

REVIEW ARTICLE

Internet addiction among teachers: A systematic review

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ABSTRACT

The proliferation of Information and Communication Technology (ICT) within educational spheres has undeniably enriched pedagogical practices through the integration of digital tools. Despite these advancements, the escalating use of ICT devices harbors the potential for internet addiction among educators. This systematic review scrutinizes the prevalence, symptomatology, and predictive indicators of internet addiction in the teaching profession, in addition to examining its association with physical and psychological well-being. Employing a methodical approach aligned with the PRISMA guidelines, an analysis of 15 rigorously selected scholarly articles, sourced from the Web of Science and Google Scholar, was conducted. The findings reveal a prevalence rate of internet addiction among educators ranging from 5.2% to 35%, pinpointing specific behaviors that may predispose individuals to higher addiction risks. Given the paucity of research pertaining to internet addiction among teachers, the corpus of articles ultimately incorporated into this study was constrained. However, the implications of these findings are multifaceted, highlighting the critical need for targeted interventions to ameliorate the detrimental effects of internet addiction on educators, thereby fostering a more conducive teaching and learning environment.

Keywords: teachers; internet addiction; problematic internet use; overuse internet; manifestations of internet addiction; predictive factors; physical health; psychological factors

1. Introduction

According to the ‘2022-2023 Activity Report’ from the International Telecommunication Union (ITU) published in June 2023, nearly 160 countries had implemented broadband strategies or digital agendas. By 2022, internet usage had encompassed 82% of the global urban population. Globally, internet penetration rates indicated that 74.8% of young individuals aged 15-24 were active online users^[1]. The integration of the internet and digital technology into daily lives had streamlined various domains such as professional tasks, social engagement, and commerce. However, its overuse catalyzed a series of adverse outcomes, including feelings of isolation^[2], depressive moods^[3], and heightened anxiety^[4-6]. These manifestations, often characterized by addictive traits, were frequently termed as Internet Addiction (IA) or problematic internet use and had become notably prevalent among contemporary youth^[7].

In this analysis, Internet Addiction (IA) is conceptualized as the extended, compulsive utilization of the Internet^[8], rather than being classified as a pathological condition. The consensus among scholars is that IA encompasses characteristics such as an uncontrollable urge to engage with the Internet, perceiving periods

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devoid of Internet access as insignificant, and manifesting excessive irritability and aggression when access is impeded^[9]. Such addictive behaviors may precipitate negative repercussions, including familial neglect^[10] and employment dereliction^[11], as well as a withdrawal from social engagements^[8]. The nomenclature 'Internet Addiction' is contentious, often erroneously presumed to be a disorder delineated within the International Classification of Diseases (ICD) or the Diagnostic and Statistical Manual of Mental Disorders (DSM). Notably, the ICD-11 classifies only Gambling Disorder and Gaming Disorder under 'Disorders due to addictive behaviors', with the DSM not formally recognizing Gaming Addiction as a distinct diagnostic category. Moreover, the ICD-11 does not explicitly define gaming as inherently addictive, but rather suggests that gaming may lead to a disorder consequent to addiction^[12].

Amidst the rapid expansion and proliferation of the internet, a significant segment of the population has become deeply engaged, with some individuals progressing to the point of internet addiction. The bulk of existing research has centered on adolescent internet addiction, owing to the increased susceptibility of this group to mental health issues, thus drawing considerable attention from societal institutions, educational systems, and parental figures. Yet, one demographic that has often been overlooked in this discourse is that of teachers. The teaching profession is inherently associated with extensive internet use during work hours^[13], placing teachers at risk of encountering issues related to internet addiction. The integration of information technology into educational practices, a trend significantly accelerated by the COVID-19 pandemic^[13], necessitates that teachers frequently engage with online resources for digital instruction. Furthermore, the profession is recognized for its high stress levels^[14-16], which could potentially contribute to a range of compulsive behaviors, including internet addiction, alongside sexual, work, and shopping addictions^[17].

