The findings presented here are, in some aspects, in alignment with the outcomes of Nambiar (2020). Literature addressing the pandemic often raises concerns about the reliability of internet connectivity and the use of electronic platforms in educational experiences. In 2021, Aytaç (2021) investigated teachers' perceptions during the pandemic, using the results of interviews with 28 secondary school teachers in Turkey during the first year of the pandemic. In Aytaç's (2021) work, it was noted that one key barrier to online learning during the pandemic was poor internet connectivity. This barrier was also identified in the current study. Another finding of Aytaç (2021) identified the importance of sharing experiences and creating online platforms to support the online learning environment. We wish to share our own experiences by producing this research paper.

In 2022, DeCoito & Estaiteyeh (2022) used an online questionnaire to gather responses from 70 teachers of students in grades 1 to 12 in Canada. The study revealed findings similar to those presented here, in terms of the impact of technology on online learning. The results of the current study agree with the findings (DeCoito & Estaiteyeh, 2022) that the COVID-19 pandemic experience provided a) an opportunity for teachers to improve their online strategies and tools, b) provided a challenge to maintain student engagement, and c) that reliable internet connectivity is a key factor in successful online learning.

In 2021, Collie (2021) conducted an online questionnaire which gathered feedback from 325 secondary teachers in Australia. In this work, Collie (2021) introduced the concept of buoyancy, an attribute that enables teachers to overcome adverse conditions in their working environment, for example, those experienced during the COVID-19 pandemic. Buoyancy is a type of resilience specific to low-level annoyances or setbacks, whilst resilience is more associated with severe adversity. Buoyancy focuses on the challenges teachers face daily. Collie (2021) concluded that high levels of teacher buoyancy are a protective factor when dealing with unexpected situations.

In 2002, Liu et al. (2022) collected feedback from 159,203 primary and secondary teachers who taught remotely during the COVID-19 pandemic in China. Chin et al. (2022) employed an online questionnaire that involved 174 secondary school teachers in the Philippines from September to November 2021. Their findings indicated the importance of additional logistic support and professional development for teachers to teach effectively online. In 2023, Sacré et al. (2023) conducted a retrospective study involving 200 secondary teachers in Germany to investigate their well-being before, during, and after the pandemic. That study also emphasised the need to create resources to deal with future pandemics. We hope that this work will contribute to those resources.

In Table 1**,** we provide a summary of the literature review

Table 1. *Literature review*

Literature Review			
Data		**Methodology**	
Covid-19	**Buoyancy**	**Bar Graphs and charts**	**Chi-square test**
Ertmer et al. 2012	Anderson et al. 2021	Kazmier & Pohl 1987	Kazmier & Pohl 1987
O'Malley et al. 1999	Collie, 2021		
Vivolo 2019	Zhang 2021		
Hodges et al., 2020	Liu et al., 2022		
Nambiar, 2020	Chin et al. 2022		
Aytaç, 2021	Li, 2022,		
Leping et al, 2021	Sacré, et al 2023		
DeCoito et al. 2022	Putwain et al. 2023		
Mathew et al. 2023	Oxley et al. 2024		

SECTION A: DESCRIPTION OF THE CASE STUDY

SCHOOL

Students attending the International School in this study are required to provide a computing device to support their learning; an iPad is used in MYP years 7 to 9, and then a laptop is used from MYP year 10. In the school, teaching staff are expected to develop competencies in applying technology to support teaching and learning. In this regard, we assert that the school, its students, and staff were well-equipped to manage the transition from face-to-face teaching to a remote model successfully. The school is recognised as a bring-your-own-device (BYOD) environment, where the use of technology in classes is commonplace. To support this status, the school has a well-equipped and experienced IT department that provides support for its technology infrastructure, hardware, and software. There is also a pedagogically focused Educational Technology team that provides training and advice to teachers on the use of technology to support teaching and learning.

METHODOLOGY

İ) QUESTIONNAIRE

Table 2. *Teacher demographic details. The number in brackets refers to the percentage of the number of teachers within this category*

Teacher demographic details			
Age (in years)	24 to 35 (12%)	36 to 50 (52%)	51 to 67 (38%)
Teaching experience (in years)	0 to 10 (12%)	11 to 20 (44%)	21 to 40 (44%)
Teaching at the school during the pandemic	Yes (82%)	No (11%)	Partially (7%)
Use of technology	Confident (33%)	Mostly confident (11%)	Partially Confident (56%)

We deliberately did not collect information relating to respondent gender. Data collection, which included gender, was common to all the other questionnaires discussed in this paper (De Coito et al., 2022; Collie, 2021; Aytaç, 2021; Leping et al., 2021; Li, 2022; Mathew et al, 2020; Zhang, 2021). Our decision not to include gender-based data was in alignment with the recent discussion in international education to keep a gender-neutral approach.

