

Article

Teachers' Work Engagement, Burnout, and Interest toward ICT Training: School Level Differences

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Abstract: Teachers' work engagement is associated with positive outcomes regarding work-related well-being. Conversely, burnout menaces teachers' work and attitudes toward professional development. As indicated in the literature, burnout can influence teachers' work engagement. Considering the impact of ICT on school activities, interest toward ICT training can also affect teachers' work engagement. The present study aims to explore the differences among different school levels concerning work engagement, burnout, and interest toward ICT training. Furthermore, we study the extent to which teachers' burnout and interest toward ICT training predict work engagement, taking into account the school level. The participants were 358 Italian teachers of primary, middle, and high school. We proposed to fill out the Utrecht Work Engagement Scale, the Copenhagen Burnout Inventory, and three ad hoc items assessing interest toward ICT training among 358 Italian teachers. To compare the school levels, an ANOVA and a Multiple regression analysis for each group corresponding to a different school level has been used. Results showed that: (a) primary school teachers have a higher level of work engagement and interest in ICT training compared to their colleagues at high schools; (b) burnout predicts work engagement in all school levels; (c) interest toward ICT training influences work engagement only in primary and high school. Cultural and contextual dimensions are considered when interpreting the results. Implications for teachers' enhancing their commitment at work are discussed, as well as limitations of this study and possible further development.

Keywords: work engagement; burnout; ICT; school level

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1. Introduction

Work engagement and burnout are considered, respectively, as the main resource and as a possible menace for teachers' well-being at work. Previous findings [1] have extensively demonstrated that both these dimensions are interrelated, and they even affect students' school achievement. Therefore, more research is requested to better understand how engagement and burnout are interconnected, so as to overcome inconsistent findings and contribute to understanding how to support teachers' professional development in coping with stressful events. The current study investigates the relationships and the differences between work engagement and burnout considering teachers' school levels. Recently, it has been also clear that the use of technology can play a role in determining both work engagement and burnout [2], thus we also included teachers' interest in ICT training.

1.1. Teachers' Work Engagement

Work engagement is a multicomponent psychological state characterized by a positive attitude and an energetic connection with job tasks and activities [3]. More specifically, when workers are engaged in their professional activities, they experience more vigor,

dedication, and absorption in their work. These dimensions encompass cognitive, emotional, and behavioral aspects. While vigor refers to the physical energy and positive emotions devoted to the job's tasks, dedication and absorption refer to workers' mental energy focused on activities associated with task-oriented behavioral strategies [4,5]. Several findings confirm that teachers' vigor refers to their investment in daily work tasks [6]. Teachers spend physical and mental energy to take care of the school environment, their mental resilience, and commitment. Teachers' dedication can be considered an attitude towards their professional tasks carried out with responsibility and a sense of belonging to their institution. When engaged in new tasks, committed teachers care about work-related relationships (i.e., with students and colleagues) and experience enthusiasm and interest [7]. Yet, absorption corresponds to a cognitive and emotional disposition, leading to high concentration and motivation, persisting while performing job activities [8]. Teachers' work engagement is associated with several positive outcomes concerning work-related well-being. Dedication is a positive predictor of job satisfaction and, when associated with vigor, negatively predicts the intention to quit the profession [9,10].

Work engagement is also associated with high energy and mental resilience to face job challenges and persevere despite difficulties. Similarly, engaged teachers are more active and inclined to experience challenges [10], and show a positive attitude toward new learning opportunities [7–10]. Likewise, previous findings reported that engaged teachers positively impact their students' motivation and academic performance [11]. Moreover, teachers' engagement at work prevents absenteeism and sickness [12], reduces burnout risk [13], promotes good work-related relationships [14], and improves their performance as educators [15].

Teachers' work engagement is expected to change depending on the job environment because of the different balance between job demand and resources [1–4]. Evidence supports the relevance of the school context and shows that school levels can be considered as a magnifying glass to understanding teachers' attitudes toward their job [16,17]. Surprisingly, despite the considerable research on teachers' work engagement over the last decade, no previous studies have comparatively investigated teachers' engagement across grade levels. We intend to fill this gap by looking at how teachers' work engagement varies according to their school level.

