

# Effective online professional development: Teacher perceptions, practices, and preferences

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## Research Article

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# Abstract

Never before has the importance of effective online professional development been more prominent than it has during the COVID-19 times with the significant transition to working and teaching online. Effective professional development (PD) is critical in supporting in-service teachers to continue developing professionally, expanding their knowledge, skills, and abilities, and enhancing self-efficacy. The elements of effective face-to-face PD have been researched extensively, but those for online PD remain elusive. This paper reports on the perspectives of in-service teachers who were surveyed on their preferences, practices, and perceptions of effective online PD. The elements of effective online PD were identified: flexibility, human connection, content, savings, and technology. These elements are presented in the context of teachers' behaviours and preferences, which allows a deeper understanding of how to design and develop effective online PD. These findings support the future development of a framework for effective online PD for in-service teachers.

## Introduction

It is well known that in-service teachers are required to continually improve their practice through ongoing professional development (PD) throughout their careers and that this teacher PD supports teachers' job satisfaction and self-efficacy (OECD 2019). In many countries, continuing PD is a requirement to maintain teacher registration (Mayer 2014; OECD 2019), and this signifies the importance of PD to the profession. Significant time and resources are invested in teacher PD, but these may be misdirected if the teachers do not or are unable to use what they have learned through the PD activities (Desimone 2009; Sandholtz and Ringstaff 2020). Therefore, evaluating PD and understanding how participants perceive PD is valuable in supporting continued efforts to improve PD offerings.

Traditionally, teachers have been provided with opportunities for face-to-face PD. However, with the increasing use of online spaces for PD, it is essential to understand what teachers need from online PD to more effectively support their continuing PD. The criticality of effective PD is not questioned in the literature but understanding what comprises effective PD is a recurring conversation, particularly as PD moves from the face-to-face to the online context (Herrington et al. 2009; Quinn et al. 2019; Boylan et al. 2018; Binmohsen and Abrahams 2020). It is also significant to understand how teachers conceptualise PD in order to better situate their behaviours, preferences, and perceptions of PD. Their understandings, perceptions, and experiences affect the effectiveness of the PD (Guskey 2000), and this is becoming increasingly critical as the affordances of online PD include the ability for teachers to disengage easily.

With the increasing availability of online PD, it has become critical to identify the elements that make online PD effective in supporting teacher learning and transference to the classroom. Given this context and the current gap in the empirical literature identified below, this paper reports on one part of a more extensive qualitative study on the components of effective online PD. Here, in-service teachers are surveyed about their perceptions and experiences of online PD, and what they believe makes online PD effective. To more fully understand and situate the findings, the teachers' contexts within which these

elements are being identified, including their understandings of and behaviours associated with online PD, are also investigated. The research question that shaped this study and was used to develop a more holistic understanding of teachers' perceptions, experiences, and behaviours of online PD is: what are in-service teachers' (a) understandings of, (b) behaviours concerning, and (c) perceptions and experiences of effective online PD?

Due to the nature of this study, PD is understood broadly to encompass experiences that are concerned with transformative outcomes (Prestridge 2017) and that allow the participants' perceptions and experiences of PD in their contexts to be self-defined. As part of the survey, the participants define online PD based on their perceptions, and this understanding is carried through the results section,

## Evaluating effective PD: What the literature says

From the early 1980s, when governments began to recognise the importance of teacher PD, the increasing focus on the professionalisation of teaching has included a focus on formal PD (Mayer 2014). Over the past two decades, there have been consistent research efforts focused on evaluating PD and determining what makes it effective (DeMonte 2013; Darling-Hammond et al. 2017; Guskey 2000; Guskey and Yoon 2009; Garet et al. 2001). Guskey (2000) proposed a framework for evaluating PD that acknowledged that PD is a complex process, not an event, and that there are different levels at which the PD needs to be evaluated. Since publication, Guskey's (2000) PD evaluation framework has been widely accepted, and it is used consistently to evaluate the effectiveness and impact of PD offerings (Binmohsen and Abrahams 2020; Mayer and Lloyd 2011; Quinn et al. 2019; Yoon et al. 2007).

Guskey's (2000) PD evaluation framework identifies five critical levels of evaluation used to determine the effectiveness of PD. Each of these levels builds on the preceding level, which means that if an evaluation is poor at one level, it is unlikely to have effectiveness at the following levels. The five levels are hierarchical in nature and begin with a simple evaluation moving through to more complex evaluations. The levels are (1) participants' reactions, (2) participants' learning, (3) organisational support and change, (4) participants' use of new knowledge and skills, and (5) student learning outcomes. These five levels show the complex connection between a teacher undertaking PD and how that has the potential to influence student learning outcomes. While it is complex, it is because these levels can be identified that PD can be evaluated for effectiveness, and its impact can be understood at multiple levels.

Through evaluating PD at these five levels, the impact of the PD can be traced through from the PD event to change in student learning outcomes (Herrington et al. 2009; Yoon et al. 2007; Guskey 2000). Success at each level implies the success of the PD itself, and lack of success at a level can support the identification of areas for improvement in the PD offering (Guskey 2000). For example, if the participants enjoyed the PD but did not acquire the intended knowledge and skills, it is unlikely that there will be an impact in the classroom or on the students. This indicates that the PD offering needs improvement in the PD content, format, and organisation. Likewise, if the evaluation does not indicate success at

transference to the classroom level, then this can be further investigated to identify how the previous levels may be improved to better support transference.