In the second section of the questionnaire, we collected data on the differences between online lessons and face-to-face lessons during the COVID-19 pandemic. The data collection was based on questionnaire items used in a comparative study developed by Nambiar (2020). Our primary

research questions gathered information on the perceived impact of the COVID-19 pandemic on the following three elements of the shift to an online teaching and learning experience:

Online classes versus face-to-face classes.

Personal factors that impact online teaching.

Student factors that impact online teaching.

For the three subcategories above, we replicated a selection of the questions used by Nambiar (2020) that were relevant to secondary educators. We categorised responses with three options: Agree, Disagree, and, in contrast to Nambiar (2020), we also added a "Not Applicable" option. This additional option provided respondents the opportunity to indicate where an item did not apply to their own particular experience. In this section of the questionnaire, we also included open-ended questions, including two items used in Nambiar (2020).

In the third section of the questionnaire, we collected data on the perceived impact of the pandemic on teacher buoyancy (Collie, 2021). This section also included open-ended questions.

II) STATISTICAL ANALYSIS

We employed descriptive statistical tools to analyse the data gathered from the questionnaires. The data were presented as bar charts and line graphs to visualise the results obtained (Kazmier & Pohl, 1987). We applied a statistical analysis of the questionnaire results using the chi-square test of independence at a 95% significance level to investigate whether there is a significant association between the "***years of teaching experience***" and the teacher's perception of their "***confidence in the use of technology***".

For the variable "***years of teaching experience***", we recorded the number of teaching years in secondary education. Here, we considered three categories: 0 to 10, 11 to 20 and 21 to 40 to compare the results with previous work in the literature. For the variable "***confidence in the use of technology***", we considered three categories - **confident**, **mostly confident** and **partially confident** to categorise the respondents' perception of the use of various digital platforms available to the teachers.

Section B: RESULTS OF THE CASE STUDY

SECTION B1: THE IMPACT OF THE COVID-19 PANDEMIC ON TEACHERS' PERCEPTION OF THEIR ONLINE TEACHING

DESCRIPTIVE ANALYSIS

I) *ONLINE CLASSES VERSUS FACE-TO-FACE CLASSES*

The questions of this part are summarised below:

i) Online classes are more effective than face-to-face classes.

ii) It is difficult to engage students in online classes.

iii) Online classes are fine and more interactive than face-to-face classes.

iv) Students concentrated less in online classes than in face-to-face classes.

v) Online classes helped the teachers in using innovative teaching methods.

We present the results in Figure 1.

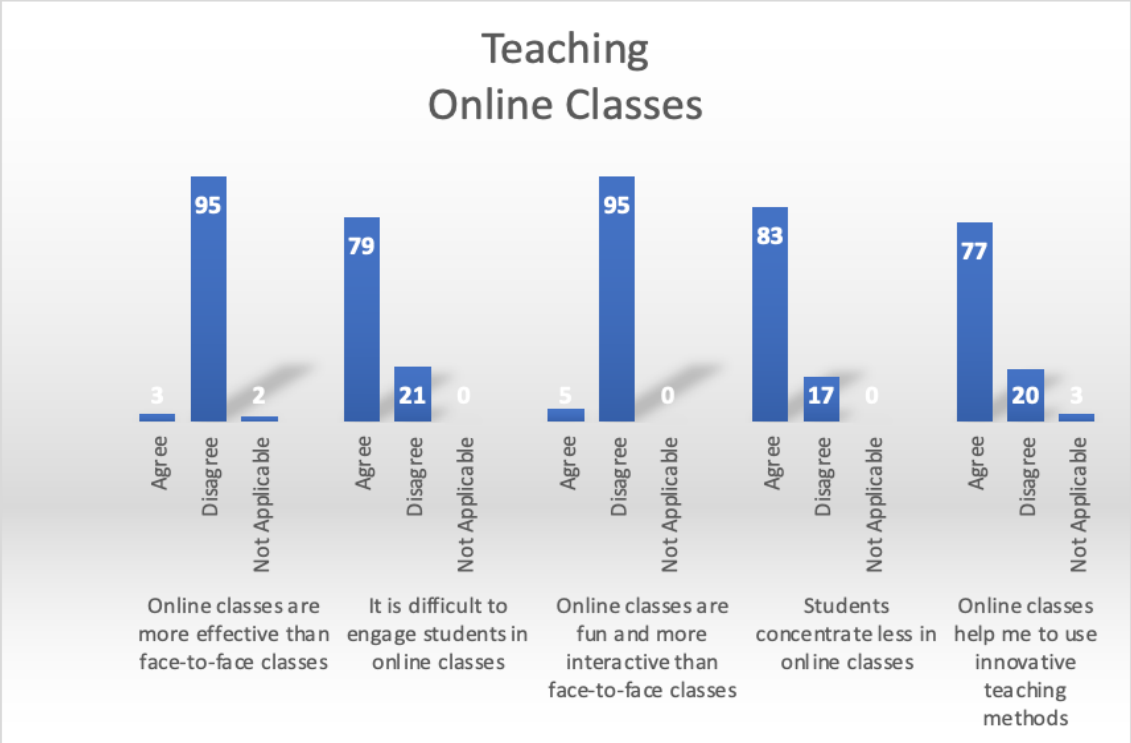

Figure 1. *The perception of teachers on the effect of teaching online classes versus face-to-face classes. The number in the bars refers to the percentage in the total number of participants*