1.2. Teachers' Burnout: Menace to Their Engagement

Among several menaces to teachers' work engagement, research has devoted huge attention to burnout syndrome, which is a psychological and psychosomatic distress affecting helping professionals, such as teachers. It can be defined as a syndrome characterized by exhaustion, which is a feeling of being overextended and depleted of one's emotional and physical resources; cynicism, which is a negative, uncaring, or excessively detached response to various aspects of the job; and inefficacy, determining feelings of incompetence together with lack of achievement and productivity at work [18]. More recently, a new approach to study workers' burnout, based on experienced physical and psychological levels of fatigue, has been developed [19,20]. This theoretical framework aims to consider how different sources of burnout contribute to the workers' disease. The Copenhagen Burnout Inventory (CBI) [19] is a tool assessing three distinct dimensions: personal burnout, work-related burnout, and student-related burnout. While personal burnout refers to people's general feeling of exhaustion in their private life (i.e., outside the work environment), work-related and student-related are dimensions associated with stressful events in the work environment (i.e., work demands and relationships with students, respectively).

Nowadays, teaching is one of the most stressful helping professions, demanding a wide range of emotional competencies (e.g., caring relationships with students and managing students' maladaptive behaviors) and cognitive skills to adapt lessons for different students (e.g., students with learning disabilities). The most frequent stress-event sources for teachers are time pressure, students' disruptive behavior, continuing changes in administrative dispositions, as well as complex relationships with students' parents, co-workers,

and school leaders [21,22]. Burnout is associated with teachers' experience of a sense of inefficacy in facing pressures and difficulties connected to daily school events [23]. Burned-out teachers feel emotionally exhausted and with not enough energy to invest in school-life issues. They may also show a cynical attitude toward their job, leading them to disinvest in their professional role [24]. Longitudinal studies have demonstrated that the more teachers experience burnout, the more their vigor and enthusiasm towards their work-life were dramatically reduced [25,26].

Relevant findings are also showing the negative correlation between teachers' burnout and their intention to either quit or continue working without investing in professional training or professional success [27]. Furthermore, teachers' negative feelings due to reduced work engagement and increased burnout symptoms negatively impact students' school achievement. Recently, a systematic review focusing on the effects of teachers' burnout on their students' school-related outcomes provided evidence of the negative impact of teachers' burnout on the overall student achievement and motivation [28].

Scholars have abundantly investigated how burnout level changes across school levels [29]. A clear result is that teachers' burnout risk increases according to the school level: it is low in primary school and it reaches its maximum at the high school level [30,31]. This trend was identified in several countries. For example, a Spanish study reported that secondary school teachers have a higher rate of burnout than their colleagues working at the primary level [31]. Similarly, Italian studies have revealed that secondary school teachers show higher exhaustion levels than their colleagues from lower school levels [27]. In contrast, only a few studies have found the inverse trend with primary teachers recording a higher burnout level than secondary school teachers (e.g., [32]). In any case, features of the work environments and personal variables may make the difference in being professionally exhausted or not. Based on these studies, we understand that the impact of the school level is not always clear, and it needs to be further investigated.

1.3. Teachers' Professional Development: Interest toward ICT Training

Teachers' professional development represents the main road to acquire new skills at work and effective educational strategies to promote students' achievement [33,34]. Teachers involved in professional development are more inclined to change their professional routine, adapt to new requests, and cope with professional challenges [35]. A relevant element of professional development is teachers' interest toward new learning opportunities through professional training (e.g., [36]). Interest is defined as a psychological state that occurs during interactions between humans and their objects of interest. It is characterized by high attention, concentration, and emotion. As an individual's interest develops in a particular area, emotions are accompanied by also developing cognitive components [37]. Interest elicits intrinsic motivation to engage in a particular content or activity [38]. Being interested "motivates exploration and learning, and guarantees the person's engagement in the environment" [39] p. 257.