Following on from the seminal PD evaluation framework proposed by Guskey (2000), Garet et al. (2001) reported on what teachers perceived to be effective in their PD. This research investigated the first level of Guskey’s framework, and it began a research push into determining what constitutes effective PD from the teacher’s perspective (Sandholtz and Ringstaff 2020; Binmohsen and Abrahams 2020; Prestridge 2017). Guskey (2003) furthered this discussion by identifying that there was no consensus on what constitutes effective PD. He also identified that the understanding of effectiveness was inconsistent in the literature at that point. In addition to this lack of clarity around effectiveness, the reporting of PD evaluation in the research has also been fraught with claims that there is a consistent lack of rigour in evaluating PD (Guskey and Yoon 2009; Yoon et al. 2007). From this, several studies have focused on determining what effectiveness means when evaluating PD and what constitutes effective PD for in-service teachers. More recently, Darling-Hammond et al. (2017), DeMonte (2013), Desimone (2009), and Yoon et al. (2007) have researched what constitutes effective teacher PD through systematic literature reviews and document analyses, which have included government policies and reports, in order to reach a consensus. Table 1 presents these four influential studies and their identified elements of effective PD. While the studies have discussed different elements of effective PD, five elements have been identified consistently across these and are widely accepted (Quinn et al. 2019; Boylan et al. 2018; Binmohsen and Abrahams 2020): active learning, coherence, collaboration, content-focused, and sustained duration.

*Table 1. Elements of effective PD identified in the literature.*

Effective element	Darling-Hammond et al. (2017)	DeMonte (2013)	Desimone (2009)	Yoon et al. (2007)
Active learning	Incorporates active learning		Active learning	Active learning
Coherence			Coherence	Coherence
Collaboration	Supports collaboration	Collaboration	Collective participation	Collective participation
Content-focused	Is content focused		Content focus	Content knowledge
Sustained duration	Is of sustained duration	Sustained and regular activities	Duration	Sufficient duration
Other identified elements				
	Uses models of effective practice	Use technology wisely		Reform rather than traditional process
	Provides coaching and expert support	Coaching		
	Offers feedback and reflection	Job embedded		

While the literature has consistently referred to these elements as essential for effective PD, the focus has remained on face-to-face PD. However, with the advances in technologies and online learning, PD has also moved online, and the importance of investigating the features of effective online PD has been acknowledged (Mayer and Lloyd 2011; Quinn et al. 2019). Considering that there are significant differences between face-to-face and online PD (Quinn et al. 2019; Hull and Saxon 2009), the research has begun to investigate what constitutes effective online PD to ensure that PD delivered through online platforms is designed for effectiveness and can allow teachers to benefit further from this format.

The rise of online PD is a relatively recent phenomenon, and thus the available literature remains limited. However, Quinn et al. (2019) recently provided a review of theoretical and policy perspectives on effective online PD through summarising and consolidating the literature and extrapolating it to the online context. In their review, they also proposed a heuristic framework to plan and evaluate online PD, but this has not yet been validated. Quinn et al. (2019) defined online PD as that “delivered using web-based technologies and learning approaches” (p. 406) and which includes synchronous and asynchronous activities, job-embedded content, and potentially provides opportunities for more inclusive participation. In their research, Quinn et al. (2019) applied the PD planning and evaluation frameworks presented by Desimone (2009) and Guskey (2014) to the online PD context. In addition to the elements of effective face-to-face PD identified above, through key literature and policy documents, Quinn et al. (2019) identified additional elements for effective online PD as the online environment, learning objects and tools, facilitation, and participant choice. They emphasised that effective online PD must be aware of and utilise the challenges and affordances in the online space, as well as the importance of building both group cohesion and individual online presence. While the features of effective online PD delivery are presented in Quinn et al. (2019), they are not explicitly defined and remain somewhat open to interpretation. To complement their work, the teacher perspective of what is effective when they are participating in online PD is also important.

Other studies have focused on specific instances of online PD and its effectiveness, but these lack coherence in the development of the online PD and appear to not focus on the established elements of effective face-to-face PD. For example, Herrington et al. (2009) investigated the transference of knowledge and strategies gained from an online PD course to the teachers’ classrooms. While this is one method of evaluating effectiveness, the evaluation focused on self-reported transference and not specifically on the elements that made the online PD effective and transferable. In another study, Hull and Saxon (2009) developed an asynchronous online PD based on a social constructivism learning design with a strong emphasis on the communication and facilitation undertaken by the instructor. They found that the instructor’s facilitation and communication were critical in supporting the participants to engage effectively and transfer knowledge and practice to their classroom contexts. However, a clear understanding of the elements of effective online PD remained elusive.

Given this context and the increasing availability of online PD, one place to start with understanding what makes online PD effective is to start with the teachers’ reactions to online PD through investigating their perceptions, practices, and preferences. Because Guskey’s PD evaluation framework has been used

across various contexts to evaluate both face-to-face and online PD (Mayer and Lloyd 2011; Quinn et al. 2019; Binmohsen and Abrahams 2020), it can be used as a basis for determining what constitutes effective online PD. Therefore, teachers' responses and reactions to online PD are explored in order to determine what constitutes effective online PD at the first level of Guskey's PD evaluation framework. If teachers find online PD ineffective, there may only be limited transference to their classroom teaching, and thus limited impact on student learning outcomes. Furthermore, because PD is a process, not an event, the perceptions and experiences of teachers become pivotal in the effectiveness of PD (Guskey 2000). That is, they provide the foundation for evaluating the effectiveness of online PD.