Most respondents agreed that the online classes are less effective than face-to-face classes. During online classes, teachers identified that it was a challenge to motivate their students to work and to maintain an effective overview of the lesson, compared to a face-to-face classroom. Most respondents agreed that maintaining student engagement during online synchronous lessons was a challenging task. They reported that it was easy for learners to deviate from tasks or even access multiple screens or devices during their online lessons. Most respondents reported that the online classes had fewer interactions between the teacher and students than would be typical in face-to-face classes in a school setting. This was especially true where a majority of the students did not stay focused on their screens. In some cases, this experience was further exacerbated by technical issues, either due to an unreliable Internet connection or defective video or sound on their devices. It was generally perceived by respondents that students concentrated less during online synchronous classes than during face-to-face classes in school. However, the general view among respondents was that the need to facilitate online classes helped them to explore the use of more innovative teaching approaches. Online classes were facilitated by the use of Google Meet and a variety of other technological applications (some of which were subject-specific) to make online lessons more interactive.

The results below (Table 3) are provided as a comparison with the results obtained from Nambiar (2020).

Table 3. *The comparison of the results of the current study with Nambiar (2020) in terms of agreement*

Area:	**Nambiar (2020)**	**Present study**
Online lessons are more effective than face-to-face classes	32.9%	3%
Difficulties with student engagement	56.5%	79%
Online class are fun	13.1%	5%
Lower student' concentration online	71.1%	83%
Helped me to use innovative teaching approaches	50%	77%

There appear to be differences between the two sets of responses. We recognise that these responses were collected during different stages of the pandemic and that in the present study, the questions were addressed to secondary education teachers, whereas the earlier study included college and university-based teachers.

A significant finding in the current study is that the pandemic-enforced distance learning situation forced teachers to innovate their teaching methods. These findings are also mentioned in Liu et al. (2022).

I) PERSONAL FACTORS THAT HAD AN IMPACT ON THEIR ONLINE TEACHING

The items in this section are summarised below:

i) Lack of computer skills makes it difficult to use online teaching effectively.

ii) I feel a lack of work satisfaction during online teaching.

iii) I get anxious during online teaching.

iv) I feel my skills as a teacher improved during the online teaching.

v) I found it difficult to adapt to teaching online.

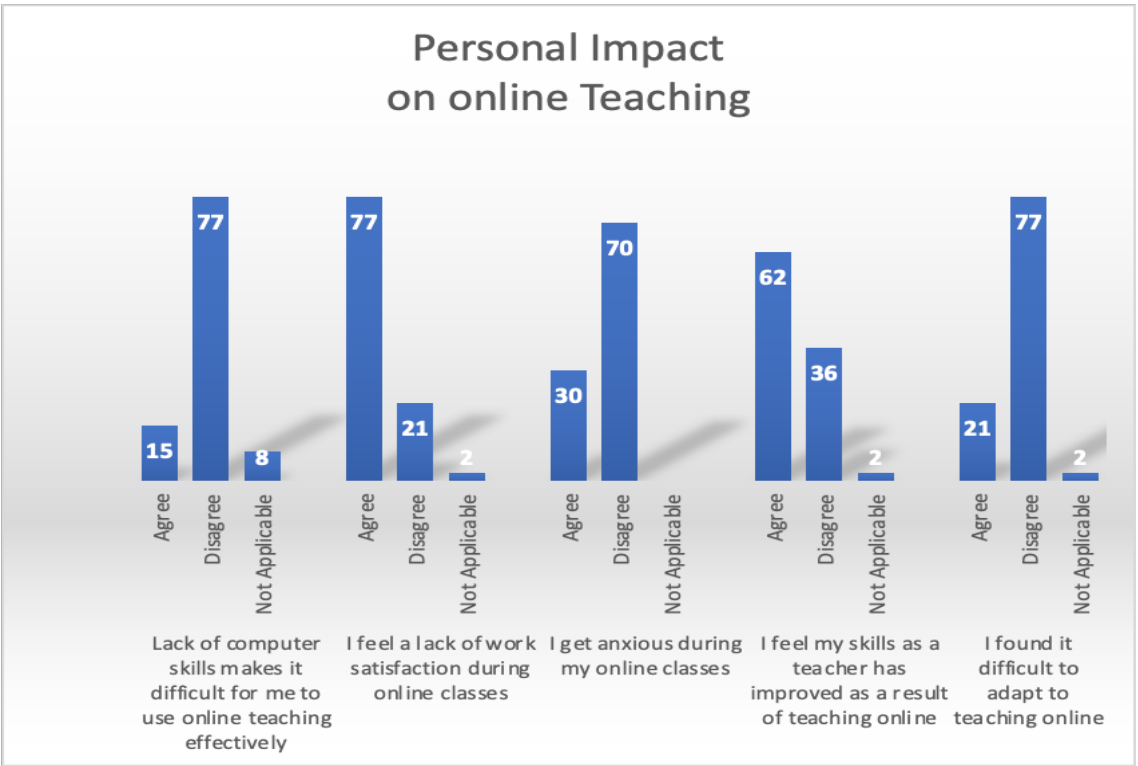

Figure 2. *The perception of teachers on the effect of online lessons. The number in the bars refers to the percentage in the total number of participants*