During the COVID-19 pandemic, a survey conducted using Facebook and Instagram data on 380 teachers from different schools revealed that over 50% of teachers spent more than 4 hours daily on remote learning^[18]. This significantly increased the time teachers spent using the internet, and prior research indicated that prolonged internet usage increased the risk of internet addiction^[10,19]. Teachers' heightened internet use carried repercussions not only for their personal well-being but also raised concerns given their pivotal roles in educational settings^[20,21]. As central figures in the educational ecosystem, they were entrusted with maintaining pedagogical quality^[20,21]. Yet, susceptibility to internet addiction could undermine their instructional efficacy and inadvertently ripple into the academic experiences of their students^[22]. While the academic landscape was saturated with literature on internet addiction at large, studies zeroing in on teacher-specific internet addiction remained scant and largely under the radar of both the societal discourse and scholarly pursuits. A nuanced systematic review specifically tailored to teachers' internet addiction was thus imperative.

This research endeavored to examine the issue through the lens of educators, offering a systematic distillation and critique of the present state, manifestations, and correlates of teacher internet addiction. By spotlighting the lacunae within this research niche, the study aimed to chart prospective avenues for subsequent investigations. The paper unfolded across four distinct segments. Subsequent to this introduction, the methodology section delineated the research objectives, the process of literature acquisition, and criteria for study inclusion. The ensuing section disseminated the core findings. Concluding the study, the final section delved into a discourse on the results, outlined the study's limitations, and proffered overarching conclusions and forward-looking recommendations for ensuing research endeavors.

2. Methodology

The ubiquity of internet usage had escalated to a degree where individuals, at times, found themselves ensnared in its virtual web. This heightened engagement rang alarm bells, particularly among adolescents of school-going age. Extensive research delineated the susceptibility of this age group to internet addiction^[23-25].

Parallel studies shed light on the adult demographic, revealing that 4.8% of Brazilian adults fell within the high-risk bracket for internet addiction^[26], with the COVID-19 pandemic exacerbating the risk to 41% among American adults^[27].

Notably, teachers, who increasingly relied on digital technology for pedagogical purposes, were not immune to this addiction threat, necessitating a closer scrutiny of the magnitude of their vulnerability. Certain markers—being male^[28,29], extended internet usage durations^[26], and pronounced smartphone engagement^[30]—served as initial indicators of internet addiction. But what distinctive behaviors pinpointed a lurking addiction threat in educators? An early identification of these potential red flags was imperative. Although academic discourses had charted various predictors of internet addiction, such as the factor of ‘having children’^[26], and psychopathological markers like narcissism, obsessive-compulsive traits, anxiety, bipolarity, depression, and certain phobias^[31], the predictors specific to educators remained largely uncharted.

The ramifications of internet addiction were multifaceted, spilling over into pedagogical quality. It was paramount for educational stakeholders to grasp the risks, manifestations, and predictors of this addiction to preemptively stave it off. Physiologically, internet addiction had been associated with maladies ranging from headaches, musculoskeletal issues like neck and back pain, to sleep disturbances^[32]. More alarmingly, there was evidence drawing correlations between internet addiction and self-harm or even suicidal tendencies^[33,34]. Psychologically, the addiction tended to amplify depressive symptoms^[35,36], heighten anxiety^[37], and culminate in social withdrawal^[36]. Thus, the study probed: Did teacher internet addiction precipitate physiological adversities, and which psychological factors dovetailed with it? This research endeavored to distill answers to the following research questions via a comprehensive literature review:

RQ1: To what extent were teachers at risk of internet addiction?

RQ2: What characterized the manifestations of internet addiction within the teaching fraternity?

RQ3: Which distinct factors forecasted the onset of internet addiction in teachers?

RQ4: What were the physiological detriments stemming from internet addiction in teachers?