## **Materials And Methods**

### **Participants**

The participants – in-service teachers – voluntarily responded to an online survey after indicating their consent. Participants (n=29) were predominantly female (90%, n=26), with 58% (n=17) being 40-55 years old and 27% (n=8) being 24-39 years old. The participants had an average of 13 years of teaching experience (SD = 8.96) with a range from graduate teachers through to teachers with 35 years of experience. The participants taught in a variety of contexts with the majority (79%, n=23) teaching in post-formal education contexts, e.g. university, college. All participants were either currently teaching or had recently been teaching (within the past two years). The survey was open for one month, and there were 29 complete responses at the end of this period.

### **Data collection**

The survey was designed to explore in-service teachers' perceptions, preferences, and experiences of online PD. There were up to 20 questions in the survey, depending on the responses and the resultant branching. The total survey time was approximately 20 minutes, again depending on the responses and depth of written content in the open-ended questions. The questions were a combination of multiple choice, rating, and open-ended questions, and those discussed in this paper are presented in Appendix A. The survey questions were developed based on a comprehensive literature review of effective online PD and the broad constructs of behavioural intention (influenced by attitude) and actual usage from the technology acceptance model (Fathema et al. 2015). The questions were piloted with a group of educators who did not participate in the main study.

After receiving university human ethics approval, the survey was deployed through a secure online survey tool. The participants were able to respond at a time and location of their choice. The online delivery of the survey enabled in-service teachers from various locations to respond and participate in the data collection. It also enabled the survey to reach a broader potential audience across several professional learning networks that connect in-service teachers. The flexibility of online surveys also allows for branching and customisation of the questions, which provides greater personalisation and

contextualisation for participants (Evans and Mathur 2018). The participants were notified of the opportunity to participate through social media channels that connected with the target participant group, e.g. teachers, lecturers. The survey was conducted during February 2020.

## Data analysis

The data were analysed using a combination of sentiment, descriptive, and thematic analyses. In order to provide a context in which to discuss their perceptions and experiences of online PD, participants were asked to respond to an open-ended question asking them about what came to mind when they heard the term 'online professional development'. The responses were analysed using a combination of thematic analysis (Braun and Clarke 2006) and sentiment analysis (Cambria et al. 2017) to provide a contextual understanding of how the participants perceived and experienced online PD. Some responses included emotions and feelings, which were themed into sentiments toward online PD. Therefore, sentiment analysis was used to further interpret these responses through manually analysing them by looking at their sentence structure, adjectives, adverbs, and keywords to determine the positivity, neutrality, or negativity of the opinion expressed in the response (Cambria et al. 2017). The neutral statements were further analysed to determine if they tended towards positive or negative, or whether they were balanced and neutral. The sentiment analysis comprised a small part of the analysis reported here.

Descriptive analyses (Bhattacharjee 2012) were employed to interpret the findings from the Likert scale response statements. The ratings and their percentages were used to draw conclusions about the participants' perceptions and experiences of online PD and the associated trends within this data. These findings provide insight into the practices, preferences, and perceptions of online PD for in-service teachers. Thematic analysis was used to interpret and theme the responses to the open-ended questions that investigated the participants' perceptions of the advantages, disadvantages, and effective elements of online PD. The responses were coded and thematically analysed to identify the themes in the responses and draw conclusions.

## Results

# How do in-service teachers experience and perceive online PD?

Overall, the survey provided insights into teachers' perceptions, practices, and preferences regarding online PD through exploring their related attitudes, behaviours, and beliefs. Of the 29 survey participants, 27 had previously participated in online PD. These participants were asked to reflect on their experiences and beliefs in their responses. The two participants who had not participated in online PD were asked equivalent questions to determine their perceptions and beliefs about online PD. The responses of these two groups were very similar: those who did not have prior experience undertaking PD online were not more likely to have a neutral perception of or disagree on the perceived benefit of undertaking online PD,

as has been reported elsewhere in the literature (Holmes et al. 2011). Due to the similarities between the two participant groups, the responses are reported and discussed together.

## What does online PD mean to in-service teachers?

Before responding to questions around their perceptions, practices, and preferences, participants were asked to describe what they thought about when they heard the term 'online professional development'. More than half of the participants (55%, n=16) responded with types of online PD, e.g. webinars, online courses, videos, and asynchronous communication. Flexibility was also clearly identified as part of online PD: 28% (n=8) responded with 'flexibility' or elements thereof (e.g. own pace, own time) in the open-ended question. Eleven participants (38%) also provided sentiments around online PD, with 45% (n=5) of these responses being positive, 27% (n=3) being neutral but tending towards positive (e.g. "Great but I don't have the time" (Participant 11)), and 27% (n=3) being negative. These sentiments were analysed by looking at their sentence structure, adjectives, adverbs, and keywords to determine the positivity, neutrality, or negativity of the opinion expressed in the response.

The survey results discussed here are presented in two groups. The first group includes the Likert rating scale responses to statements investigating participants' online behaviours, preferences, and perceptions of using online PD resources and opportunities. The second group of responses are those that were open-ended questions: these focused on the perceived advantages, disadvantages, and effective elements of online PD.

## Understanding in-service teachers' online PD behaviours, preferences, and perceptions

In this part of the survey, participants were asked to rate statements indicating their level of agreement on a scale of 1 (strongly disagree) to 5 (strongly agree). Five statements focused on participant behaviours and four statements related to participants' preferences and perceptions. These results are discussed below.

### Online PD behaviours

These statements were designed to understand the participants' general behaviours around online PD opportunities and to provide a context in which their behaviours may influence their perceptions and preferences for online PD. Figure 1 shows that four out of five of participants (80%, n=23) have positive behaviours with online PD resources and opportunities.

