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Digital Technologies—And Teacher Wellbeing?

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Abstract: The concept of teacher wellbeing, the importance of considering teacher wellbeing, concerns for developing digital wellbeing and concerns for using digital technologies to support teaching practices have all been previously studied. The idea that uses of digital technologies can support teacher wellbeing (or not) and ways that uses might do this have not been studied to the same extent. Indeed, it can be argued that this topic requires a complete and focused area of study in its own right. This methodologically focused paper takes an initial step in this direction, exploring existing research and backgrounds to wellbeing, teacher wellbeing, digital wellbeing and uses of digital technologies to support teachers' practices. The paper reviews conceptions of digital technologies supporting teacher wellbeing and offers a newly developed outline conceptual model and framework for this research field. The framework is tested, identifying influencing factors from evidence presented in a number of existing relevant case studies where digital technologies have been used to support teacher practices. The efficacy of the proposed framework is assessed, and the paper concludes by offering a proposed research instrument and strategy to advance knowledge in this area.

Keywords: digital technologies; teacher wellbeing; factors affecting teacher wellbeing; teacher wellbeing using technologies; data collection method

1. Introduction

Teacher wellbeing is highlighted as a topic of concern in education. While using digital technologies is highlighted as an important need for teachers, the link between uses of digital technologies and how they might positively support teacher wellbeing has received limited research attention to date. Acknowledging these two important concerns (teacher wellbeing, and using digital technologies to support teaching and learning), it is crucial that we consider how to gather research evidence about uses of digital technologies that might positively support teacher wellbeing. This paper takes a step in that direction in this newly formulated area of research.

This is a conceptual paper, where the study detailed uses an inductive approach to initially develop an outline model and framework of features and factors that can influence teacher wellbeing when teachers use digital technologies. The framework is then developed further to derive a structured data collection instrument.

The paper begins by providing an overview and rationale for undertaking this focus and development, an overview of relevant literature on wellbeing, and how this is related to literature on teacher wellbeing, digital wellbeing, effective uses of digital technologies for teaching and learning, digital literacy, and digital agency. Features and factors that could influence teacher wellbeing when teachers use digital technologies, drawing on findings from the literature review, are identified and formulated as a framework. The efficacy of the proposed framework is assessed, by relating its features to a selected range of existing case studies that report teacher uses of digital technologies in specific but different contexts and situations. The findings of this efficacy review support a proposed data collection instrument that can be used to gather evidence about teacher wellbeing when teachers are using digital technologies.

The idea of digital technologies having a positive influence on teacher wellbeing is often overshadowed in the literature by reports of negative influences. For example,

cyberbullying of teachers by students and parents has been reported in the media [1], as have problems associated with email overload [2]. At a policy level, it is often the negative influences of increasing uses of digital technologies on children and young people's wellbeing that have been considered fundamentally. For example, in a briefing paper [3] for the House of Lords in the United Kingdom (UK), negative effects were highlighted through a stated focus on "issues of: cyberbullying; the use of social media; and screen time" (p. 1).

In a research overview, Mackin [4], looking at the effects from an adolescent perspective, highlights other potentially negative effects on learning that have been raised in a range of previous studies: mental health problems, 'shallower engagement with written material', shortening of attention spans, reducing reliance on memory, and sleep disruption (p. S138-9). Anderson and Rainie [5] share and categorise other concerns from a range of respondents as "digital deficits; digital addiction; digital distrust/divisiveness; digital duress; and digital dangers" (p. 3). These issues may certainly be identified by teachers, but they might also be fundamentally associated with certain approaches to and management of teaching. Indeed, Harding et al. [6], from their study of 3215 12-13-year-old students and 1182 teachers, pointed to this, in concluding that teacher wellbeing affected by student wellbeing and distress could "be partially explained by teacher presenteeism and quality of teacher-student relationships" (p. 460). In contrast, the effects of digital technologies on learning can be positive, and according to Mackin [4], there is as yet insufficient evidence about impacts on mental processes. However, ways that digital technologies are used can affect mental processes; as Howard-Jones [7] says in his report on the impact of digital technologies on human wellbeing, "it is how specific applications are created and used (by who, when and what for) that determine their impact" (p. 7). Although this report [7] is not specifically focused on teachers and their practices, the author does recommend that "[m]ore research is needed in a number of areas, to help evaluate the risks and potential benefits for healthy development presented by the new technologies and their applications" (p. 8).

In exploring teacher uses of digital technologies and how teachers' activities and actions might be leading to teacher wellbeing outcomes, there are a number of salient background concepts and practices to consider. Some background concepts are specifically associated with digital technologies while others are concerned with teacher wellbeing at a wider level. The concept of teacher wellbeing and the importance of teacher wellbeing on a wider level have both been studied in some depth (for example, [8,9]). Concerns about appropriate uses of technologies by teachers in their teaching practices have also been studied in some depth, while practices that teachers can usefully adopt and implement have been explored through conceptions of digital literacy. A range of studies have focused on the digital literacy of teachers (for example, [10,11]), others on the digital agency of teachers (for example, [12,13]), yet others on digital wellbeing that includes teachers (for example, [14,15]) and finally others on uses of technologies by teachers to support effective and specific teaching and learning outcomes (for example, [16,17]).

However, the concept and ways that outcomes of uses of digital technologies might support teacher wellbeing (or not) have not been studied to the same extent. One article that has explored this concept offers an innovative technology adoption development perspective [18] and provides a conceptual framework in order to study teacher wellbeing in this context. Looking at evidence of outcomes on teacher wellbeing when digital technologies are used is not the approach taken by these authors, but one study that has focused on evidence of outcomes [19] explores the effect of home-school communication on teacher wellbeing, as it is recognised that relationships with parents can have both positive and negative effects on teacher wellbeing. The study gathered evidence from 400 parents and 80 teachers in Finland. The authors identified three categories of communication between schools and homes, where effects on teacher wellbeing could arise. The most commonly used was 'study-related matters' ($n = 188$) that included items such as 'homework, test dates, evaluation, and absences'. This was followed by 'behavioral issues' ($n = 58$) that included items such as 'continuous misbehavior and infrequent misbehavior', and lastly 'sensitive issues' ($n = 51$) that included items such as 'conflicts and health matters' (p. 5).

The study found that, overall, "parents and teachers expressed the need for more balanced and encouraging feedback on pupils. It appears from our results that there is too much emphasis still on a child's weaknesses" (p. 6). Whilst this study highlights the need to select digital technologies and their uses appropriately and that the management of the communication can be critical, and whilst ways to support more positive relationships that would lead to more positive teacher wellbeing are suggested, the study does not identify any specific outcomes relating to features or factors that have influenced teachers in their reported wellbeing.

Recent events, brought about by the coronavirus (COVID-19) pandemic, where many teachers have been asked to support their pupils and students through online practices, have opened up ideas for uses of digital technologies to many teachers who had not used these previously [20,21]. The outcomes of this shift in terms of teacher wellbeing are not yet known in detail, but it is clear that such practices can support teacher wellbeing in terms of general health; online practices can support social distancing [22]. In contrast to some extent, a recent University College London (UCL) review of research literature [23] suggested that schools have not been shown in the past to have had major impacts on the spread of viral infections and that schools could for economic and social reasons be opened earlier than had been suggested by others. More recently, researchers (including those at Imperial College London) have questioned findings and recommendations from an alternative scientific perspective [24], contending whether comparing previous viral epidemics and pandemics offers a reliable perspective about possible impacts of this current pandemic. While our children and youth may be more resistant on the whole to the most severe symptoms arising from infection [25], our older populations (which include teachers) will certainly be at greater risk. Classrooms are restricted spaces; they are areas where individuals may well have difficulty in maintaining sufficient social distance (particularly where younger children are involved). Additionally, airborne spread may well be supported by airflow patterns that are set up through movements within these spaces. To address this dilemma, there are schools that have continued to maintain teaching and learning in difficult circumstances, using digital technology to its best effect—to support communication as well as to support viable teacher and pupil interactions, providing a basis for continued teaching and learning.