RQ5: Which psychological correlates were intertwined with teacher internet addiction?

2.1. Literature search process

We selected the Web of Science (WOS) electronic database for retrieval, as it encompassed a comprehensive collection of literature and served as a gateway to all social science citation indexes and science citation index journals. Considering that internet addiction could also be understood as inappropriate internet usage, encompassing excessive use of the internet^[7], terms related to internet usage issues, internet addiction, and excessive internet use were key search terms in this retrieval. Thus, based on the theme of teacher internet usage issues, we utilized the following search strings in the advanced options: “teacher internet addiction ‘OR’ teacher problematic internet use ‘OR’ teacher overuse internet.” Additionally, we supplemented our search with 4 studies from Google Scholar (Kizilok et al., 2021), (Erdogan et al., 2020), (Gunduz, 2017), (Ogelman, 2015) to ensure all relevant articles were included. Furthermore, during the writing process, this study also referenced other related articles to establish a foundation and basis for the research question.

2.2. Eligibility criteria

Through initial retrieval, a total of 466 articles were obtained. Our inclusion criteria considered: (a) participants must be employed teachers, as the primary focus was on the internet usage of working teachers; (b) article content must relate to teachers’ internet usage, interactions through the internet, or being influenced by the internet; (c) articles utilizing quantitative, qualitative, and mixed methods; (d) articles published

between 2011 and 2023 (as a search revealed an increase in relevant articles on this topic since 2011, ensuring comprehensive retrieval); (e) articles written in English and accessible in full text; (f) articles accessible in full text (specific inclusion and exclusion criteria are detailed in **Table 1**).

Table 1. Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Participants were serving teachers	For pre-service teachers, students, parents and other people
The content was about internet addiction	Not about internet addiction
Used quantitative, qualitative, and mixed methods	Systematic review article
Articles from the past twelve years	Articles from twelve years ago
Wrote in other languages	Written in other languages
Articles with full text	Couldn't get the full text of the article

2.3. Quality assessment

Following the inclusion and exclusion criteria, after the initial article selection, the authors created a database in Excel containing 276 articles, including their titles and abstracts. Further refinement led to the selection of 49 articles. Through careful review of full texts, articles irrelevant to this study (such as those focusing on pre-service teachers) were filtered out. Ultimately, 15 articles were included in the final results (as per the PRISMA systematic review flowchart, details in **Figure 1**).

3. Results

This section primarily revolved around reporting the research questions mentioned earlier, totaling five in number.

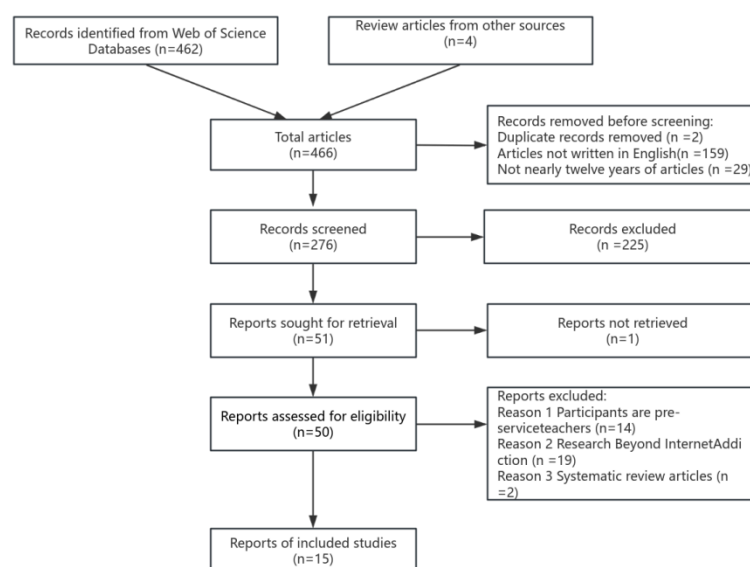


Figure 1. An overview of the search protocol based on the PRISMA recommendation statement.