We note that, as a well-resourced BYOD school, teachers and students were already familiar with using their devices to support teaching and learning prior to the need for campus closure. Teachers also received additional support, advice, and training during the pandemic via an online platform created and regularly updated by the Education Technology team. Despite this support, in combination with prior experience, a majority of respondents still reported they felt a lack of work satisfaction when conducting lessons online. Teachers missed classroom face-to-face interactions with their students and their colleagues. However, only a minority of teachers reported feeling anxious during online lessons, possibly due to the provision of technical and curriculum support for a blended learning approach and for adapting curriculum expectations. The school created an online community blog to provide curriculum and community support to the staff. There was general agreement among respondents who reported having to use a variety of new online tools they had not previously used in a face-to-face setting. In general, teachers in the study school did not report significant difficulty in adapting to online teaching. We surmise that this may have been due to the availability of support provided by the school. Additionally, online support was provided through the online forum (blog) to exchange ideas, tips, and suggestions for combating the feelings of isolation that many people experienced during the pandemic.

The results presented below (Table 4) are provided for comparison with those previously obtained by Nambiar (2020).

Table 4. *A comparison of the results of the current study with Nambiar (2020) in terms of agreement*

Area:	**Nambiar (2020)**	**Present study**
Lack of computer skills added to difficulty for teachers	32.9%	15%
Distant learning and Work satisfaction	63.1%	77%
Online lessons resulted in anxiety	31.6%	30%
Improvement in teaching skills as a result of online lessons	38.2%	62%
Difficulty in adapting to teaching online	32.9%	21%

In the first row of results, we observe a disparity between the two groups of respondent teachers who reported that a lack of technical skills contributed to difficulties with online teaching. The difference in perception of lack of computer skills in Table 4 can be explained by the study school being a BYOD school, where the teacher respondents are relatively familiar with using technology to support learning in their lessons. This emphasis on the use of technology in teaching in the BYOD setting may also explain why, in this study school, the staff were able to modify their teaching approaches given the opportunity presented by the campus closure. However, it should be noted that in both instances, we find that distance learning resulted in raised teacher anxiety and less work satisfaction.

I) STUDENT FACTORS IN ONLINE TEACHING

The questions of this part are summarised below:

i) Students make more excuses for not attending online classes.

ii) It was more difficult to assess the truth of excuses for not attending online classes.

iii) Students appeared less interested during online classes.

iv) Students were less involved in online classes.

We present the results in Figure 3.

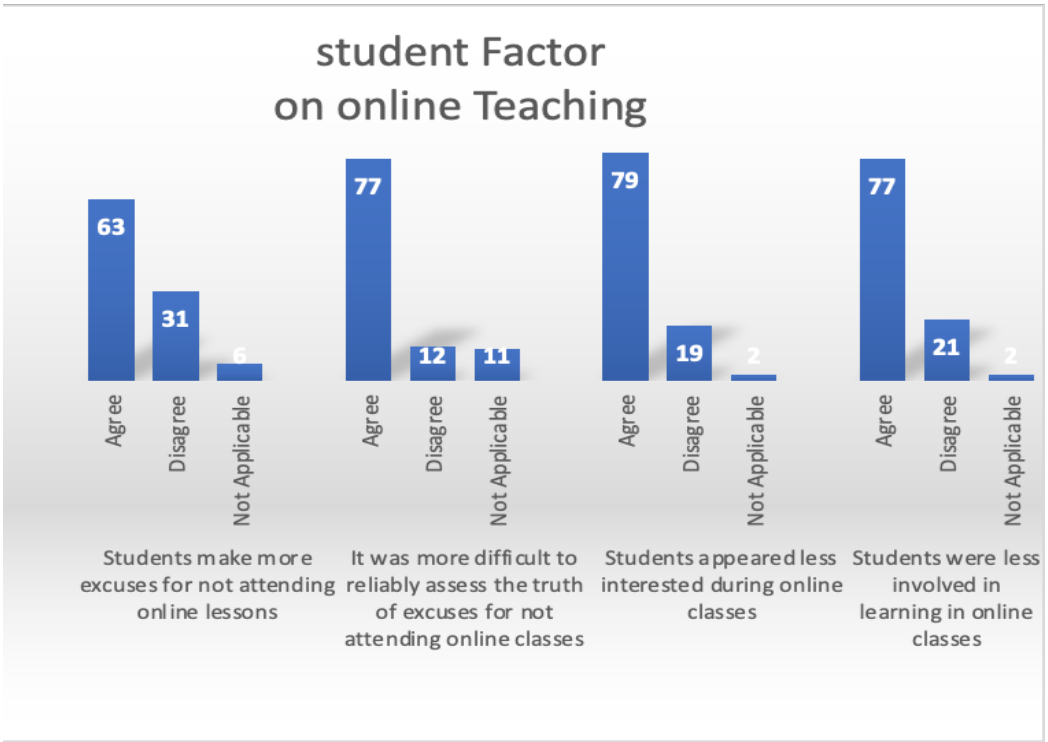

Figure 3. *A comparison of teacher perception of student factors in online lessons and face-to-face lessons. The number in the bars refers to the percentage of the total number of participants*