Therefore, what evidence do we have that digital technology can support teacher wellbeing, and in what situations is this happening, or not? This paper provides an initial overview and then takes a strategic approach to its exploration. The paper is not intended to provide detailed quantitative insight; it offers a strategic perspective for future action.

2. A Literature Review

In this section, literature in a number of related, pertinent areas is reviewed. The areas considered are wellbeing, teacher wellbeing, digital wellbeing, effective uses of digital technologies for teaching and learning, digital literacy, and digital agency. The reviews will highlight features and factors that influence teacher wellbeing when using digital technologies, and these will be drawn together as a framework in the section following (Section 3).

2.1. Wellbeing

The self-determination theory, proposed in the seminal paper of Ryan and Deci [26], provides a conceptual basis for considering wellbeing in a wide sense. Within that paper, the authors identified three important needs—competence, relatedness and autonomy—which, as they said "appear to be essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal well-being" (p. 68). In this paper, the focus is on the ways that digital technologies may affect teacher wellbeing. Taking Ryan and Deci's three needs into consideration in a teacher practice context, the reviewed literature areas that follow relate to these needs and describe teacher wellbeing, digital wellbeing, effective uses of digital technologies for

teaching and learning, digital literacy, and digital agency, all areas that offer varied perspectives. These areas certainly relate to Ryan and Deci's three needs, but the relationship is not necessarily simple to map, as overlaps arise between and across these areas. However, within the review that follows, it is possible to see that teacher wellbeing is related to all three needs of competence, relatedness and autonomy; digital wellbeing is related more to competence and autonomy, and effective uses of digital technologies for teaching and learning are related similarly; digital literacy is related to all three needs, while digital agency is similarly related.

Exploring the concept of wellbeing through another lens, Dodge et al. [27] provide an overview of previous research and seek to clarify the definition of wellbeing. They propose that wellbeing is "the balance point between an individual's resource pool and the challenges faced" (p. 230). These authors consider the resource pool and challenges faced to both be arising from psychological, social and physical sources. It will be clear in the review that follows that these sources also relate to the areas of teacher wellbeing, digital wellbeing, effective uses of digital technologies for teaching and learning, digital literacy, and digital agency. This relationship also provides a foundation for the development and creation of the data collection instrument offered in the last section of this paper.

In terms of measuring wellbeing, Longo, Coyne and Joseph [28] identified fourteen constructs from previous wellbeing models that they used within their measurement instrument. These were happiness, vitality, calmness, optimism, involvement, self-awareness, self-acceptance, self-worth, competence, development, purpose, significance, congruence and connection. In this paper, it is this form of constructs that seek to be identified, but focusing on those that relate to a specific group of individuals—teachers using digital technologies—rather than to a wider population and contexts.

2.2. Teacher Wellbeing

Research reviewed in this sub-section clearly indicates that teacher wellbeing can be affected by psychological, social and physical sources [27], across all three needs of competence, relatedness and autonomy [26]. Savill-Smith [8], from research and reports on teacher wellbeing, identified key issues and factors that influence positive or negative wellbeing outcomes. In her research, factors were explored particularly through a lens focused on physical, lifestyle, psychological and mental health issues. Of the 3019 educational professionals involved in the participant sample, 72% described themselves as stressed (increasing to 84% for senior leaders), 74% considered the inability to switch off and relax to be the major contributing factor to a negative work/life balance, 78% experienced behavioural, psychological or physical symptoms due to their work, and 51% of school teachers attributed work symptoms to pupil/student behavioural issues (p. 6). In this context, within the report [8], four groups of features were identified as contextual and important, all of which could relate to uses of digital technologies by educational professionals. These four groups of factors were: work/life balance, symptoms experienced, work issues, and mental health issues. The groups of features and individual features are:

- Work/life balance—factors which contributed a great deal or somewhat to a negative work–life balance: inability to switch off and relax; working long hours on weekdays; not finding time to be with my family/friends; working over the weekends; working during holidays; family commitments preventing me from doing a good job at work.
- Symptoms experienced linked to possible signs of mental health issues—self-defined or suggested by someone else: anxiety; depression; exhaustion; acute stress.
- Work issues that symptoms were related to: excessive workload; work/life balance; pupils'/students' behaviour; low income; unreasonable demands from a manager; rapid pace of change (e.g., National Curriculum); problems with pupils'/students' parents; bullying by colleagues; redundancy/restructure; lack of opportunities to work independently; lack of trust from managers; discrimination; retirement.
- Ways in which mental health problems experienced at work were alleviated: physical exercise; meditation/mindfulness; alcohol; therapy/counselling; self-medication; drugs.

Garland et al. [9] found similar evidence of influences and levels of effect from their research. These researchers gathered evidence from 2400 school staff via a mobile application (app) and from 684 school staff via an open-ended survey. They found that major causes of stress were related to workload and work–life balance (62%), accountability in terms of performance, test scores and inspections (49%), administrative tasks (42%), pastoral concerns related to mental health and safeguarding (39%), relationships with colleagues (25%), relationships with the senior leadership team (23%), and relationships with parents (17%) (p. 6). Related to these causes, the Office for Standards in Education (Ofsted) in England stated in a recent report on teacher wellbeing in schools and further education colleges [29] the more positive drivers, that teachers "love their profession, overwhelmingly enjoy teaching, are generally very positive about their workplace and colleagues, and enjoy building relationships with pupils and seeing them flourish" but that these are balanced against negative drivers, "high workloads, lack of work–life balance, a perceived lack of resources and, in some cases, a perceived lack of support from senior managers, especially in managing pupils' behaviour. They sometimes feel the profession does not receive the respect it deserves" (p. 5). Discussions with teachers indicate that this latter feature can arise from parental as well as senior manager comments, linking back to the results of a study cited earlier [19].

However, the relationship between job conditions and teacher wellbeing is not necessarily consistent across countries. For example, Verhoeven et al. [30] compared factors affecting Dutch teachers (304 from seven secondary schools) with a wider European sample (1878 from upper secondary school in 10 countries). They found that job conditions for Dutch teachers did differ from the wider European sample in terms of involving "less physical exertion and environmental risks" (p. 473). Additionally, Dutch teachers reported they were "more depersonalised" and more "satisfied than teachers of the European reference group", and "had fewer somatic complaints and reported higher levels of personal accomplishment" (p. 473).

From the data presented in the literature reviewed above, it is clear that teacher wellbeing is not only an issue that needs to be explored deeply, but it is an issue that warrants research that can look for ways to address the challenges that teachers face. As Kidger et al. [31] concluded from their study of 555 teachers in 8 schools, "[i]nterventions aimed at improving their mental health might focus on reducing work related stress, and increasing the support available to them" (p. 76).

The specific features that affect teacher wellbeing need also to be considered in terms of a wider motivational context. This wider motivational context was highlighted in the Savill-Smith report [8]; whilst education professionals stated that they enjoyed different aspects of their work, they also indicated that a vitally important concern for them was to make a difference to the lives of young people. Helping young people to achieve their potential, as well as the quality of interactions they had with their learners, were additional and important underlying concerns (p. 22). Interventions that can enhance these positive reasons for teachers being involved in their work and that can help to alleviate problems that they experience will clearly support more positive teacher wellbeing. While Ofsted in England identified in their report [29] a similar list of influences on teacher wellbeing as those reported by Savill-Smith [8], their recommendations to school leaders did not mention the possible positive influences on teacher wellbeing that might be associated with appropriate uses of digital technologies (some of which are shown from analyses reported in Section 3 of this paper).