3.1. The result of RQ1

In this study, besides Internet Addiction (IA), teachers’ internet usage issues also encompassed Problematic Internet Use (PIU), which included issues related to Social Media Use (PSMU), Smartphone Addiction (PSU), Gaming Problems (PG), and Compulsive Internet Use (CIUS), among others. The authors reviewed 14 articles that employed scales to measure teacher internet addiction, as well as 1 qualitative article

that gathered information through interviews (see details in **Table 2**). Seven articles provided values of teacher internet addiction measured by scales (Gunduz, 2017; Iwaibara et al., 2019; Erdogan et al., 2020; Lee et al., 2021; Yi et al., 2021; Karakose et al., 2022; Karakose et al., 2022). Three articles presented the proportions of teacher internet addiction (Tóth et al., 2021; Kizilok, 2021; Chen et al., 2022). While the remaining did not provide specific values for teacher internet addiction, they all mentioned the viewpoint that teachers are at risk of internet addiction. Therefore, this paper suggested that teachers have a certain level of risk for internet addiction.

Based on **Table 2**, current research on teacher internet addiction was primarily concentrated in Turkey, Japan, China, and Hungary, with the majority of reports focusing on middle and high school teachers. Several surveys conducted by Japanese scholars revealed a risk of internet addiction among junior and senior high school teachers, with prevalence rates of 0.09% for IA and 6.9% for high-risk IA ^[13]. A study on junior high school teachers in Japan indicated an average IAT score of 46.68 ± 6.23 for the Risk IA group, compared to 25.51 ± 4.82 for the Non-IA group, with 5.7% of teachers at risk for IA and 94.3% without IA ^[19]. For primary and secondary school teachers, the average scores for PSU and PSMU were 2.76 and 2.26, respectively. In terms of PSU, 27.1% of respondents scored above 21 points, while 13.1% of respondents scored above 19 points on PSMU, suggesting a certain level of PIU among the participants ^[38]. Another survey of junior and senior high school teachers in Japan suggested a potential high-level PIU risk among school teachers ^[39].

Surveys conducted in Turkey, Hungary, and China also indicated a certain risk of internet addiction among teachers. Additionally, there were two studies specifically focused on preschool teachers and physical education teachers. The study on preschool teachers revealed a significant relationship between teachers' internet addiction levels and various components of social skills, although specific internet addiction levels were not provided. The investigation into internet addiction among physical education teachers reported an average score of 31.00 on the internet addiction scale. According to the criteria established by Cakir and Horzum, scores of 50 and below indicated that participants 'show no symptoms,' leading to the determination that the level of internet addiction among physical education teachers could be categorized as 'low level'^[40].

Table 2. The degree of internet addiction among teachers.

Measurement Subjects	Measurement Content	Measurement Tools	Measurement Results	Articles
Preschool Teachers (Turkey)	Internet Addiction (IA)	Internet Addiction Scale (IAS)	There is a significant relationship between teachers' level of internet addiction and the levels of social skills as indicated by the respective scale scores (specific internet addiction levels were not provided)	Ogelman, 2015
Middle School Information Technology Teachers (Turkey)	Problematic Internet Use (PIU)	Problematic Internet Usage Scale (PIU, Author-developed)	The female teachers scored 68.97, the male teachers scored 88.41.	Gunduz, 2017
Middle and High School Teachers (Japan)	Problematic Internet Use (PIU)	Internet Addiction Test (IAT)	School teachers might be at a higher level of risk for PIU (specific values were not provided).	Tsumura et al., 2018
Middle School Teachers (Japan)	Internet Addiction (IA)	Internet Addiction Test (IAT)	The average IAT score for the risk IA group was 46.68 ± 6.23 , while for the non-IA group it was 25.51 ± 4.82 . Teachers at risk for IA accounted for 5.7%, while non-IA teachers accounted for 94.3%.	Iwaibara et al., 2019