As seen in Figure 1, the results show that most participants seek to improve their teaching practice (79%, n=23) and pedagogical knowledge (79%, n=23) through online PD opportunities. They also use online

resources to support their teaching (97%, n=28). Participants indicated that they participate in online communities that support their teaching practice, with 79% (n=25) of participants agreeing, 14% (n=4) being neutral about their participation in online communities, and 7% (n=2) indicating that they did not participate in these communities. Interestingly, the participants indicated that they generally complete online PD that they start: 66% (n=19) complete the online PD that they start, 24% (n=7) indicated that they might only sometimes complete, and 10% (n=3) indicated that they do not complete these online PD opportunities.

## Online PD preferences and perceptions

These statements enabled deeper contextualisation for the following open-ended questions in the survey, which are discussed in the following section. As seen in Figure 2, three of the four statements had generally positive responses, while the second statement about preferring to undertake PD online had a more neutral response, as discussed below. Figure 2 graphs the responses to these statements.

Most participants indicated that they prefer to research teaching practices online (62%, n=18), with 24% (n=7) indicating no preference and 14% (n=4) indicating that they do not prefer to do this online. While the participants' behaviours (see Figure 1) indicated that they actively sought and used online PD opportunities, they were only slightly more positive about undertaking PD online with 38% (n=11) preferring to undertake PD online, 31% (n=9) not having a preference, and 31% (n=9) preferring not to undertake PD online. This result contrasts with the participants indicating that they enjoyed (62%, n=18) or neither enjoyed nor disliked (28%, n=8) undertaking PD online. To explore this further, the participants were asked to identify whether online PD is effective for them. Most participants (72%, n=21) agreed or strongly agreed that online PD was effective, with some (17%, n=5) neither agreeing nor disagreeing that it was effective, and few (10%, n=3) indicating that it was not effective.

## Understanding in-service teachers' perceptions of the advantages, disadvantages, and effective elements of online PD

Three open-ended questions were asked after the rating statements, and these questions were designed to further explore the participants' perceptions of online PD in terms of advantages, disadvantages, and elements of effectiveness. The responses to these questions were analysed using thematic analysis to distil the key themes that arose. Table 2 presents an overview of the distilled themes, which are presented in detail with further analysis of the questions and responses below.

*Table 2. Themes emerging about the perceived advantages, disadvantages, and effective elements of online PD.*

Advantages	Disadvantages	Effective elements
Flexibility (83%, n=26)	Human connection (69%, n=20)	Flexibility (52%, n=15)
Content (31%, n=9)	Flexibility (38%, n=11)	Human connection (24%, n=7)
Savings (24%, n=7)	Content (14%, n=4)	Content (21%, n=6)
	Technology (14%, n=4)	Savings (14%, n=4)
	Completion (14%, n=4)	Technology (3%, n=1)

## Perceived advantages of online PD

In the survey, participants were asked to describe their perceived advantages of undertaking online PD. The responses were thematically analysed into three broad themes of flexibility, content, and savings. While the participants identified different aspects of these three themes, it was clear that these were considered the key advantages of undertaking online PD. Within these three themes, flexibility was the most common with most participants (84%, n=24) referring to aspects of flexibility such as being able to undertake the PD in their own time, at their own pace, and in a location that suited them, while having the flexibility to choose which PD they participated in based on their needs or interests. The theme of content was the next most commonly identified advantage (31%, n=9) and the responses fell into two categories: increased access to PD and increased access to resources. When describing how increased access was an advantage of online PD, participants commented on being able to participate in PDs that they would not have otherwise had access to due to the travel required or time zones. They also discussed the variety of PDs available online and that they could access interstate and international PD opportunities more easily. For increased access to resources, participants indicated that an advantage of online PD was included the asynchronous access to supporting information, being connected to professional networks, gaining access to the most current knowledge, and access to high-quality resources. The third theme of savings was considered an advantage by 24% (n=7) of participants. This theme arose when participants identified that online PDs saved them time, money, and travel associated costs. Overall, these advantages of online PD were weighted towards the typical affordances of technologies and asynchronous communications.

## Perceived disadvantages of online PD

Participants were also asked to share their perceptions of the disadvantages of online PD. Five overarching themes were identified in the responses: lack of human connection, timing, technical issues, content-related factors, and completion. The most identified disadvantage was that online PD had less (or no) human connection. Sixty-nine percent of participants (n=20) felt not engaged, disconnected, and isolated while experiencing a lack of community, interaction, teacher presence, and networking. It is noteworthy that the two participants who had not experienced online PD only identified potential disadvantages within the human connection theme. The next most common disadvantage was regarding flexibility. Thirty-eight percent of participants (n=11) identified that flexibility was a problem because they

had “competing attention demands” (Participant 1) and experienced a lack of timely feedback and responses, as well as a lack of flexibility in timing (e.g. requirements for synchronous activities). Some identified that the online PD became “extra work” (Participant 20) done in their own time. The three remaining themes were identified as equally disadvantageous with 14% (n=4) of respondents identifying these. The technological issues were related to technical requirements to engage with the online PD content (e.g. learning management system, webinar tools), general technology issues, internet connection, and feeling too similar to social media rather than learning. Content-related factors included disadvantages such as poor-quality resources, lack of guidance (which also relates to human connection), unnatural discussions, and “more complex concepts [being] more difficult to grasp online” (Participant 20). Like many online learning opportunities, it was also identified that PD completion was affected by being online and easily forgotten because it was not a face-to-face, synchronous opportunity. Overall, the identified disadvantages of online PD were typically focused on the human element in the PD process, but also reflected that sometimes an advantage could also be a disadvantage, as seen with the themes of flexibility and timing.