2.3. Digital Wellbeing

When teachers use digital technologies, digital wellbeing becomes a more focal element within the arena of wider teaching wellbeing. JISC [32] defines digital wellbeing as "a term used to describe the impact of technologies and digital services on people's mental, physical, social and emotional health" (n.p.). In this context, digital wellbeing can clearly be affected by psychological, social and physical sources [27], but research

reviewed indicates that these appear most strongly to relate to needs of competence and autonomy [26]. Research into digital wellbeing has focused largely on students rather than on teachers; digital wellbeing of teachers is a field that has received fairly recent attention (for example, [33]). From the Digital Wellbeing Educators project website [33], the focus described is more concerned with ways that educators can use a range of digital tools. Specifically, seven digital tools are highlighted. These are course creation tools/e-learning authoring tools (to create courses, simulations, or other educational experiences), presentation software/animation tools (to display information in the form of a slide show), webinar/meeting tools (to interact with each other), screencasting, audio and capture tools (to share their screens directly from their browser and make the video available online so that other viewers can stream the video directly), collaboration and file sharing tools (to help people involved in a common task achieve their goals), bookmarking and curation tools (to collaboratively underline, highlight and annotate an electronic text, in addition to providing a mechanism to write additional comments on the margins of the electronic document), and project management tools (to assist an individual or team to effectively organise work and manage projects and tasks).

2.4. Effective Uses of Digital Technologies for Teaching and Learning

A more specific concern of teachers, going beyond digital wellbeing, is that they use digital technologies effectively for teaching and learning. The research literature indicates that these practices are affected by psychological, social and physical sources [27], that they again relate strongly to needs of competence and autonomy [26]. The discourse that encourages uses of digital technologies to support teaching practices and student learning has been prominent in the research literature for over forty years (and summarised through, for example, the meta-analyses of Tamim et al. [34]). Teacher uses of technologies to support effective and specific teaching and learning outcomes have been encouraged and exemplified in both research and policy documents. In terms of policy documentation, the Victoria Curriculum and Assessment Authority (VCAA) in Australia is an example that provides guidance for teachers on accessing and using a range of online resources [35]. The VCAA website offers guidance to teachers about using digital school planning resources, about safe and responsible use, and offers resources concerned with developing professional learning for teachers to build digital capabilities. The website provides access to an online video content platform, educational resources from around the world, a blogging community, virtual conferencing, educational software that adds value to teaching and learning, and core software including the Microsoft Office Suite, software for video, image and music creation, and software to support thinking skills, literacy, mathematics and science. The Education Endowment Foundation [36], on the other hand, takes a different approach in its guidance, highlighting four recommended ways to consider using digital technologies effectively for teaching and learning. These are considering how uses will improve teaching and learning before using them, improving the quality of explanations and modelling, improving the impact of pupil practice, and playing a role in improving assessment and feedback.

2.5. Digital Literacy

Whilst the discourse around digital literacy is sometimes concerned more with competence and confidence, the concepts of digital literacy and digital agency are clearly related in the research literature to ideas about how digital technologies can be used to effectively support teaching and learning. From the literature on digital literacy, it can be seen that digital literacy practices can be affected by psychological, social and physical sources [27], and that they relate to the three needs of competence, relatedness and autonomy [26]. Conceptions of digital literacy of teachers (for example, [37,38]) often describe and identify a set of skills. This set of skills is considered fundamental to having what is regarded as digital literacy. BBC Bitesize [37], for example, states these as how to find sources of information through digital media and how to access them, sorting information for relevance,

evaluating information for reliability, credibility and authority, managing information in a legal and safe way, and creating original content. DigComp [38] states these in more detail, through a Digital Competence Framework (in its second version) for all citizens:

- Information and data literacy: browsing, searching and filtering data, information and digital content; evaluating data, information and digital content; managing data, information and digital content.
- Communication and collaboration: interacting through digital technologies; sharing through digital technologies; engaging in citizenship through digital technologies; collaborating through digital technologies; netiquette; managing digital identity.
- Digital content creation: developing digital content; integrating and re-elaborating digital content; copyright and licences; programming.
- Safety: protecting devices; protecting personal data and privacy; protecting health and well-being; protecting the environment.
- Problem solving: solving technical problems; identifying needs and technological responses; creatively using digital technologies; identifying digital competence gaps.

2.6. Digital Agency

Digital agency goes beyond the discourse on digital literacy. The details in the European Commission DigComp framework are related to this more recently termed concept of digital agency of teachers (for example, [39]). In digital agency, the core concern is that the teacher is as much a producer as a consumer with regard to using digital technologies. The literature indicates that digital agency can be affected by psychological, social and physical sources [27], and across all three needs of competence, relatedness and autonomy [26]. The concept of digital agency is described through three intersecting elements. The first, digital competence, is defined as the ability to safely and effectively navigate the digital world. The second, digital confidence, is defined as the ability to expertly use a variety of popular computer applications and software to handle information and communication technology (ICT) in different contexts—for learning, for interacting with family and friends and for societal participation such as accessing government services or purchasing goods and services online. This second element includes a sub-element of digital autonomy, which is defined as knowing the informed basis of one's choices and actions. The third intersecting element, digital accountability, concerns digital responsibility for oneself and for others regarding one's digital actions, knowledge of the digital world and its ethical issues, understanding concerns and ensuring security and privacy, and understanding the impact of our digital activities.

2.7. Teacher Wellbeing Arising from Uses of Digital Technologies

Going back to the overview concept being explored in this paper, in terms of teacher wellbeing arising from uses of digital technologies, there is currently a very limited and focused research literature available. Some recent research and development projects have focused more specifically on the development of teacher wellbeing as an outcome. For example, Rymmin, Kunnari and Fonseca D'Andréa [40], in a review of a teacher education programme with Finnish and Brazilian teachers, stated that "teachers consciously constructed networked expertise and socio-psychological wellbeing by applying digital solutions creatively, and this had a positive impact on their pedagogical practices" (n.p.). One way to summarise and model teacher wellbeing that is influenced by uses of innovative digital technologies has been proposed by De Pablos-Pons et al. [18]. Figure 1 shows the outline of their theoretical model.
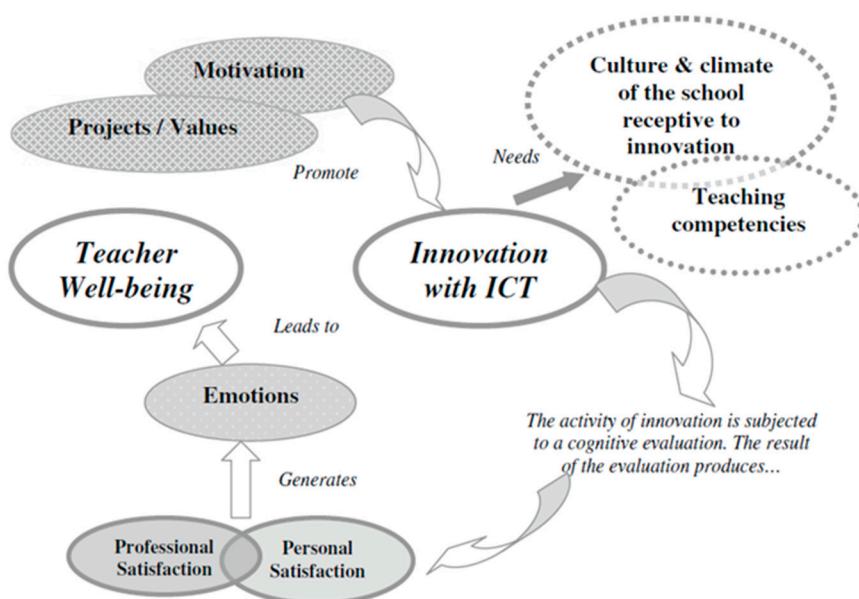
Figure 1. Model relating teacher wellbeing with innovative uses of digital technologies (Source: De Pablos et al. [41]).