Nowadays, information and communication technologies (ICT) skills are greatly expected in teachers' pedagogical repertoire. These skills are also considered a distinctive dimension of professional development through which teachers improve their knowledge, pedagogy, and classroom strategies. According to previous research [40–42], teachers' ICT competencies refer to knowledge and pedagogical competencies about technology and its effective use during classroom activities. Teachers' approach to ICT combines cognitive, emotional, and motivational dimensions, including knowledge, skills, interests, and self-confidence [43]. When teachers feel confident with ICT, they are more likely to generate a positive classroom environment, work on didactic subjects with pleasure, and, consequently, positively impact students' learning [40].

Nevertheless, findings have shown teachers' difficulty in introducing ICT at school. Studies investigating the association between teachers' emotions and ICT use have found that teachers tend to experience negative emotions (i.e., anxiety, apprehension) when new technology is introduced in school [44,45]. Similarly, a negative correlation has been found

between teachers' ICT use in daily instruction practices and their well-being. Actually, adopting technology at work can be a source of stress—namely, technostress—characterized by fatigue, cynicism, and inefficiency related explicitly to ICT [44,46]. Likewise, findings reported that technostress is associated with teachers' high burnout levels [47]. Technostress can be related to a sense of unfamiliarity with technology, malfunctioning devices, and continuing requests for updating and training about the use of technology [44,48,49]. Conversely, only a few studies found teachers' positive feelings regarding ICT experience at school (e.g., enjoyment, happiness, engagement, and curiosity) [50,51]. Among the studies addressing this topic, [42] has recently found that teachers who experienced positive emotions towards ICT use in their pedagogical practices showed more autonomous motivation and high work engagement.

Despite the relevance ICT skills are gaining in contemporary society and in education, these skills rank at the fifth position according to teachers' interests [52]. In particular, Italian teachers' rate their professional interests toward ICT training lower than the European average (51% and 56%, respectively) [52]. This affects both teachers' professional development and students' performance. Other studies found that the use of ICT in teaching activities increases when teachers receive in-service specific training about it [53].

The introduction of ICT at school can have either a positive or a negative impact on teachers; therefore, it seems important to consider ICT training as a relevant resource to reduce the problematic effects of innovation at school. A positive interest towards ICT training could indeed favor teachers' acquisition of digital skills [53], which can promote a more positive work engagement. Nonetheless, teachers' interest toward ICT training remains unexplored in the current literature, both in general and in a comparative perspective across school levels.

1.4. Aim and Research Questions

This study investigates the relationships among three dimensions—work engagement, burnout, and interest toward ICT—by considering teachers' school levels, which is substantially unexplored in the existing literature. As already stated, studies focused on the relations between the above mentioned three dimensions looking at the differences across school levels are inconsistent and scarce. Therefore, our study can be considered as exploratory since no solid theory delineating these dimensions according to school level can be found.

We addressed, then, the following research questions:

Research Question 1 (RQ1). *Is the work engagement experienced differently by teachers of primary, middle, and high school level?*

Research Question 2 (RQ2). *Is burnout experienced differently by teachers of primary, middle, and high school level?*

Research Question 3 (RQ3). *Do teachers of primary, middle and high school differ in their interest towards ICT training?*

Research Question 4 (RQ4). *Would burnout and interest toward ICT training predict work engagement for all school levels?*

Being an explorative study, we can not formulate clear expectations at least for RQ1, RQ2 and RQ3. As for RQ4, we expect to observe that burnout negatively predicts work engagement. We also expect interest toward ICT training to positively predict work engagement at any school level.