In the school of study, the teachers generally agreed with the statement that students used more excuses to avoid attending their online lessons. One of the excuses most frequently mentioned referred to issues with internet connectivity. Most of the respondent teachers agreed with this statement, indicating that it was not often possible to verify the validity of the excuses. This was especially true when students claimed that their camera was not working or their microphone had malfunctioned. The majority of our respondents agreed that students appeared less engaged during online lessons. The student's attention to their lessons was also disturbed due to the use of additional electronic devices such as mobile phones. The respondents considered that the students were less involved in online learning when compared to traditional classroom lessons. For some students, the online learning experience was likened to being a spectator at an online show rather than an active participant.

The results presented below (Table 5) are provided for comparison with those obtained by Nambiar (2020).

Table 5. *Comparison of the results of the current study with Nambiar (2020) in terms of agreement*

Area:	**Nambiar (2020)**	**Present study**
Student excuses absent & Reliability of students' excuses	78.9%	
Student more excuses		63%
Reliability of students' excuses		77%
Students lack interested and Students Involvement	75%	
Students lacked interested		79%
Students lacked involvement		77%

The results presented in Table 5 are consistent with those published in Nambiar's work (2020). The emotional and behavioural impacts of the pandemic are widely accepted. In those strict lockdown conditions, the students had only the online environment to maintain social contact and may have been easily distracted and unable to stay focused on learning.

OPEN-ENDED QUESTIONS

In the questionnaire, we have included several open-ended questions in order to gather more diverse data. Two of the questions were also used in Nambiar (2020). In each question, we present examples which represent the broader feedback of the answers provided.

OPEN-ENDED QUESTION 1: TO IDENTIFY ANY POSITIVE OUTCOMES OF TEACHING YOUR CLASSES ONLINE

In most responses obtained from open-ended questions, it was indicated that one positive outcome of the online teaching experience was the perception of an improvement in teachers' familiarity with certain online tools. These included online testing software and the use of Google Meet to host online classes. Similar responses are reported in Liu et al. (2022). Another positive outcome was the opportunity for teachers to modify their teaching approaches, methods and skills to work effectively in an online environment.

> *"My skills in using new technology have improved, and I could use them to make students more engaged."*
>
> *"Working out of one's comfort zone to ensure that learning takes place. Allowed me to be creative and innovative in my teaching."*
>
> *"A new skill for everyone to adapt to - teachers and students. Private 'meeting rooms' for talking to groups were useful. I felt that I was still connected to the students during the pandemic and that it was an important social link for them."*

"*I learned how to use more online teaching tools and had to be a bit more creative in trying to engage students online*"

"*I developed my interest in online teaching tools and platforms. I find Google Classroom an excellent tool to use for differentiation.*"

"*Working out of one's comfort zone to ensure that learning takes place. Allowed me to be creative and innovative in my teaching.*"

Another positive outcome identified by one of the participants was the increased flexibility in the teachers' use of time, such as a reduction in travel time between home and workplace. For example, no wasted time in traffic.

OPEN-ENDED QUESTION 1: TO IDENTIFY ANY NEGATIVE OUTCOMES OF TEACHING YOUR CLASSES ONLINE

The responses to this question on the negative outcomes of teaching online can be categorised into three main issues: Teacher perceptions of teaching online, student behaviour, and specific difficulties experienced when teaching online.

Teacher Perceptions

"*Exhaustion, lack of connection with students*"

"*Extremely tiring beyond imagination, no training, loss of satisfaction, my privacy felt violated*"

"*Engaging in formative feedback was harder, as 'circulating the classroom' and viewing student progress is best done in a room*"

Student behaviour/performance and experience

"*Students lack basic social skills, they are overly reliant on technology, and learnt much less*"

"*Detail of learning wasn't great, student engagement was lower than in class, focus of students not always there (you could hear students playing video games in the background)*"

"*The loss of face-to-face interaction, students were less inclined to ask questions or give answers when online*"

General negative perceptions of teaching online

"*There are more misunderstandings/communication errors due to microphones or speakers not conveying the voice well. Additionally, subtle facial expressions are less obvious with low-bandwidth (resolution) cameras.*"

"*Difficult to assess progress and monitor understanding.*"

"*I teach students who are new to the English language, and then it's sometimes very hard to engage, understand and make yourself understood online.*"

OPEN-ENDED QUESTION 3: TO IDENTIFY ANY SPECIFIC CHALLENGES, YOU FACED WHILE TEACHING YOUR CLASSES ONLINE

Respondents frequently indicated that one of the biggest challenges was motivating students to stay on task, while others also highlighted the challenge of unreliable Wi-Fi connections in the homes of both teachers and students. Teachers also reported difficulty in maintaining a "personal connection" typically associated with the face-to-face environment at school. This finding is like one reported in Aytaç (2021).