However, as they stated, the aim of the study was to "empirically validate the theoretical model" focusing on "the teacher well-being of those teachers who use good practice or innovations with ICT in primary and secondary schools" ([41], p.2760). In the context of innovative use, the authors, from their own literature review, identified seven critical factors concerned with driving a wellbeing balance for teachers when they use digital technologies in this way:

- Background motivations to use the digital technologies.
- Project and values that are identified or foreseen.
- Influence of the culture and climate of the school.
- Teaching competencies.
- Personal satisfaction.
- Professional satisfaction.
- Emotions generated.

The literature reviewed in the previous sub-sections of this paper shows that there is a potentially wide range of factors and features that can influence teacher wellbeing when teachers use digital technologies to support teaching and learning practices. Clearly, these factors can have a positive or negative effect or indeed a neutral effect on teacher wellbeing. How might these factors and features be initially modelled and framed to support future research in this area?

3. Materials and Methods: Approach and Methodology

The aim of the study presented in this paper is to derive a data collection instrument that can gather evidence about how teachers, using digital technologies, perceive the effects of use on their wellbeing. The inductive approach that is taken follows three sequential steps:

- From the range of literature reviewed, and drawing out the features and factors from that literature that are shown to affect teacher wellbeing when using digital technologies (both positively and negatively), two initial outcomes can be developed. Firstly, an outline conceptual model can be created that identifies key features to be considered when researching teacher wellbeing arising from uses of digital technologies. Secondly, a conceptual framework can be detailed that lists pertinent influencing factors within each of the features of the model (shown in Section 3.1).
- To assess the efficacy of the framework, previous studies that have gathered evidence about how teachers use digital technologies in a variety of settings and contexts are

re-analysed using document analysis. This re-analysis involved examination and interpretation of the documents through a specific lens—the individual features listed in the framework (shown in Section 3.2). Whilst it is recognised that a qualitative data analysis program could have been used to undertake this re-analysis, the author chose to adopt a manual method, as the wider context of the case study was important in fully identifying and describing the evidence that supported each feature.

- From a discussion of the assessed efficacy of the framework (shown in Section 4), a structured data collection instrument is developed and proposed for future research in this field (shown in Section 5).

3.1. A Conceptual Model and Framework

A conceptual model that matches and accommodates the categories of features arising from the current literature review is shown in Figure 2. It is clear that this is not a simplistic field to explore; it is complex, as shown by the general relationships and overlaps in Figure 2. This paper does not explore the detail of these overlaps and relationships, which would be a focus of a separate paper and study. It is also acknowledged that other possible models might be drawn and might accommodate other features that would emerge and become identified in the future. Whilst it is worth noting the complexity of this field through the diagrammatic representation in Figure 2, it is the features and factors across this model that will be extracted in order to propose a framework that will lead to the development of an instrument to gather evidence about ways that digital technologies might be affecting teacher wellbeing.
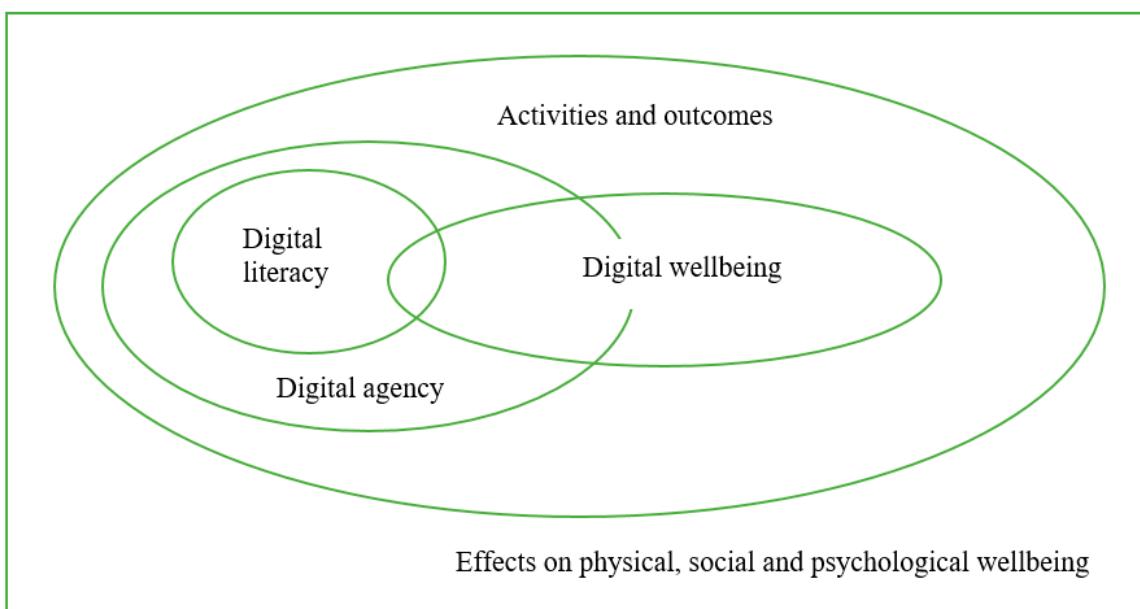
Figure 2. A conceptual model that identifies key features affecting teacher wellbeing when using digital technologies.

The proposed framework developed from the model offered in Figure 2 is shown in Table 1. The factors in this framework are derived from those identified within the literature review, detailed within the previous section and sub-sections of this paper. In Table 1, the factors that are taken from the literature are all phrased in ways to indicate how these might support teacher wellbeing if present, or not if absent. For the final instrument, these factors are constructed in ways offering the potential to gather evidence that could have either positive, neutral or negative influence on teacher wellbeing when teachers are using digital technologies.

The list of factors in the framework will be used in the next section of this paper (but will be referred to by the codes in the right-hand column of Table 1) in order to consider how a number of cases (where digital technologies were used and reported to lead to a number

of positive teacher outcomes that could be related to wellbeing) can be re-analysed to check the framework efficacy. This approach is taken to explore the use of a more structured identification of the specific factors that might influence enhanced teacher wellbeing.

Table 1. A conceptual framework detailing factors influencing positive teacher wellbeing when using digital technologies.