2. Materials and Methods

2.1. Participants

In this study, 358 Italian teachers participated. Of these 358, 88.3% are female, which reflects well the real composition of teachers in Italy. We collected data in 10 schools located across the whole national territory. The age ranges from 32 to 66 years old ($M = 49.25$;

SD = 7.45), with 8 to 42 years of teaching experience (M = 21.65; SD = 8.45). Considering the school level where they teach, 52.5% of them are employed at the primary school level (1st–5th grade, N = 188, 97, 3% females, age: M = 48.77; SD = 7.32), 21% at the middle school level (6th–8th grade, N = 75, 86.7% females, age: M = 49.19; SD = 7.80), and 26.5% at the high school level (9th–13th grade, N = 95, 71.6% females, age: M = 50.24; SD = 7.39). We contacted the teachers via e-mail after the initial approval of their school principals. All the relevant information about the project was provided, and teachers voluntarily participated in the research.

2.2. Instrument and Procedure

The Italian version validated by Pisanti et al. [54] of the Utrecht Work Engagement Scale (UWES) [10,55] was used as a teachers' engagement measure with 17 items each allowing 7-point Likert scale answers. The UWES inquires about three dimensions: vigor, dedication, and absorption. Following the authors' recommendation [10,55], UWES can be used both to measure work engagement globally—summing the items' score of each scale—and to measure each dimension by summing the items' score of the relative subscale. In this study, we decided to use the UWES in both ways: to measure teachers' work engagement globally and to elaborate on each dimension. In the present study, Cronbach's alpha was 0.95 for the global scale and 0.88 for vigor subscale, 0.91 for dedication subscale, and 0.87 for absorption subscale. The Copenhagen Burnout Inventory (CBI) [19] was used in the Italian version validated by Fiorilli et al. [56] and Avanzi et al. [20] to assess teachers' burnout. This tool consists of 19 self-reported items on a 5-point Likert scale. The CBI measures three dimensions: personal burnout, work-related burnout, and student-related burnout. Personal and work-related subscales address emotional and physical exhaustion in private and workplace areas. The third subscale, about student-related burnout, refers to the experience of professional fatigue among students. Cronbach's alpha was, in the present study, 0.94 for the global scale and 0.90 for personal burnout subscale, 0.87 for the work-related burnout subscale, and 0.83 for students related burnout subscale. According to previous studies [19,20,56], there is no impediment in using the CBI's total score. The total burnout score is calculated by summing the scores gathered by all items of the three subscales.

Three ad hoc items were administered to assess teachers' interest toward ICT. This dimension was operationalized by measuring teachers' interest in acquiring new ICT skills through training programs. The following introductory statement preceded these items: "If you have to plan training, could you indicate the degree of interest for the following topics: (a) technological innovation in the instructional practices; (b) introductory course on ICT in education; (c) advanced course on ICT in education". Participants were asked to express their level of interest on a 4-point Likert scale; in this case, the Cronbach's alpha was 0.62. The total interest toward the ICT training was calculated by summing the scores given by participants to each item.

The study was conducted in May 2019, before the pandemic crisis. This timing allows us to consider our data not depending on an exceptional situation; nevertheless, the results can offer indications useful for the post-pandemic situation. The questionnaires were administered online, anonymously, and without any identification number.

2.3. Data Analysis

Through a one-way ANOVA, we first checked that the three groups—teachers from primary, middle and high school—did not significantly differ in terms of their age and years of teaching experience. Concerning RQ1, RQ2 and RQ3, we assessed the conditions of distribution normality and the homogeneity of the variance. Subsequently, a one-way ANOVA was carried out with the three school levels as independent variables. At the same time, burnout, interest towards ICT training programs, and work engagement were all treated as dependent variables. In addition, for each dimension of work engagement and burnout, a one-way ANOVA was carried out in order to find differences among the three

school levels. To compare the three groups, Bonferroni's post hoc test [57] for multiple comparisons has been used.

Concerning RQ4, multiple regression analysis, with the method "Enter", has been used for each group corresponding to a different school level. The two variables—burnout and interest toward ITC training programs—were entered simultaneously into the regression equation to predict work engagement in each multiple regression analysis. To verify the absence of multicollinearity between the two predictors in all the school levels—a condition requested to use the multiple regression analysis—the Variance Inflation Factor (VIF) and the Tolerance statistic were used [58].