> *"We only have Wi-Fi___33 in the living room (not in the sleeping rooms), so it was challenging when teaching and my kids needed to attend their own lessons. It was hard to draw and explain things that you would normally graph on the board"*
>
> *"Too much screen time resulting in sore eyes and headaches; the amount of time it took to prepare lessons; getting no feedback from students (normally you can tell from their faces and body language how the lesson is going)."*
>
> *"Authentication of student work was also a challenge, especially because parents were also at home. Occasional parental interference and an inappropriate learning environment for some students, due to spaces at home being fully occupied by siblings and parents. That was the biggest challenge."*

HYPOTHESIS TESTING

In this section, we applied the chi-square test of independence (Kazmier & Pohl, 1987) at a 95% significance level to investigate whether there is a significant association between the "**years of teaching experience***"* and the teacher's perception of their "***confidence in the use of technology***", with the questions presented in figures 1, 2 and 3. In Table 6, we provide the calculation of the p-values of the chi-square test of independence of the test

Table 6. *The p-values of the chi-square test of independence of the "**years of teaching experience**" and the*

	Online teaching during COVID-19				
	Effective	Engagement Students	Fun and interactive	Concentration Students	Help in innovative teaching methods
Years of teaching experience	.27	.24	.66	.38	0.00001
Confidence in the use of technology	.44	.002	.29	.04	.05
	Personal impact during online teaching during COVID-19				
	Lack of computer skills difficulty	Lack of work satisfaction	Anxiety increase	Improvement teaching skills	Difficulty to adapt
Years of teaching experience	.44	.38	.1	.5	.16
Confidence in the use of technology	.02	.76	.001	.73	.72
	Student factors that influence the online teaching during COVID-19				
	Increase of excuses of non-attendance	Less reliability of not attending	Less interest	Less involved in learning	
Years of Teaching Experience	.24	.36	.45	.04	
Confidence in the use of technology	.13	.25	.64	.01	

*"**confidence in the use of technology**" with online teaching during COVID-19*

It is shown in Table 6 that there is a significant association between **"years of teaching experience"** and the assertion that,

i) The pandemic helped the teachers develop innovative teaching methods.

ii) The students were less involved in online lessons,

There is also a significant association between a teacher's "**confidence in the use of technology"** and

i) The ability to engage the students during the online lessons.

ii) The ability to keep students concentrated during the online lessons.

iii) The pandemic helped the teachers develop innovative teaching methods.

iv) The perception that the lack of computer skills is a challenge in online education

v) The increase of anxiety during online lessons.

vi) The students were less involved in online lessons.

SECTION B2: THE IMPACT OF THE COVID-19 PANDEMIC IN RELATION TO THE TEACHER'S PERCEPTION OF THEIR BUOYANCY

DESCRIPTIVE ANALYSIS

At the beginning of the research questionnaire, teachers were introduced to a definition of teacher buoyancy, based on Anderson et al (2021). Putwain et al. (2023) pointed out the importance of academic buoyancy for teachers to support both learning and the subsequent academic success of students. Based on the work of these authors, we provided our respondents with the following definition.

> *Teacher buoyancy refers to a teacher's ability to maintain a positive attitude and resilience in the face of classroom challenges and setbacks. It involves being able to adapt to changing circumstances, remain optimistic, and maintain a growth mindset. Teacher buoyancy is essential for effective teaching and creating a positive learning environment for students.*

Teachers were prompted to rank their perception of buoyancy on a scale from 0, indicating a lower level (sinking), to 10, indicating a higher level (*swimming*). The results are presented in the line chart in Figure 4**.**