## **Perceived effective elements of online PD**

Participants were asked what made online PD effective for them within their contexts. This open-ended question garnered responses in five themes: flexibility, human connection, content, savings, and technology. Flexibility was identified as the most important factor for effectiveness: 52% of participants (n=15) identified flexibility in timing, pace, and choice of content as being necessary for effective online PD. The next theme was human connection with 24% of participants (n=7) identifying this as being important: the comments indicated that the connection and communication with peers and facilitators are essential for effective online PD. The theme of content included the content being new, useful, relevant, current, and authentic; this was considered necessary for effective online PD by 21% of participants (n=6). Savings in time, cost, and travel were also identified by 14% of participants (n=4) as being a factor in effective online PD. Aspects of technology were identified by 3% of participants (n=1) as making online PD effective for them, including the use of a suitable technological platform for delivering the online PD and setting clear “rules of engagement” (Participant 16) within this space. Overall, these five themes align with those identified in the advantages and disadvantages, but to varying degrees.

## **What makes it come together for effective online PD?**

Through understanding the complex context within which in-service teachers are experiencing and participating in online PD, as well as their perceptions of effective elements, an evidence-based approach to designing effective online PD can be developed. In-service teachers are already undertaking PD online through accessing resources and opportunities that further develop their professional knowledge and skills. However, their inconsistency in completing and reluctance to prefer online PD indicates that these

offerings need to be improved and demonstrably more effective. Teachers can afford to be highly selective and more autonomous in their online PD undertakings and choose to opt-out when the PD does not meet their expectations. Considering that the first level of Guskey's PD evaluation framework (2000) evaluates teacher reactions, the criticality of developing online PD that is effective through deeper understanding of teachers' perceptions and experiences cannot be understated.

The survey results identified five themes that affect in-service teachers' perceptions and experiences of online PD. These themes were presented in Table 2 in order of identification frequency. In all three survey questions, the themes of flexibility and content were identified, but to varying degrees with varying emphasis on the features within each theme. Interestingly, the themes of savings, human connection, and technology also appeared as elements of effectiveness and either a potential advantage or disadvantage, which indicates their importance when developing effective online PD for in-service teachers. These five themes are discussed below as elements that support effective online PD in order to understand how they come together for participants to create positive reactions, which support the first level of PD evaluation according to Guskey (2000).

*Flexibility.* As is widely recognised (Quinn et al. 2019; Binmohsen and Abrahams 2020; Koehler et al. 2013; Fathema et al. 2015), a key affordance of technology is its flexibility and adaptability. In the survey responses, the participants defined flexibility as being able to undertake online PD in their own time and at their own pace, with the content being what they are interested in and with options for asynchronous and synchronous participation in learning activities. They also described flexibility as including the level of participation in the online PD: those who wanted to engage more were able to, and those who wanted to engage less and simply access the resources could do so. This flexibility is a particular advantage of online PD, but it also brought about disadvantages when it lacked sufficient structure and relied on the participants to fully determine their learning journey. Participants also identified that flexibility was important for effectiveness, although the degree of flexibility to achieve effectiveness is changeable depending on the content, context, and purpose of the online PD. Through this understanding of flexibility, it is clear that this element is complex and must be considered carefully when designing online PD as it can bring about advantages and disadvantages. In some cases, too much flexibility may be a disadvantage because more structure would be beneficial; in other cases, too little flexibility will hinder participation and completion of the online PD. In the literature, flexibility is considered a strength of online learning (Fathema et al. 2015; Herrington et al. 2009), and thus it could also be transferable to online PD. Furthermore, as Quinn et al. (2019) discussed in their article, participant choice, which is part of flexibility, is a critical feature of effective online PD.

*Content.* The literature has identified a content-focus as being an element of effective PD (Darling-Hammond et al. 2017; DeMonte 2013; OECD 2019; Yoon et al. 2007), and this element has been reinforced as a significant factor according to the survey participants in relation to the advantages, disadvantages, and effectiveness of online PD. The participants' responses have further enhanced and elaborated this element. There are advantages of online PD in terms of participants having greater access to resources and different content. Teachers can participate in PD opportunities that are not local

to them, and there is greater opportunity for them to participate in a wider variety of PD opportunities. This diversity in content areas and access to more PD can allow teachers to participate in online PD offered by leading practitioners in the field and to engage with likeminded participants, as well as allowing teachers to personalise their PD to suit their desired professional pathway. However, the flipside of this element is that not all content is created equal: some content is high quality, and other content is not. Compensating for this, though, is the ability for teachers to quickly opt-out of a PD opportunity when they have made a judgement that it does not have the quality that they are seeking. While there is a plethora of online PD available, the quality may be hit-and-miss, so the flexibility that online PD affords allows teachers to stop participating in the online PD or not complete it.

*Human connection.* This element was identified as both a perceived disadvantage and perceived effective element in the survey. As a disadvantage, the participants noted that the lack of human connection and interaction distanced them from the PD content and resulted in fewer professional connections with their peers. Some participants felt that the lack of human connection was disengaging and reduced their tendency to complete the online PD. It follows on that human connection was identified as a critical element in effective online PD when there was direct, active engagement with peers and facilitators. This element of human connection aligns with the teaching and social presence elements from the community of inquiry framework developed by Garrison et al. (2010). These two community of inquiry framework elements have become a key element in online learning, particularly in online PD (Holmes et al. 2011). Interestingly, the responses in the survey conflated social presence and teaching presence into one notion of human connection where both connection with the facilitator and peers were seen as important. That is, lack of this connection is considered a disadvantage, while the human connection is also considered to be a part of effective online PD. Therefore, clear consideration of the balance of human connection, including both facilitator-participant connection and participant-peer connection, is important in ensuring effective online PD.