Measurement Subjects	Measurement Content	Measurement Tools	Measurement Results	Articles
Physical Education Teachers (Turkey)	Internet Addiction (IA)	Young Internet Addiction Scale (YIAS)	Physical education teachers obtained an average score of 31.00 on the internet addiction scale, indicating that the level of internet addiction among physical education teachers can be classified as 'low level'.	Erdogan et al., 2020
Middle and High School Staff (Japan)	Problematic Internet Use (PIU)	Compulsive Internet Use Scale	Higher scores on Compulsive Internet Use (CIUS) are related to the risk of problematic internet use (PIU). The median (interquartile range) for CIUS scores is 7 (2, 14).	Tanabe et al., 2021
High School Teachers (Hungary)	Internet Addiction (IA)	Problematic Internet Use Questionnaire (PIUQ)	The rate of participants with Internet Addiction (IA) was 5.2% (a total score exceeding 41 indicates internet addiction).	Tóth et al., 2021
Primary and Middle School Teachers (China)	Problematic Smartphone Use	Smartphone Application-Based Addiction Scale (SABAS)	The high sleep problem group had a mean (M) of 3.11 on the PSU scale (compared to 2.49 for the low sleep problem group).	Lee et al., 2021
	Problematic Social Media Use	Bergen Social Media Addiction Scale (BSMAS)	The high sleep problem group had a mean (M) of 2.47 on the PSMU scale (compared to 2.08 for the low sleep problem group).	
Primary and Middle School Teachers (China)	Problematic Smartphone Use (PSU)	Smartphone Application-Based Addiction Scale (SABAS)	The average score for PSU was 2.76 (SD=1.03).	Yi et al., 2021
	Problematic Social Media Use (PSMU)	Bergen Social Media Addiction Scale (BSMAS)	The average score for PSMU was 2.26 (SD=0.79).	
Teachers (Turkey)	Internet Addiction (IA)	Semi-Structured Interviews (Qualitative Research)	The percentage of teachers who considered themselves completely addicted to the internet was 35% (n: 6), the percentage of teachers who considered themselves partially addicted was 18% (n: 3), and the percentage of teachers who did not consider themselves as internet addicts was 47% (n: 8).	Kizilok, 2021
Teachers and School Administrators (Turkey)	Internet Addiction (IA)	Short-Form of Young's Internet Addiction Test (YIAT-SF)	The mean value was 3.213 (SD=1.119), indicating an above-average level.	Karakose et al., 2022
Principals and Teachers (Turkey)	Social Media Addiction (SMA)	Bergen Social Media Addiction Scale (BSMAS)	The average score was 1.924 (SD=0.609).	Karakose et al., 2022
Primary and Middle School Teachers (China)	Problematic Social Media Use (PSMU) Problematic Game (PG)	Bergen Social Media Addiction Scale (BSMAS) IGDS-SF9	The prevalence of internet addiction in the study population was 5.2% (95 out of 1817). Specific values for PSMU and PG were not provided.	Chen et al., 2022
High School Teachers (Hungary)	Internet Addiction (IA)	Score of PIU-Q (Internet addiction)	A total score exceeding 41 indicates internet addiction. Specific values were not provided.	Pohl et al., 2021

Measurement Subjects	Measurement Content	Measurement Tools	Measurement Results	Articles
High School Teachers (Japan)	Internet Addiction (IA)	Internet Addiction Test (IAT)	The proportions of IA (severe cases), high-risk IA, and non-IA were 0.09% (n=3), 6.90% (n=220), and 93.0% (n=2296) respectively. The average IAT score for the high-risk IA group was 47.25 (standard deviation [SD] = 6.41), and for the non-IA group, it was 25.54 (SD = 4.85).	Fukuda et al., 2023

3.2. The result of RQ2

Based on the literature analysis, teachers at risk of internet addiction exhibited the following characteristics:

(1) Predominantly male. In the high-risk IA teachers, the male ratio was 64.58%^[19];

(2) Younger. Iwaibara et al. (2019) found that compared to non-IA teachers, high-risk IA teachers were younger (among teachers under 30 years old, the high-risk IA ratio was 43.75%, significant at $p < 0.05$)^[19]. Other studies also indicated that internet addiction levels were significantly higher among physical education teachers aged 20-29 compared to those aged 30-39 and 40-49^[40];

(3) Shorter tenure in school. Among teachers with less than 5 years of service, the high-risk IA ratio was 38.54%, significant at $p < 0.05$ ^[19]. Other research suggested that information and communication technology teachers with 6 years or more of teaching experience tended to use problematic internet more than those with fewer years of teaching^[22];

(4) Part-time teachers. More part-time teachers worked in private schools^[13];

(5) Owning more internet devices. Teachers at risk of high-risk internet addiction had more internet-connected devices and a higher proportion of them owned smartphones and tablets^[13];

(6) Spending more time online. Spending over 1 hour on the internet for personal purposes on workdays or weekends^[13,19], high-risk IA teachers spent more time online regardless of the day compared to non-IA teachers^[19];

(7) Engaging in internet activities like gaming, entertainment, shopping, and browsing^[13,19];

(8) Engaging in aimless internet use more frequently^[13].

3.3. The result of RQ3

Based on the literature analysis, several aspects served as predictive factors for teacher internet addiction:

(1) Gender and Age: Gender and age were predictors of the risk of internet addiction, with male teachers being more susceptible to internet addiction^[22,30,41]. Teachers under 35 years old, and specifically physical education teachers aged 20-29, were found to have significantly higher levels of internet addiction compared to those aged 30-39 and 40-49^[40].

(2) The duration of online activities, the presence of a secondary occupation, marital and parental status, and the purpose of internet usage served as predictors of internet addiction risk. Prolonged online duration (exceeding 5 hours daily), engaging in a secondary occupation (where work overload leads to distress and problematic internet use)^[22,30,41], being unmarried and childless, and the specific purposes of internet use, such as engaging in online gaming, chatting, and matchmaking, were identified as significant predictive factors for Internet Addiction (IA)^[30,40].

(3) Educational Level: Lower educational levels were associated with internet addiction^[30].

(4) Monthly Income Level: Monthly income level was also related to internet addiction. Physical education teachers with moderate monthly incomes had lower levels of internet addiction compared to those with higher incomes^[40].

(5) Grade Level of Work: The grade level in which teachers worked could predict the risk of internet addiction. The internet addiction levels of physical education teachers working in high schools were statistically significantly lower than those working in middle schools^[40].

(6) Workplace Location: The workplace location could predict the risk of teacher internet addiction. The internet addiction levels of physical education teachers working in urban schools were statistically significantly lower than those working in rural area schools^[40].

(7) Insomnia: Insomnia could also be a predictive factor for IA. Insomnia could lead to nighttime internet addiction or problematic internet use, which in turn affected sleep quality^[41].

(8) Personality Traits: Teachers' personality traits could predict the risk of internet addiction. High-risk IA participants exhibited impulsive approaches to new stimuli, emotional instability, higher anxiety levels, and a tendency to avoid interpersonal communication in the real world. Early personality disintegration could serve as a predictor of IA among middle school teachers. Observing changes in teachers' behavior towards students, parents, and colleagues, as well as a preference for spending time on the internet over interacting with coworkers and relatives, could provide insights^[19].

(9) Loneliness: Loneliness could be a predictive factor for internet addiction. A study by Karakose et al. (2022) involving school administrators and teachers during the pandemic concluded that loneliness had a significantly positive and significant predictive effect on internet addiction. The standardized regression coefficients between loneliness and internet addiction showed a substantial effect size, suggesting that loneliness positively predicted internet addiction. Participants' loneliness levels during the COVID-19 pandemic had a positive and significant predictive effect on their internet addiction^[42].