Features Concerned with Teacher Wellbeing	Factors Influencing Teacher Wellbeing	Code
Digital literacy	Having choice of digital technologies	A1
	Having skills to deploy and use the digital technologies	A2
	Supporting information and data literacy	A3
	Supporting communication and collaborations	A4
	Supporting digital content creation	A5
	Supporting safety	A6
	Supporting problem solving	A7
Digital agency	Supporting interactions with parents and guardians	B1
	Feeling more responsible for one's actions	B2
	Feeling security and privacy are ensured	B3
	Feeling that there has been a positive impact on learning	B4
Digital wellbeing	Feeling motivated from digital technology use	C1
	Feeling the use has value for learning	C2
	Feeling the school culture and climate is positive to the use	C3
	Feeling personal satisfaction	C4
	Feeling professional satisfaction	C5
	Feeling positive emotionally	C6
	Supporting collaboration	C7
	Supporting recording of evidence	C8
Activities and outcomes	Support for planning	D1
	Support for professional learning	D2
	Feeling safe and responsible	D3
	Feeling access is easily feasible	D4
	Having access to digital technologies to support interactions in class or beyond	D5
	Having ideas of how positive impact will arise	D6
	Supporting explanations and modelling	D7
	Supporting pupil practice	D8
	Improving assessment and feedback	D9
Effects on physical, social and psychological wellbeing	Feeling more able to switch off and relax	E1
	Reducing long weekday hours	E2
	Finding more time to be with family and friends	E3
	Reducing weekend working	E4
	Reducing holiday working	E5
	Reducing anxiety	E6
	Reducing depression	E7
	Reducing exhaustion	E8
	Reducing stress	E9
	Reducing workload	E10
	Offering a better work/life balance	E11
	Improving pupil/student behaviour	E12
	Reducing unreasonable manager demands	E13
	More positively handling rapid change	E14
	Reducing problems with parents or guardians	E15
	Reducing colleague bullying	E16
	Offering more opportunity to work independently	E17
	Gaining more trust from managers	E18
	Reducing discrimination	E19
	Enabling more physical exercise	E20
	Reducing reliance on ways to alleviate stress	E21

3.2. Exploring the Framework Efficacy through Case Re-analyses

The author has undertaken previous studies that have gathered evidence about how teachers use digital technologies in a variety of settings and contexts. These studies have gathered evidence identifying reasons why and how teachers perceive both benefits and challenges [27], and how they consider this balance in their views and perspectives about the value of using digital technology, to them as teachers. In this section, a number of those reported cases are re-analysed by the author of this paper. Document analysis, as described for example by Bowen [42], was the methodology adopted for this re-analysis. This methodology entails examination and interpretation of the documents through specific lenses (in this case, the individual features listed in Table 1). In each case within the sub-sections following, the background and outcomes are described and then specific details from the cases that evidence influence on the factors in the framework are listed. The author re-read the case studies and identified, for each factor in Table 1, how the teacher reported this (or not), and the evidence they gave in order to demonstrate this feature having an effect upon their wellbeing. These details of evidence are shown in tables within each of the sub-sections that follow.

The selection of these case studies was made on the basis of the original purpose of the case study (identifying why and how teachers perceive and recognise benefits and challenges of using digital technologies), the forms of evidence gathered (qualitative short cases), covering a range of different settings (phases across compulsory education), varied digital technologies (the resources used and for what subject or educational purposes) and different contexts (in-class and online in different countries). From this re-analysis approach, it is possible to see whether individual factors can be identified as being influential in these instances. Using the outcomes of this re-analysis, the efficacy of the framework is assessed. As negative features have been identified in many previous studies, the efficacy focused more on identifying positive features. However, instruments developed and shown in Section 5 will focus on the collection of evidence that is negative, neutral and positive.

3.2.1. Using an Interactive (SMART) Board

A teacher in a German secondary school (gymnasium) had access to a mobile SMART panel with Notebook and document camera, and a mobile SMART kapp iQ panel, able to be connected to the teacher's laptop and to a school virtual learning environment (VLE). The teacher was familiar with the use of interactive whiteboards, but in her school, this was the first time she had had opportunity to use an interactive whiteboard for a number of years. She used the interactive boards in her teaching room with all her classes (in mathematics and English). She felt the use of the interactive boards was supporting her teaching practices, as well as pupil learning. Her use was frequent; she used at least one of the interactive boards in all lessons. The full case study is reported elsewhere [43], and the re-analysis identified ways that the digital technologies are likely to have influenced teacher wellbeing, shown in Table 2. Likely factors not identified are not included in this table, or in the tables in subsequent sub-sections.

It should be noted that a feature arising from this case study was not already identified in the proposed framework—reducing reliance on tools considered unhealthy. This feature has been added into the framework in Table 2, and in subsequent tables.

3.2.2. Using a Software Learning Resource, Learning by Questions (LbQ)

LbQ is a software resource bank which provides questions that cover entire areas of the curriculum for specific age groups (in mathematics, literacy and science). The questions are grouped according to levels of difficulty and their applicability to real-life problems. The levels allow pupils to move from more general understanding to reasoning and finally to problem-solving. The full case study is reported elsewhere [44], and this re-analysis identified ways that the digital technologies are likely to have influenced teacher wellbeing, as shown in Table 3.

Table 2. Likely influencing factors in case 1.

Code	Features Indicating Influence
A1	The teacher could choose from a range of software to use in specific lessons
A2	The teacher was very familiar with uses of an interactive whiteboard
A3	Uses included ways to inform pupil learning and to gather data from pupils
A4	Uses included ways that pupils interacted frequently with the technologies, in the classroom and at home
A5	The teacher regularly created resources to be used in lessons and shared resources beyond lessons
B4	The teacher felt that the use of the interactive whiteboards was positively affecting pupil learning and interactions
C1	The teacher was delighted to have the chance to use the technologies, having not had the chance for some years
C2	The teacher felt there were particular aspects of learning that were being gained, including collaboration and discussion
C3	The teacher was not discouraged at all from use of the technologies
C4	The teacher felt that ways of working in lessons and being able to share resources after lessons was personally satisfying
C5	The teacher felt a better job was being done with the technologies than without them
C6	The teacher was more satisfied with and felt more emotionally positive about lessons
C7	The teacher felt that pupils were being more collaborative when using the technologies
C8	The teacher was able to keep a record of lesson work, which also supported records of pupil work submitted from home
D1	The teacher was able to plan resources ahead of lessons, rather than having to construct them on a blackboard during a lesson
FD4	The teacher found that access to the technologies was very easy
D5	The teacher was able to use a VLE that supported interaction in classrooms and in homes
D6	The teacher planned uses of the technologies to support specific learning and topic needs, focusing on those where pupils identified problems
D7	The teacher was able to create resources that showed pupils how to model analyses and answers
D8	Pupils were more able to be involved in lessons, and to review resources when they were at home
D9	Pupils could share work with the teacher easily, and this could be discussed more easily in lessons
E8	The teacher felt less exhausted when lessons were more easily planned and carried out
E12	Pupils were found to be more positive about lessons and interactions in lessons
E22	The teacher felt that using chalk was unhealthy, and the technologies avoided this problem

Table 3. Likely influencing factors in case 2.

Code	Features Indicating Influence
A1	Although the teacher had limited choice of the hardware involved, there was wide possibility of question choice within the software
A2	The teacher had been trained in use of the technologies
A4	The technologies supported communication of results, between pupils and the teacher, highlighting individual pupil progress
A7	The teacher was able to move to work on problem solving questions more quickly than had been the case in lessons without the technology
B2	The teacher felt that the pupils were more engaged in activities and keen to solve mathematical tasks
B4	The teacher knew that pupils were successfully discussing and completing more mathematical tasks than had happened previously
C1	The teacher was positively motivated by enhanced pupil engagement and outcomes
C2	The teacher felt that using the technologies had added value in lessons
C3	The school principal was known to be supportive of the use of the technology
C4	he teacher felt more personally satisfied about the outcomes of teaching in lessons
C5	The teacher felt a more professional job had been done
C6	The teacher reported feeling less emotionally drained at the end of lessons
C8	The teacher was much more able to monitor and track individual pupil progress
D1	The technology enabled the teacher to choose appropriate questions for specific lessons and pupil groups
D4	The teacher felt that access to the resources was very easy and straightforward
D8	The teacher recognised the additional practice that pupils were involved in
D9	The teacher felt more able to understand progress in a more detailed way and was more able to give supportive feedback
E8	The teacher reported feeling less exhausted when going into lessons
E12	The pupils were more engaged and more active in lessons
E18	Managers in the school were positive about outcomes arising

3.2.3. Engaging with Parents through Uses of Digital Technologies

This case explores uses of digital technologies to support parental engagement in a primary school in Northern Ireland. The full case study is reported elsewhere [45], and the re-analysis identified ways that the digital technologies are likely to have influenced teacher wellbeing, as shown in Table 4.