3. Results

Results concerning RQ1, RQ2 and RQ3 are reported in Table 1.

Table 1. Mean and Standard Deviation (SD) of Work Engagement, Burnout, and Interest toward ICT training programs at the three school levels.

School-Level	N	Work Engagement Mean (SD)	Burnout Mean (SD)	Interest toward ICT Training Mean (SD)
Primary School	188	98.09 (16.70)	50.48 (12.98)	8.45 (2.16)
Middle School	75	95.33 (18.23)	50.52 (13.48)	8.33 (1.88)
High School	95	89.27 (18.74)	51.22 (11.25)	7.70 (2.35)

The ANOVA detected differences statistically significant concerning work engagement ($F(2, 355) = 7.93, p < 0.001$) and interest toward ICT training programs ($F(2, 355) = 3.90, p < 0.05$). In particular, post hoc with Bonferroni's test showed that the difference between primary and high school teachers ($p < 0.05$) was statistically significant for both work engagement and interest toward ICT training programs, with the highest level for primary school teachers.

Analyzing more in depth each dimension composing work engagement, we have found the results displayed in Table 2.

Table 2. Mean and Standard Deviation (SD) of Work Engagement dimensions according to the three school levels.

School-Level	N	Vigor Mean (SD)	Dedication Mean (SD)	Absorption Mean (SD)
Primary School	188	32.50 (6.96)	30.37 (4.96)	35.21 (5.90)
Middle School	75	32.09 (6.62)	29.48 (6.17)	33.76 (6.66)
High School	95	30.06 (6.46)	28.01 (5.83)	31.20 (7.73)

The ANOVA detected differences statistically significant concerning vigor ($F(2, 355) = 4.23, p < 0.05$), dedication ($F(2, 355) = 5.89, p < 0.01$), and absorption ($F(2, 355) = 11.72, p < 0.001$). In particular, post hoc with Bonferroni's test showed that the difference was statistically significant when comparing primary and high school teachers ($p < 0.05$) on vigor, dedication, and absorption, with the highest level for primary school teachers. About absorption, post hoc with Bonferroni's test showed a statistically significant difference between middle and high school teachers ($p < 0.05$), with the highest level for middle school teachers. ANOVA was also run on each of the burnout dimensions—personal burnout, work-related burnout, and student-related burnout—but we have not found significant differences across the three school levels.

Concerning RQ4, the correlations between the variables are presented in Table 3.

Table 3. Correlations between the variables at each school level.

<i>Primary school</i>		1.	2.	3.
1.	Work engagement		−0.535 **	0.172 *
2.	Burnout			0.003
3.	Interest toward ICT training			
<i>Middle School</i>		1.	2.	3.
1.	Work engagement		−0.531 *	−0.066
2.	Burnout			0.183
3.	Interest toward ICT training			
<i>High School</i>		1.	2.	3.
1.	Work engagement		−0.431 **	0.359 **
2.	Burnout			−0.409 **
3.	Interest toward ICT training			

* $p < 0.05$, ** $p < 0.01$.

The correlation matrix shows a statistically significant negative correlation between work engagement and burnout at any school level. Furthermore, statistically significant correlations emerged between work engagement and interest toward ICT training programs in primary and high school. Burnout and interest toward ICT training programs correlated negatively in high school.

The results of the regression analysis are displayed in Table 4.

Table 4. Model of regression on Work Engagement.

School/Level/Factors	B	Standard Error	β	p Value
<i>Primary school</i>				
Interest toward ICT Training programs	1.35	0.47	0.17	<0.01
Burnout	−0.69	0.08	−0.54	<0.001
F(2, 185) = 42.92, $p < 0.001$, $R^2 = 0.32$, R^2 adjusted = 0.31				
<i>Middle School</i>				
Interest toward ICT Training programs	−0.31	0.98	−0.03	>0.05
Burnout	−0.72	0.14	−0.54	<0.001
F(2, 72) = 14.19, $p < 0.001$, $R^2 = 0.28$, R^2 adjusted = 0.26				
<i>High School</i>				
Interest toward ICT Training programs	1.75	0.80	0.22	<0.05
Burnout	−0.57	0.17	−0.34	<0.01
F(2, 92) = 13.42, $p < 0.001$, $R^2 = 0.23$, R^2 adjusted = 0.21				

As is it possible to see in Table 3, for primary school teachers, burnout and interest toward ICT training programs are both significant predictors of work engagement. A similar situation appears for high school teachers; again burnout and interest toward ICT training programs are both significant predictors of work engagement. Burnout only seems to predict work engagement for middle school teachers.