(10) Psychological Distress: Psychological distress could predict social media addiction. Karakose et al. (2022) found that COVID-19-related psychological distress significantly predicted social media addiction. In this case, the prediction ability was moderately strong. Furthermore, COVID-19-related psychological distress explained 19.6% of the variance in social media addiction differences^[42].

(11) Social Skills: Social skills could predict teacher internet addiction. Ogelman et al. (2015) conducted a study on the predictive role of social skills in internet addiction among preschool teachers. The study found a significant relationship between the levels of social skills subscales (emotional expression, emotional sensitivity, emotional control, social expression, social sensitivity, social control) and the level of teachers' internet addiction. As the levels of certain subscales of social skills increased, the degree of internet addiction decreased. The ability to express emotions, emotional control, social sensitivity, and social control significantly predicted teachers' internet addiction levels based on the social skills subscales^[43].

3.4. The result of RQ4

Internet addiction had negative impacts on physical health. Tanabe et al.'s study (2021) indicated that adults with Problematic Internet Use (PIU) might be at risk for physical ailments. Higher Compulsive Internet Use Scale (CIUS) scores were correlated with a higher prevalence of neck pain. The presence of problematic internet use associated with high CIUS scores positively correlated with neck pain among Japanese middle and high school teachers aged 20 and above. Additionally, the duration of internet use affected the likelihood of neck muscle problems. Compared to non-internet users, those who used the internet on workdays were twice

as likely to experience neck pain as weekend internet users. This could be attributed to people being more relaxed while using the internet on weekends, reducing the incidence of neck pain^[44].

Furthermore, internet addicts were more commonly associated with smoking, alcohol consumption, substance abuse, and diabetes^[30]. Alcohol abuse was linked to PIU, independently of psychological distress and insomnia^[39]. Excessive internet use could also lead to insomnia^[39,41,45], which, in turn, affected physical health.

3.5. The result of RQ5

A substantial amount of research revealed correlated relationships between internet addiction and certain psychological issues (as shown in **Table 3**).

(1) **Insomnia and Internet Addiction:** PIU or IA patients were associated with insomnia^[29,39]. The severity of insomnia was significantly correlated with PIU-Q total scores ($r=0.325$, $p<0.001$), possibly due to the difficulty PIU patients faced in controlling nighttime internet use^[39]. Lee et al. (2021) divided individuals with sleep problems into a high sleep problem group and a low sleep problem group, with results indicating that teachers in the high sleep problem group had significantly higher PSU and PSMU values^[45].

(2) **Psychological Distress and Internet Addiction:** Tsumura et al. (2018) confirmed a significant correlation between psychological distress and PIU^[39]. Lee et al. (2021) used depression, anxiety, and stress scales to reflect participants' psychological distress^[45]. Regarding the relationship between psychological distress, PSU, and PSMU, results suggested a significant correlation between psychological distress and both types of PIU^[38,45], with PSMU having a stronger impact on psychological distress than PSU. During the COVID-19 pandemic, psychological distress was positively correlated with social media addiction^[42], and PIU might have further elevated the psychological distress level among school teachers^[46].

(3) **Psychological Needs and Internet Addiction:** Here, it refers to the thwarting of psychological needs in online teaching. Two studies found correlations. First, Yi et al. (2021) found that the thwarting of psychological needs was significantly positively correlated with PSU and PSMU^[38]. Second, Chen et al. (2022) found that school teachers in mainland China were prone to PIU due to the thwarting of psychological needs in online teaching. Moreover, this PIU might have further elevated the psychological distress level among school teachers^[46].

(4) **Depression and Internet Addiction:** Issues related to internet use were significantly correlated with a history of depression. The severity of IA was significantly correlated with the severity of depression (total score) ($r=0.558$, $p<0.001$), and the severity of depression was significantly correlated with the severity of problematic internet use^[41].