*Savings.* This was identified as both an advantage of online PD and an element of effective online PD. As an advantage, the time and cost savings that online PD presented to participants was conducive to positive experiences; however, as an element of effectiveness in online PD, the savings should allow participants to maximise their time and costs in undertaking the online PD. The element of savings can be associated with that of flexibility, in that the flexible nature of online PD can afford different savings in time and cost, while enabling participants to undertake the online PD outside of traditional working hours. Through these savings, as identified in the survey data, it can also be possible to undertake more online PD opportunities than would be possible when doing them in a traditional face-to-face environment. Moreover, the savings that participants may accrue should be made explicit and visible in order to leverage this as an element of effectiveness rather than an implicit assumption of undertaking PD online.

*Technology.* Technology has been identified in the literature as being an element of effective online PD, with DeMonte (2013) concerned with using technology wisely and Quinn et al. (2019) focusing on different aspects of the technology. The responses garnered here in the theme of technology advance the understandings of what this element comprises. This theme was identified as both a disadvantage and

an element of effectiveness. The technology theme encompasses the software and tools, and the way that facilitators use these to support the PD. Having a balanced approach to technology and using technology to support the PD learning with technology-knowledgeable and technology-capable facilitators can provide an environment in which effective PD can be undertaken. As proposed by Koehler et al. (2013), technology knowledge is an important part of teaching using the digital technologies that are instrumental in providing PD in the online environment. In the case of online PD, understanding the constantly evolving digital space and its associated technology knowledge is particularly important in delivering effective online PD as this is how teachers experience the online PD and their reactions to it inform the first level of Guskey's PD evaluation framework.

These five elements of effectiveness demonstrate that there is no simple answer to what makes an online PD opportunity effective, but rather it is a balancing act of the right combination of flexibility, content, human connection, savings, and technology that will make it effective. As discussed above, some elements can be both an advantage and a disadvantage, while also being crucial in the effectiveness of an online PD opportunity. Therefore, there is no simple panacea for developing and delivering effective online PD, but it can be designed and supported to be as effective as possible and must be further iterated based on participant feedback in order to ensure that it is meeting the needs of the teachers.

## **Implications And Conclusion**

To date, the literature has clearly identified the effective element of face-to-face PD, but there is a gap in understanding what makes online PD effective. By garnering in-service teachers' perspectives of online PD through investigating their practices, preferences, and perceptions, five elements of effective online PD were identified. These elements – flexibility, content, human connection, savings, and technology – can be used to inform online PD development. The teachers who responded to this survey are already engaging with online PD opportunities, so increasing the effectiveness of online PD has the potential to increase the impact on student learning. Therefore, a deeper understanding of what teachers perceive to be the elements that make online PD effective is beneficial when providing online PD that is more likely to be completed and have a positive influence on the subsequent levels in Guskey's (2000) PD evaluation framework.

The perceptions and experiences of in-service teachers presented here provide a foundation for further exploring what constitutes effective online PD as experienced by the teachers themselves. According to Guskey's (2000) PD evaluation framework, the first level of effectiveness must be found in the teacher's responses and reactions before the effectiveness can travel through to the next levels and eventually impact on student learning outcomes. This study has two key limitations. The first is that the survey participants were only gathered from a limited number of online teacher professional networks. The second limitation was that the survey was conducted immediately before the COVID-19 pandemic, during which there has been an exponential increase in online PD being offered and undertaken, which would provide teachers with more experiences to draw on and to evaluate the effectiveness of the available

online PD. It would be worthwhile to conduct this survey again and increase the potential audience through wider dissemination among more teacher professional networks.

This study demonstrates that in-service teachers are engaging with online PD but are not yet finding it effective. They have provided their perceptions and experiences so that online PD can be improved and become more effective. In the current context of COVID-19 where most PD is offered online and traditional face-to-face PD cannot be undertaken, the importance of determining the effective elements of online PD cannot be understated. In the COVID-19 context, the importance of effective online PD has come to the fore, and online PD has the opportunity to become a significant and enduring pathway for teachers to participate in the PD opportunities that they want to through the flexibility and convenience that it affords.

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### **Funding**

Not applicable. There was no funding associated with this research.

### **Conflicts of interest/Competing interests**

The authors declare no conflicts of interest or competing interests

### **Availability of data and material**

Data is available upon request.