4. Discussion

In this paper, we inquired whether teachers' work engagement, burnout, and their interest toward ICT training differ according to the school level they are employed—the first three research questions—and, moreover, whether burnout and interest toward ICT training would predict work engagement in each school level considered—the fourth research question. These are relevant dimensions for understanding how work engagement can be supported, particularly when teachers are required to use ICT in their professional practice.

Concerning RQ1 (is the work engagement differently experienced by teachers of primary, middle and high school level?), results show a significant difference between

primary and high school teachers in all the dimensions of work engagement. Primary school teachers, indeed, are more engaged compared to their colleagues in high schools, demonstrating more vigor, dedication, and absorption towards their work activities. In addition, middle school teachers show a higher level of absorption compared to their colleagues in high schools.

According to Ho et al. [59], primary school teachers feel more engaged with their work than their middle and high school colleagues. In this regard, the quantity and quality of school time that primary teachers spend with their students (e.g., emotional intensity involved in the relationships with students) make young students more engaged compared to adolescent students [60]. Probably, this is because high school students are perceived as more autonomous, and teachers at this school level are more focused on the syllabus at the expense of the relationship with their students. This could explain why they may feel less engaged in their work.

Regarding RQ2 (is burnout differently experienced by teachers of primary, middle and high school level?), we have not found significant differences in burnout across the school levels considered. Our teachers display the same level of burnout, which stands at an average level, regardless of their school level. This result is confirmed also when considering each single burnout dimension.

As we have seen in the literature, results about teachers' burnout are controversial, with some studies where burnout for primary school teachers is higher compared to their colleagues teaching in secondary school [32], and other studies showing the opposite trend [27,31]. The present study shows a different situation, where the level of burnout does not differ according to the school level. This result could be explained by considering the general national perception of Italian teachers' roles. It is possible that in the Italian context, teachers have experience of similar stress event sources in the three levels of school, such as time pressure, students' disruptive behavior, continuing changes in administrative dispositions, and complex relationships with students' parents, co-workers, and school leaders [21,22].

With reference to RQ3 (do teachers' schools of primary, middle and high school have a different interest towards ICT training?), our results show primary school teachers with a higher positive interest towards ICT training than their colleagues in high schools. These results can be attributed to several factors. As suggested by Perrotta [61], teachers' attitude toward technology is influenced more by institutional demands rather than individual preferences. This reasoning could also be extended to the interest toward ICT training.

Contextual and cultural conditions can vary according to school levels, and these differences are not due simply to students' age. When comparing the three school levels, there are differences also in teachers' workloads and autonomy, daily agenda, curricula, institutional demands, interdisciplinarity, and connectedness among the teachers. For instance, in the Italian context primary school teachers are requested by the school organization to work in teams more than their colleagues from other school levels. It is also conceivable, hypothetically speaking, that in primary school ICTs are more often used within constructivist teaching models; while in high schools, more transmissive teaching models could prevail. This explanation is consistent with the results of other studies [62,63], showing that teachers working in early grades, such as kindergartner and primary school, demonstrate a more constructivist approach and more student-centered beliefs about teaching than those teaching in higher grades. Following this argumentation, a constructivist and student-centered approach in using ICT could induce primary school teachers to perceive ICT training as a resource from which to benefit.

In regards to RQ4 (would burnout and interest toward ICT training predict work engagement for all school levels?), we found that teachers' burnout negatively predicts work engagement at any school level, while interest toward ICT training positively predicts work engagement both at the primary and high school level.