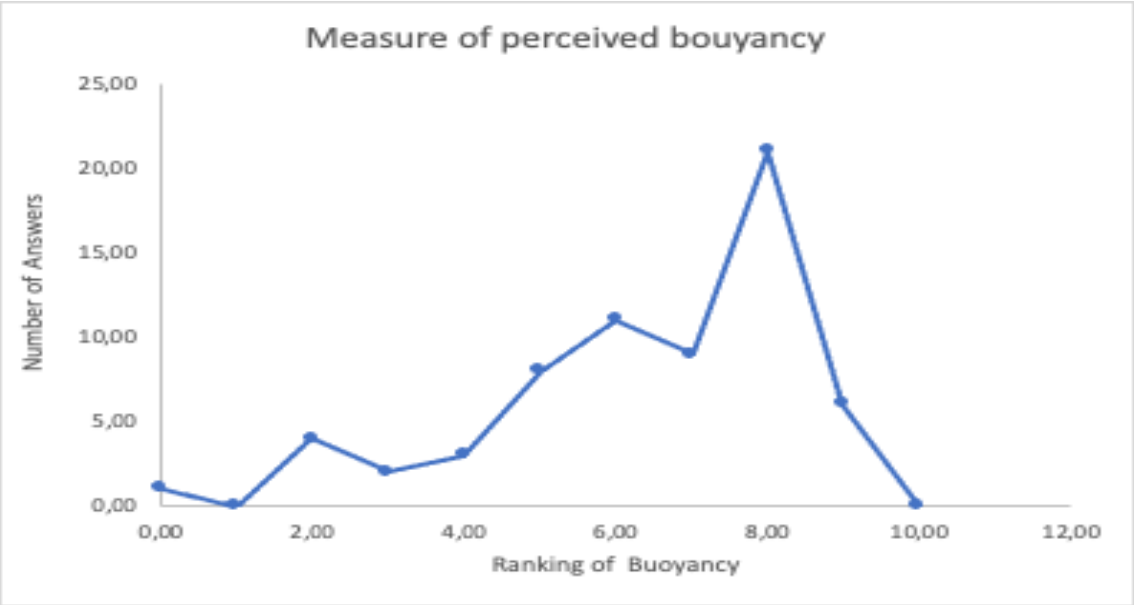

Figure 4. *Teacher perception from sinking to swimming in terms of their buoyancy*

Figure 4 shows that most teachers had a high perception of their buoyancy. Only a minority of teachers reported a relatively low perception of their personal buoyancy due to the need to teach online.

To analyse this further, we present in Table 7 the average rankings of perceptions of buoyancy based on their teaching years of experience and confidence in using technology.

Table 7. *The average ranking of the perception of teachers' buoyancy based on their "**years of teaching experience**" and their "**confidence in the use of technology**"*

"Years of teaching experience"	**Average ranking of buoyancy**
0 to 10 years	4.75
10 to 20 years	6.06
20 years and above	7.1
"Confidence in the use of technology"	**Average ranking of buoyancy**
Confident	6.04
Mostly confident	6.09
Partially confident	6.57

The results from Table 7 show that the **"years of teaching experience"** had a positive impact on teacher buoyancy, where more experienced teachers reported being better able to adapt to an emergency, such as the COVID-19 pandemic. These results also support the suggestion by Liu et al. (2022) regarding the importance of providing professional development in online teaching for teachers with fewer years in the profession.

However, the perception of teachers on their level of "**confidence in the use of the technology"** has no effect on their perception of a teacher's buoyancy during the campus closures. That might be explained by the fact that the school of study was a BYOD school, and thus both teachers and their students were familiar with the use of technology.

OPEN-ENDED QUESTIONS

In this part of the questionnaire, we have also included two open-ended questions. In each question, we present a collection of representative answers submitted by the teachers.

OPEN-ENDED QUESTION 1: DURING YOUR EXPERIENCE OF THE OCVIDE-19 L0CKDOWN, CAN YOU TELL US ABOUT ANY EXPERIENCES THAT CONTRIBUTED TO YOUR OWN SENSE OF BURNOUT?

Some respondents suggested that teachers look at the pandemic as an opportunity to provide positive feedback to the lives of students

> *"The sense of responsibility to our role as teachers to lead by example contributed to staying positive in those difficult times with complete isolation for students and staff."*

> *"Focussed and developed possibilities rather than focusing on deficiencies."*

Other comments highlighted the value of working with colleagues and supporting one another, especially during the pandemic.

> *"The support by the colleagues using online meetings and the support provided by the school to lead moments of working."*

A key proposal suggested by one respondent was to ensure that students were made aware that their work was marked in the same way as in a traditional physical classroom setting.

> *"Making results visible to the students via Google Meet room using polls and Google Docs created the certainty of viewing the students' work."*

OPEN-ENDED QUESTION 1: DURING YOUR EXPERIENCE OF THE OCVIDE-19 L0CKDOWN, CAN YOU TELL US ABOUT ANY EXPERIENCES THAT UNDERMINED YOUR OWN SENSE OF BUYOANCY?

One teacher reported that a hindrance to developing a sense of buoyancy was the lack of contact with other colleagues.

> *"The experience that undermined the sense of buoyancy was the lack of contact with colleagues to exchange ideas and be part of the team."*

Another participant reported frustrations due to the online nature of the lessons, especially with the lack of readily available technology support or poor internet connections at their home or the student's home.

"There were also frustrations due to the impact of factors that were due to the online nature of lessons that were not under our control (such as the lack of Internet connectivity, software not working."

Another negative factor, as indicated by one respondent, was the impact of parents/guardians or management approaches on their lessons.

"The influence of external factors, such as parents who also followed the online classes and sometimes provided feedback."

"There were also efforts of the management to create a uniform approach to the delivery of the curriculum that created more bureaucracy and affected the sense of buoyancy."