### **Code availability**

Not applicable

### **Authors' contributions**

Not applicable

## **References**

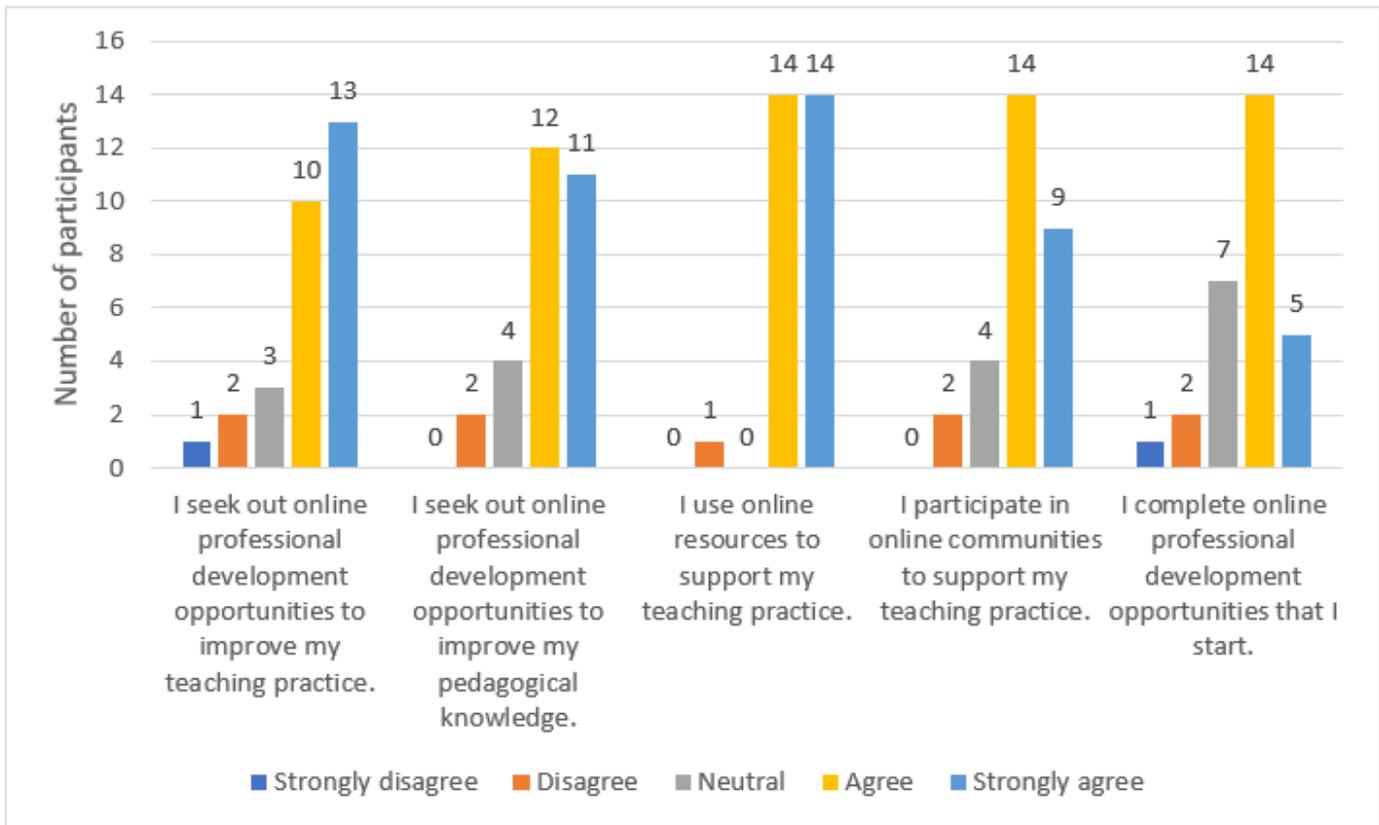
Bhattacharjee, A. (2012). *Social science research: Principles, methods, and practices*. (2 ed.). Tampa, FL: Global Text Project.

Binmohsen, S. A., & Abrahams, I. (2020). Science teachers' continuing professional development: Online vs face-to-face. *Research in Science & Technological Education*, 1-29, doi:10.1080/02635143.2020.1785857.

- Boylan, M., Coldwell, M., Maxwell, B., & Jordan, J. (2018). Rethinking models of professional learning as tools: A conceptual analysis to inform research and practice. *Professional Development in Education, 44*(1), 120-139, doi:10.1080/19415257.2017.1306789.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101, doi:10.1191/1478088706qp063oa.
- Cambria, E., Das, D., Bandyopadhyay, S., & Feraco, A. (Eds.). (2017). *A practical guide to sentiment analysis* (Vol. 5, Socio-Affective Computing, Vol. 5). Switzerland: Springer.
- Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. Palo Alto, CA: Learning Policy Institute.
- DeMonte, J. (2013). High-quality professional development for teachers: Supporting teacher training to improve student learning. Washington, DC: Center for American Progress.
- Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199, doi:10.3102/0013189x08331140.
- Evans, J. R., & Mathur, A. (2018). The value of online surveys: A look back and a look ahead. *Internet Research, 28*(4), 854-887, doi:10.1108/IntR-03-2018-0089.
- Fathema, N., Shannon, D., & Ross, M. (2015). Expanding the technology acceptance model (TAM) to examine faculty use of learning management systems (LMSs) in higher education institutions. *Journal of Online Learning & Teaching, 11*(2), 210-232.
- Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education, 13*(1), 5-9, doi:10.1016/j.iheduc.2009.10.003.
- Guskey, T. R. (2000). *Evaluating professional development*. Thousand Oaks, CA: Corwin Press.
- Guskey, T. R. (2003). What makes professional development effective? *Phi Delta Kappan, 84*(10), 748-750.
- Guskey, T. R. (2014). Planning professional learning. *Educational Leadership, 71*(8), 10-16.
- Guskey, T. R., & Yoon, K. S. (2009). What works in professional development? *Phi Delta Kappan, 90*(7), 495-500.