Table 4. Likely influencing factors in case 3.

Code	Features Indicating Influence
A1	Teachers were able to choose from a range of software technologies to support specific parental engagement needs
A2	Teachers received training and support for all software deployed and used
A3	Technologies supported the flow of information and how data could be used
A4	Engagement and communications with parents were found to be increased and enhanced
A6	Software used was known to be safe for parents and teachers to use within the wider managed network system
B1	Teachers felt that more parents were interacting positively with the school and with teachers
B2	The teachers were able to show parents what work they were doing with their children
B3	Teachers and managers recognised that the technologies used were secure and ensured privacy
B4	Teachers found that pupils were more engaged in learning when they were positively supported and encouraged at home
C1	Teachers were positive and felt motivated by the outcomes of their technology use
C2	Teachers identified enhanced learning that resulted for individual pupils
C3	School managers were known to be supportive of technology uses
C4	Teachers felt more satisfied when their work was appreciated by parents
C5	Teachers felt they were doing a professional job
C6	Teachers felt positive about their interactions in school
C7	Teachers and managers recognised the enhanced collaboration with parents
C8	Teachers recognised that the technology was keeping track of evidence and allowing it to be used positively
D1	Technologies allowed teachers to plan for activities in lessons
D3	Teachers felt safe and responsible when parents were more collaborative
D4	Teachers felt they could use the technologies easily
D5	Teachers were able to share interactions in classrooms with parents at home
D6	Teachers identified ways that the technologies could support specific needs of pupils
D7	The technologies enabled teachers to provide greater explanation to parents
D9	Teachers could monitor and assess pupil progress and behaviours to much greater extents
E9	Teachers found it was less stressful if they could identify problems to discuss with parents earlier
E12	Teachers found that pupils were more engaged and positive when their parents were more encouraging of their school work
E14	Teachers could identify more quickly any changes that were happening concerning the wellbeing of individual pupils
E15	Teachers found that earlier interactions with parents reduced problems, as did the sharing of pupil work with their parents

3.2.4. Using and Contributing to an Online Resource Bank, NewsDesk

NewsDesk is a resource available to all schools in Northern Ireland. A C2k guidance document [46] states that:

"NewsDesk gives pupils an opportunity to engage with current news stories in a digital environment. They can be active users with opportunities to comment on stories and submit their own topical writing to a ready-made audience. NewsDesk also gives pupils opportunities to practise talking and listening and reading and writing skills that they have learned in the classroom" (p. 2).

The full case study [47] explores uses of this resource in a primary school in Northern Ireland; it is one element of a resource prepared for publication in Northern Ireland. From the re-analysis, likely ways that the digital technology has influenced teacher wellbeing are shown in Table 5.

<p style="text-align:center">Table 5. Likely influencing factors in case 4.</p>

Code	Features Indicating Influence
A1	Teachers can choose different technologies to support activities, and can choose from a wide variety of resources on the NewsDesk website
A2	Teachers can be trained in use of the resources, but many teachers find that they have skills to do this already
A3	Activities using these resources support the awareness and creation of information, and support concepts of literacy
A4	Pupils are encouraged to collaborate with others in developing news, and communicate these items to others widely
A5	Pupils create content in a range of forms, which include video and image, as well as documentary text and comments
A6	The whole site runs within a managed network which ensures safety, which parents appreciate
B1	Parents are able to access work that pupils have completed, and also to support their children's creation of news at home
B2	Teachers and pupils both recognise responsibility they have when creating news and commenting on that of others
B3	Pupils and teachers feel that the environment in which they operate is safe
B4	Teachers recognise the impact arising from uses of this technology on literacy and engagement with news
C1	Teachers and pupils report positive motivation arising from uses of this technology
C2	Teachers report ways in which the technology supports learning
C3	School managers are supportive of these uses of technology
C4	Teachers and pupils both report the satisfaction gained when their news items are accessible across 1000+ schools
C5	Teachers feel that they have done a professional job when they support use of this technology
C6	Pupils and teachers both report emotional satisfaction and enjoyment
C7	Teachers and pupils report the ways that activities support collaboration within schools and beyond
C8	The technology provides a record of evidence of pupil and school outcomes and involvement
D1	Teachers report that the width of resources enables them to plan different activities for different age groups
D2	Teachers recognise how the use of the technology has supported their own professional development
D3	Teachers and pupils report feeling safe and responsible when using the technology
D4	Teachers and pupils report that the technology is easily accessible
D5	The technology supports activities that enhance interactions in class and beyond
D6	Teachers consider ways that the technology can be used to support specific learning needs
D7	The technology has been used to support explanation of topics and details, and to model ways to write and to consider audience
D8	The technology supports understanding and creation of news through practice
D9	Feedback is a built-in element of the ways that the technology resource is designed
E12	Teachers report that pupils can be more positively engaged in writing and reading when using the technology
E14	Pupils are demonstrating through the technology how learning activities are changing, and how daily news is of importance to them

3.2.5. Using Online Teaching and Learning during School Lockdown

This case describes how a teacher moved her own practice and that of her colleagues from face-to-face teaching to online teaching during the 2020 COVID-19 pandemic. The teacher works in a secondary school in Germany—a gymnasium. When the school was closed due to lockdown, the teacher set up online classrooms for each of her classes, online classrooms for the majority of the other classes in the school, as well as an online staff room. The online classrooms allowed pupils to be involved in online lessons. In this way, using online teaching was found to support teacher wellbeing during the coronavirus pandemic. The full case study [48] has been re-analysed, identifying ways that the digital technology influenced teacher wellbeing, as shown in Table 6.

It is clear from details in Tables 2–6 that factors identified as influencing teacher wellbeing across these five cases are different in each case, but with some common factors arising. Certain factors are more commonly identified, in two or more cases. Implications of these similarities and differences are discussed in the next section of this paper. What has been shown from the re-analyses of five cases is that the framework in Table 1 provides a means to identify influencing factors. However, means to identify positive, neutral and negative influences need to be developed, and a proposed means to do this will be shown in Section 5.

Table 6. Likely influencing factors in case 5.