To explain the negative influence of burnout on work engagement, Bakker et al. [64] show that the negative correlation between work engagement and burnout is based specifi-

cally on vigor and dedication, two aspects crucial in determining work engagement and strongly contrasted with exhaustion and cynicism, which are two core burnout's symptoms. As previously indicated, it is possible that in the Italian context teachers experience similar stress event sources at the three levels of school. Moreover, it would be interesting to further explore how teaching strategies are connected to work engagement. The literature insists on considering constructivism the theoretical framework under which it makes sense to introduce technology at school [65]; therefore, we can consequently assume that teachers more interested in technology and in ICT training—in our case, primary school teachers—may adopt a constructivist approach in their work. This may trigger a greater work engagement. Anyway, it cannot be excluded that even teachers adopting a transmissive approach may be interested in introducing technology in their educational practices, for instance to share information. This possibility could act as a flywheel to induce some interest for ICT training even in middle and high school teachers.

Primary and secondary teachers usually have different aims when using technologies, according to the theoretical framework by which they are inspired (constructivist vs. transmissive). However, it is conceivable that if digital technologies are perceived as useful in teaching activities within one's own approach, then these technologies are more likely to be accepted. As suggested by Schepers and Wetzels in their meta-analysis [66], utility is actually a crucial aspect when adopting new technologies. Consequently, when ICT is perceived as useful for their activity, teachers can develop a positive interest towards ICT training, in this way supporting work engagement. It is possible that teachers in lower secondary schools may have less opportunity to use ICT because of various organizational constraints. In this case, even if the teachers show a positive interest toward ICT training, work engagement would not be affected.

As for the limitations of this study, we reiterate the explorative nature of this study. This condition allowed us to formulate open questions, and we could not formulate precise hypotheses for three out of our four research questions. Furthermore, although our sample could be considered sufficiently large in its totality, we acknowledge that it becomes limited when considering that we collapsed the teachers into three groups, according to their school levels. A larger sample would offer more solid results and it would allow a finer theoretical elaboration. Finally, it should be noted that the data presented here were collected before the pandemic that dramatically impacted teachers' educational practices and ICT use. It would be interesting to understand if the use of distance learning, which became necessary during the pandemic, has changed the situation outlined here. Therefore, we plan to start a new data collection, using the same tools described here, for a comparison with the current results. This comparison would produce a better understanding of the effects induced by the pandemic, concerning the relationship between work engagement, burnout, and interest for professional training in the educational use of technologies.

Based on these results, we draw some research implications. As further research directions, different subjects taught and teachers' seniority in teaching may also be considered as dimensions relevant in unpacking the relationship between teachers' work engagement, burnout, and interest toward ICT training. Specific features of each school level should be better taken into account, for instance, the teaching method adopted. Finally, using ICT should be considered part of the general contextual conditions within which teachers work. Therefore, future research inquiring about dimensions impacting ICT should also consider organizational issues. Considering that continuing professional development is conceived as a personal resource positively associated with work engagement [67], it is important to study which kind of ICT training could better promote a positive introduction of ICT at school. In general, it is recommended to highlight the link between ICT training and work engagement. The intersection between these two dimensions seems to be able to counterbalance teachers' burnout. These reflections can pose the basis for a theoretical model where ICT training should highlight the role of technologies as mediators to promote psychological conditions—such as work engagement—and to prevent professional burnout.

Based on these results, we can also offer a few practical implications useful for teachers' professional development. Thinking about the post-emergency, almost paradoxically, it is reasonable to figure out that Italian primary teachers may be in better conditions to keep up with some of the online teaching strategies developed during the distance education imposed by the pandemic. We consider this speculation paradoxically because primary students may be less mature in the autonomous use of ICT, compared to students attending the upper school levels. This leads us to recommend that teachers from secondary school levels frame the use of ICT and the training on ICT within constructivist models to better exploit students' ability to use technology and redirect this ability toward educational uses.

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