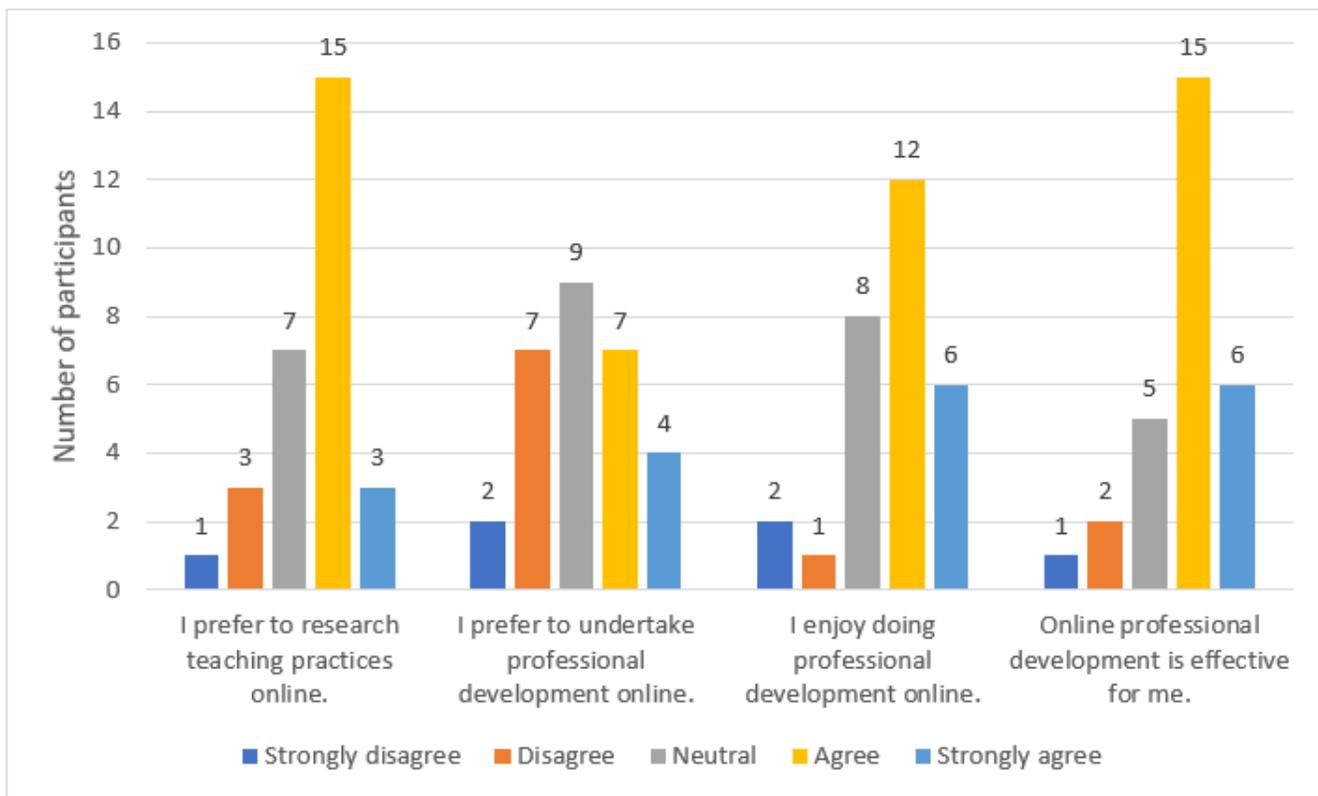
- Herrington, A., Herrington, J., Hoban, G., & Reid, D. (2009). Transfer of online professional learning to teachers' classroom practice. *Journal of Interactive Learning Research, 20*(2), 189-213.
- Holmes, A., Signer, B., & MacLeod, A. (2011). Professional development at a distance: A mixed-method study exploring inservice teachers' views on presence online. *Journal of Digital Learning in Teacher Education, 27*(2), 76-85, doi:10.1080/21532974.2010.10784660.
- Hull, D. M., & Saxon, T. F. (2009). Negotiation of meaning and co-construction of knowledge: An experimental analysis of asynchronous online instruction. *Computers & Education, 52*(3), 624-639, doi:10.1016/j.compedu.2008.11.005.
- Koehler, M. J., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)? *Journal of Education, 193*(3), 13-19, doi:10.1177/002205741319300303.
- Mayer, D. (2014). Forty years of teacher education in Australia: 1974–2014. *Journal of Education for Teaching, 40*(5), 461-473, doi:10.1080/02607476.2014.956536.
- Mayer, D., & Lloyd, M. (2011). Professional learning: An introduction to the research literature. Melbourne, Australia: Australian Institute for Teaching and School Leadership (AITSL).
- OECD (2019). How teachers update their teaching skills to cope with the rapidly changing world. *Teaching in Focus* (Vol. 28, pp. 6). Paris: Organisation for Economic Cooperation and Development.
- Prestridge, S. (2017). Conceptualising self-generating online teacher professional development. *Technology, Pedagogy and Education, 26*(1), 85-104, doi:10.1080/1475939X.2016.1167113.
- Quinn, F., Charteris, J., Adlington, R., Rizk, N., Fletcher, P., Reyes, V., et al. (2019). Developing, situating and evaluating effective online professional learning and development: a review of some theoretical and policy frameworks. *The Australian Educational Researcher, 46*(3), 405-424, doi:10.1007/s13384-018-00297-w.
- Sandholtz, J. H., & Ringstaff, C. (2020). Offering modest supports to extend professional development outcomes and enhance elementary science teaching. *Professional Development in Education, 1*-16, doi:10.1080/19415257.2020.1725594.
- Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. L. (2007). Reviewing the evidence on how teacher professional development affects student achievement. *Issues & Answers Report*. Washington, DC: Institute of Education Sciences.

## Figures



**Figure 1**

Behaviours relating to online PD resources and opportunities.



**Figure 2**

Preferences and perceptions of online PD.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Appendix.docx](#)