Code	Features Indicating Influence
A1	The teacher was able to choose technologies to address specific needs
A2	The teacher had previous experience and skills in using the technology
A3	The technology supported the creation and flow of information, and how data could be used to enable sharing between teachers and pupils
A4	Communication and collaboration was at the heart of the interactions that the technology enabled
A5	The technologies enabled teachers to create content in a variety of formats
A6	The technology was supported on a safe networking environment
B2	Teachers were responsible for creating lessons and activities, rather than using those created by others
B3	Security and privacy were assured by the providers of the technology
B4	The teacher reported how teachers and pupils gained from the use of the technology
C1	The teacher was positively motivated as a result of the successful outcomes
C2	The teacher was aware of how the technology had been used to support learning in an extremely challenging situation
C3	The school management was entirely supportive of the uses of the technology
C4	The teacher felt that the outcomes of the technology use were personally satisfying
C5	The teacher felt that a professional job had been achieved
C6	The teacher felt entirely positive about the outcomes
C7	The technology supported teacher and pupil collaboration, as well as teacher and teacher collaboration
C8	The technology was able to record the outcomes of learning completed by pupils
D1	The technology enabled teachers to set up lessons and activities in a range of ways and formats
D2	The teacher reported the many other teachers had gained in terms of their professional development
D3	Teachers and pupils felt safe in using the technology
D4	Teachers and pupils reported ease of access and use
D5	The technology enabled classroom environments to be created even though they were not face-to-face physically
D6	The teacher used the technology to set up provision in ways that were felt would positively support learning and teaching
D8	Pupils were able to interact in ways to support their practice through engagement and activity
E14	The technology enabled an online alternative to be set up within days, responding to the rapid change necessary

4. Discussion

Considering the maximum number of ways that a technology could influence wellbeing of a teacher across all five cases in the previous section, and within each of the five categories identified in Table 2, this would total: 35 for digital literacy; 20 for digital agency; 40 for digital wellbeing; 45 for activities and outcomes; and 110 for effects on physical, social and psychological wellbeing. The actual number and percentage of positive features that were identified from the analysis of the five cases were: 26 out of 35 (74%) for digital literacy; 14 out of 20 (70%) for digital agency; 39 out of 40 (98%) for digital wellbeing; 34 out of 45 (76%) for activities and outcomes; and 13 out of 110 (12%) for effects on physical, social and psychological wellbeing. Across these five cases, the most influential category identified in supporting positively was digital wellbeing, followed by activities and outcomes, digital literacy and digital agency, with limited influence being shown on physical, social and psychological wellbeing. It should be noted, however, that this outcome could at least in part have arisen from the fact that data gathering from the case studies did not ask specific questions about this latter area or indeed about some of the elements in other categories. If data are to be gathered about the influences as a whole on teacher wellbeing, then clearly a wide range of questions needs to be asked if the potential influences (negative and neutral as well as positive) are to be fully considered.

To view similarities and differences across the identified positive factors in all cases, an overview grid (shown in Table 7) has been created. The right-hand column totals the number of instances that the factor was identified across the five cases. The factors are ordered from the highest number of instances (5 in total) to the lowest (1 in total). Again, it should be noted that factors other than those identified might have been involved, but when the cases were created, specific questions relating to these other factors were not asked of the teachers.

Table 7. Likely influencing factors across all 5 cases.

Factors Influencing Teacher Wellbeing	Likely Influencing Factors					Total
	Case 1	Case 2	Case 3	Case 4	Case 5	
Having choice of digital technologies	✓	✓	✓	✓	✓	5
Having skills to deploy and use the digital technologies	✓	✓	✓	✓	✓	5
Supporting communication and collaborations	✓	✓	✓	✓	✓	5
Feeling that there has been a positive impact on learning	✓	✓	✓	✓	✓	5
Feeling motivated from digital technology use	✓	✓	✓	✓	✓	5
Feeling the use has value for learning	✓	✓	✓	✓	✓	5
Feeling the school culture and climate is positive to the use	✓	✓	✓	✓	✓	5
Feeling personal satisfaction	✓	✓	✓	✓	✓	5
Feeling professional satisfaction	✓	✓	✓	✓	✓	5
Feeling positive emotionally	✓	✓	✓	✓	✓	5
Supporting recording of evidence	✓	✓	✓	✓	✓	5
Support for planning	✓	✓	✓	✓	✓	5
Feeling access is easily feasible	✓	✓	✓	✓	✓	5
Feeling more responsible for one's actions		✓	✓	✓	✓	4
Improving assessment and feedback	✓	✓	✓	✓		4
Improving pupil/student behaviour	✓	✓	✓	✓		4
Supporting information and data literacy	✓		✓	✓	✓	3
Supporting safety			✓	✓	✓	3
Feeling security and privacy are ensured			✓	✓	✓	3
Supporting collaboration	✓		✓	✓		3
Feeling safe and responsible			✓	✓	✓	3
Having access to digital technologies to support interactions in class or beyond	✓		✓	✓	✓	3
Having ideas of how positive impact will arise	✓		✓	✓	✓	3
More positively handling rapid change			✓	✓	✓	3

Table 7. *Cont.*

Factors Influencing Teacher Wellbeing	Likely Influencing Factors					Total
	Case 1	Case 2	Case 3	Case 4	Case 5	
Supporting digital content creation	✓			✓	✓	2
Supporting interactions with parents and guardians			✓	✓		2
Support for professional learning				✓	✓	2
Supporting explanations and modelling	✓		✓	✓		2
Supporting pupil practice	✓	✓		✓	✓	2
Reducing exhaustion	✓	✓				2
Supporting problem solving			✓			1
Reducing stress				✓		1
Reducing problems with parents or guardians				✓		1
Gaining more trust from managers			✓			1
Reducing reliance on tools considered unhealthy	✓					1

The factors where influence was not identified (gaining 0 responses across all five cases), and perhaps where more emphasis needs to be placed on subsequent studies in this field were: feeling more able to switch off and relax; reducing long weekday hours; finding more time to be with family and friends; reducing weekend working; reducing holiday working; reducing anxiety; reducing depression; reducing workload; offering a better work/life balance; reducing unreasonable manager demands; reducing colleague bullying; offering more opportunity to work independently; reducing discrimination; enabling more physical exercise; and reducing reliance on ways to alleviate stress.

From Table 7, it can be seen that it was certainly possible to identify factors influencing more positive teacher wellbeing in each case, given the details known within the cases analysed. The original set of factors listed in the left-hand column of Tables 2–6 and in the left-hand column of Table 7 appears to cover related outcomes of teacher wellbeing for each of the range of different digital technologies used. Relevant identification holds for each of the cases, which focus on different schools, different contexts, different digital technologies and different actors involved (pupils, teachers, principals and parents). Certain factors have been identified as those likely to influence a wide range of cases (across all five cases in this paper), while some have not been identified at all. However, given the sources to which these factors were related, this does not mean that any of these are not important or irrelevant. What might be inferred at this stage is that those with higher total ratings are those that might be relevant to many different situations.

Overall, the conceptual framework shown in Table 1 identifies features and factors of teacher wellbeing that are driven by psychological, social and physical concerns [27]. In order to retain this range and possible balance for any case situation, the full set of features and factors that are known at any one time should be considered when undertaking research that gathers evidence about effects of digital technologies on teacher wellbeing; furthermore, instruments should allow for negative and neutral influences to be gathered as well as positive influences. When asking teachers about their experiences, these features and factors can certainly be framed or phrased using existing research tools and approaches in ways that enable the identification of negative and neutral influences as well as positive influences. This balance of negative, neutral and positive influences can effectively be gathered and accommodated within adopted data collection and analysis methods, chosen according to study contexts (with an example provided in the next section of this paper). Additionally, it should be noted that background studies contributing to this conceptual framework (particularly [8,9]) did identify negative influences as part of their data collection and analysis methods.

5. Conclusions

From the analysis and discussion presented in the previous section, it is vitally important that a full range of features and factors are used when gathering data to explore whether and how digital technologies influence teacher wellbeing (and exactly in what ways and to what extent). Questions to ask teachers, drawn from the conceptual framework and the analysis of its applicability to a range of case scenarios is shown in Table 8, in the form of a data gathering instrument. Some redundant (repeated) factors have been eliminated from the factors listed, and the list has been reordered to group questions into categories (shown in the lettered headers A-E of Table 8), aligned with commonly encountered topics associated with data gathering when these are undertaken in case study situations. In this data gathering instrument (Table 8), each feature is introduced with a general question that relates to the focus of that feature, followed by specific factors that are presented with a range of response options in Likert-style form in order to gather negative, neutral and positive perceptions, and finally, each feature ends with an open-ended question.