HYPOTHESIS TESTING

In this section, we applied the chi-square test of independence (Kazmier & Pohl, 1987) at a 95% significance level to investigate whether there is a significant association between the "***years of teaching experience****",* the teacher's perception of their "***confidence in the use of technology***", with their ranking of their teaching buoyancy presented in Table 7. In Table 8, we provide the calculation of the p-values of the chi-square test of independence of the test

Table 8. *The p-values of the chi-square test of independence of the "**years of teaching experience**" and their "**confidence in the use of technology**" with the perception of their teacher buoyancy during COVID-19*

	Perception of Teacher Buoyancy
"years of teaching experience"	.12
"Confidence in the use of technology"	.27

There is no significant association between "**years of teaching experience"** and "**confidence in the use of technology"** with a teacher's perception of **buoyancy**.

This might be explained by tech-confident teachers being able to handle day-to-day technical challenges; however, their overall mood is greatly affected by the momentous change due to prolonged campus closure and the ongoing presence of COVID-19. In addition, they still experienced the emotional drain of disengaged students.

From another perspective, teachers already familiar with technology for teaching and learning during their day-to-day school experience may already possess high levels of buoyancy, and therefore experienced a relatively low impact on the need to up-skill technologically as a result of the campus closures.

CONCLUSIONS

The results from this study indicate that experienced teachers were more likely to hold a positive perception of their coping strategies during a campus closure. In a recent study by Oxley et al. (2024), an increase in problems experienced by students in engagement and perception of the teacher's well-being is reported. The results of this study showed a significant association between the "**years of teaching experience**" and students' involvement in online classes. Therefore, it is recommended that schools provide additional professional development opportunities to teachers, especially for those with limited teaching experience. This will mitigate against disruption and help engage students in cases where online learning is necessary.

Furthermore, the results show a significant association between teachers' perception of "**confidence in using technology"** in the classroom and the development of innovative teaching methods required during the Pandemic lockdown. This finding supports the suggestion that schools provide professional development opportunities for teachers to continue developing their information technology skills. This point aligns with recent work by Brianza et al. (2024) and Zhang (2021), indicating that it is important to reinforce the link between a teacher's ability to navigate online learning and student engagement. Establishing a good relationship in the classroom is important for promoting student engagement.

The school in this study continues to provide training and support for the use of technology tools to support teaching and learning. In doing so, the school is preparing for any future requirements related to a campus closure. The school is investing in online additional digital platforms and resources to support teaching and learning and reinforce digital literacy and numeracy skills. More recently, there has been an investment of time and resources in the use of artificial intelligence technology in Education, as seen in Tuba et al. (2024), which involves providing regular training to staff. The use of these technologies to support models such as the "flipped classroom" (López-Villanueva et al., 2024) helps prepare students for independent work outside the classroom.

LIMITATIONS

The purpose of this study is to raise awareness about preparing schools for serious calamities, such as the COVID-19 pandemic, by sharing additional school experiences. It explores the impact on teachers' abilities to maintain online learning imposed due to a major disruption to normal teacher experiences. This research will be beneficial when planning for future pandemics or major disruptions. However, this research is focused entirely within the context of an international school. The international school sector experiences a relatively high rate of staff turnover. Therefore, a limitation of this work is that it is based on a small sample of 66 responses collected from a population of 195 teachers. The relatively low response rate could be attributed to the turnover of teaching staff in the school following the pandemic period. Teachers may also have chosen not to participate in the survey due to fatigue resulting from their experiences during the pandemic. Another limitation of the study is that we are using teacher perceptions to measure both the impact on online learning and teacher buoyancy; hence, bias might be a confounding factor in this study.

Finally, recommendations emerging from this study might be relevant to a limited number of international schools. For example, schools that also maintain a BYOD or 1:1 device ratio for students or schools where a well-structured IBO curriculum is established. In addition, the research was conducted in an international school in the Netherlands, a well-ordered and relatively small country where the pandemic was closely monitored and where appropriate measures were taken to limit the spread of contagion.

For school environments where technological readiness is lower (for both students and teachers), it would be beneficial to provide access to and training for a range of online learning platforms that support pedagogy and educational processes.

AUTHOR CONTRIBUTION

Both authors equally contributed to the conceptual framework, planning, data collection, data analysis, content creation, review of findings, drafting and editing of the manuscript.

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APPENDIX I. *Email was distributed to the secondary teachers together with the google questionnaire form.*

Dear Colleague,

The Covid-19 experience was significant for people in the teaching profession and a flurry of research has emerged from the experience. We are interested in doing a small-scale comparative study whereby a survey used in previously published research is applied to a different context. For this, we would very much welcome your participation.

Please answer our anonymous questionnaire which has been designed to obtain feedback from teachers about their experience of teaching and learning during the Covid-19 lockdown. The responses might be used anonymously in published research.

The questionnaire may take 5-10 minutes to complete and will remain open till Wednesday 25th May 2023.

Thank you for your support