Table 8. Questions related to factors influencing teacher wellbeing.

Feature A—Planning and using digital technologies	
Which digital technologies do you use, and what factors are involved when you plan to use them?	Open-ended question
I have a choice of digital technologies to use	Disagree 1 2 3 4 5 Agree
The digital technology is easy to access	Disagree 1 2 3 4 5 Agree
I have the skills to deploy and use the digital technologies	Disagree 1 2 3 4 5 Agree
The digital technology supports my professional learning	Disagree 1 2 3 4 5 Agree
The digital technology supports my planning	Disagree 1 2 3 4 5 Agree
The digital technology supports recording of evidence	Disagree 1 2 3 4 5 Agree
I have ideas of how positive impact can arise when using the digital technologies	Disagree 1 2 3 4 5 Agree
I feel safe and responsible when using the digital technology	Disagree 1 2 3 4 5 Agree
I feel security and privacy are ensured when I am using the digital technology	Disagree 1 2 3 4 5 Agree
I feel the school culture and climate is positive towards digital technology use	Disagree 1 2 3 4 5 Agree
Please offer any comments about your experiences that relate to your responses above, particularly if you can offer examples of how and why you think digital technologies influenced in those ways.	Open-ended question
Feature B—Intentions for using digital technologies	
What do you use the digital technologies for?	Open-ended question
The digital technology supports information and data literacy	Disagree 1 2 3 4 5 Agree
The digital technology supports communication and collaborations	Disagree 1 2 3 4 5 Agree
The digital technology supports digital content creation	Disagree 1 2 3 4 5 Agree
The digital technology supports problem solving	Disagree 1 2 3 4 5 Agree
The digital technology supports interactions with parents and guardians	Disagree 1 2 3 4 5 Agree
Please offer any comments about your experiences that relate to your responses above, particularly if you can offer examples of how and why you think digital technologies influenced in those ways.	Open-ended question

Table 8. *Cont.*

Feature C—Outcomes arising from using digital technologies	
What would you say are the effects and outcomes arising from uses of the digital technology?	Open-ended question
I feel there has been a positive impact on learning when using the digital technology	Disagree 1 2 3 4 5 Agree
I feel using digital technology offers value for learning	Disagree 1 2 3 4 5 Agree
The digital technology supports interactions in class and beyond	Disagree 1 2 3 4 5 Agree
The digital technology supports explanations and modelling	Disagree 1 2 3 4 5 Agree
The digital technology supports pupil practice	Disagree 1 2 3 4 5 Agree
The digital technology improves assessment and feedback	Disagree 1 2 3 4 5 Agree
Using digital technology improves pupil/student behaviour	Disagree 1 2 3 4 5 Agree
I feel motivated from using digital technology	Disagree 1 2 3 4 5 Agree
I feel personal satisfaction from using digital technology	Disagree 1 2 3 4 5 Agree
I feel professional satisfaction from using digital technology	Disagree 1 2 3 4 5 Agree
I feel positive emotionally from using digital technology	Disagree 1 2 3 4 5 Agree
I feel more responsible for my actions from using digital technology	Disagree 1 2 3 4 5 Agree
I feel more able positively handle rapid change when using digital technology	Disagree 1 2 3 4 5 Agree
Using digital technology reduces problems with parents or guardians	Disagree 1 2 3 4 5 Agree
Using digital technology reduces unreasonable manager demands	Disagree 1 2 3 4 5 Agree
Please offer any comments about your experiences that relate to your responses above, particularly if you can offer examples of how and why you think digital technologies influenced in those ways.	Open-ended question
Feature D—Professional outcomes arising from using digital technologies	
There are professional outcomes arising from my use of digital technologies	Open-ended question
Using digital technology, I gain more trust from managers	Disagree 1 2 3 4 5 Agree
Using digital technology reduces colleague bullying	Disagree 1 2 3 4 5 Agree
Using digital technology reduces discrimination	Disagree 1 2 3 4 5 Agree
Please offer any comments about your experiences that relate to your responses above, particularly if you can offer examples of how and why you think digital technologies influenced in those ways.	Open-ended question

Table 8. *Cont.*

Feature E—Effects on physical, social and psychological wellbeing	
Are there any personal outcomes arising from the use of the digital technologies?	Open-ended question
Digital technologies offer more opportunity to work independently	Disagree 1 2 3 4 5 Agree
Using the digital technology, it reduces long weekday hours	Disagree 1 2 3 4 5 Agree
Using the digital technology, it reduces weekend working	Disagree 1 2 3 4 5 Agree
Using the digital technology, it reduces holiday working	Disagree 1 2 3 4 5 Agree
Using the digital technology, it offers a better work/life balance	Disagree 1 2 3 4 5 Agree
Using digital technology, I find I have more time to be with family and friends	Disagree 1 2 3 4 5 Agree
Using digital technology, I feel more able to switch off and relax	Disagree 1 2 3 4 5 Agree
Using digital technology, I find it enables me to do more physical exercise	Disagree 1 2 3 4 5 Agree
Using digital technology reduces anxiety	Disagree 1 2 3 4 5 Agree
Using digital technology reduces depression	Disagree 1 2 3 4 5 Agree
Using digital technology reduces exhaustion	Disagree 1 2 3 4 5 Agree
Using digital technology reduces stress	Disagree 1 2 3 4 5 Agree
Using digital technology reduces workload	Disagree 1 2 3 4 5 Agree
Using digital technology reduces reliance on ways to alleviate stress	Disagree 1 2 3 4 5 Agree
Using digital technology reduces reliance on tools considered unhealthy	Disagree 1 2 3 4 5 Agree
Please offer any comments about your experiences that relate to your responses above, particularly if you can offer examples of how and why you think digital technologies influenced in those ways.	Open-ended question

It should be noted that the data collection instrument shown in Table 8 is not a scale measurement tool. The study was not undertaken in a way that would allow the development and assessment of the use of a scale development tool, using a scale development approach. It might also be argued that the questions in Table 8, identifying factors affecting teacher wellbeing when using digital technologies, can only gather evidence that would be considered to be too 'subjective'. Indeed, Veerhoven [49] discusses distinctions between subjective and objective evidence in detail and indicates the importance of considering evidence that can combine both the subjective with the objective where possible. If this data collection instrument is used in a case study scenario, it is argued that it is important that the 'how' and 'why' questions, which Yin [50] so rightly emphasised as being critical to understanding any case, are asked additionally. It is through the understanding and detail that arises from answers to these 'how' and 'why' questions that can lead to examples of ways to support teachers positively.

In summary, digital technologies have more commonly been identified in the past as having negative influence on teachers and their wellbeing. Whilst examples of such negative influence clearly exist, it is also important for us to identify where positive influences on teacher wellbeing may be arising, in order for us to support teachers more effectively in the future—in terms of their needs, in times when demands on their time and on their expertise do not seem to be diminishing. We owe it to the teacher profession to understand much more exactly when, how and why positive teacher wellbeing can be supported through effective uses of digital technologies. Given the current situation from 2020 and ideas of different possible future scenarios of how educational provision may be developed to address contemporary challenges, it is particularly important that this area of research focuses on four different alternatives. These four alternatives should cover contexts where teacher wellbeing arises from uses of digital technologies firstly in a purely face-to-face classroom environment, secondly in a purely online environment, thirdly through a blended model where face-to-face and online happen at different scheduled times, and fourthly through a hybrid model where face-to-face and online are happening concurrently. A deeper understanding of how teacher wellbeing in each context can be supported is likely to match the needs for our future in education.

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