(5) **Emotional Exhaustion and Depersonalization in Relation to Internet Addiction:** Among teachers with high-risk IA, scores for emotional exhaustion and depersonalization were significantly higher than those of non-IA teachers, and emotional exhaustion and depersonalization were significantly correlated with IA^[19,41].

(6) **Burnout and Internet Addiction:** Individuals with Burnout Syndrome (BOS) might exhibit behavioral dependencies, such as internet use. BOS easily led to addictive behaviors like internet use^[41].

(7) **Sense of Happiness, Loneliness, and Internet Addiction:** Karakose et al. (2022) examined the relationship between the sense of happiness, loneliness, quality of life, and internet addiction during the COVID-19 pandemic. They found a negative correlation between the sense of happiness and internet addiction ($r=-0.094$, $p<0.01$), and a positive correlation between loneliness and internet addiction. Loneliness explained

20.3% of the variance in internet addiction, revealing a positive correlation between internet addiction and the sense of happiness. Internet addiction statistically predicted individual sense of happiness positively and significantly, explaining 36% of the variance in happiness^[47].

(8) Fear and Internet Addiction: Here, fear refers to fear of COVID-19. PSU and PSMU were positively correlated with the fear of COVID-19^[38].

(9) Stress and Internet Addiction: Teachers might be more motivated to use the internet due to work-related stress, spending more time online as it provides stress relief. Kizilok (2021) determined through interviews that teachers working in different cultures most commonly cope with stress by using the internet and technology. They spent a considerable amount of time watching videos for both educational and personal purposes, considering it a way to alleviate stress^[48]. Cultural differences in stress increased the propensity for internet addiction. Teachers coping with stress by using the internet and technology were a common method in different cultures^[48].

(10) Personal Achievement and Internet Addiction: Two different results existed. Iwaibara et al. (2019) found a significant relationship between high-risk IA and decreased sense of personal achievement^[19], while Pohl et al. (2021) suggested that teacher internet addiction was unrelated to personal achievement^[41].

(11) Social Interaction and Internet Addiction: As the level of social skills increased, the level of internet addiction decreased, and as the level of social skills decreased, the level of internet addiction increased^[43].

Table 3. The relationship between teachers' internet addiction and psychological factors.

Psychological factors	Relationship with Internet Addiction	Articles
Insomnia	Insomnia is significantly correlated with PIU.	Tsumura et al.,2018
	Insomnia is closely related to IA.	Pohl et al.,2021
	With teachers experiencing high sleep problems scoring higher on both types (PSU, PSMU) of PIU values.	Lee et al., 2021
Psychological distress	Psychological distress is significantly correlated with PIU.	Tsumura et al.,2018
	A significant correlation between psychological distress and both types (PSU, PSMU) of PIU.	Lee et al., 2021;Yi et al., 2021
	During online teaching, teachers' psychological distress is positively correlated with PSMU and PG.	Chen et al.,2022
	COVID-19 related psychological distress is positively correlated with social media addiction ($r = 0.186, p < 0.001$).	Karakose et al., 2022
Depression	Depression is closely related to IA.	Pohl et al.,2021
	A positive correlation between social media addiction and the depression variable.	Karakose et al., 2022
Emotional exhaustion	Emotional exhaustion is significantly correlated with IA.	Iwaibara et al., 2019 Pohl et al., 2021
burnout	Internet addiction is correlated with severe burnout.	Pohl et al., 2021

Psychological factors	Relationship with Internet Addiction	Articles
Personality disintegration	disintegration of personality is significantly correlated with IA.	Iwaibara et al., 2019
Personal achievement	Personal achievement is related to IA. Unrelated to personal achievement.	Iwaibara et al., 2019 Pohl et al., 2021
Happiness	Positive correlation between IA and sense of happiness.	Karakose et al., 2022
Loneliness	A positive correlation between loneliness and internet addiction.	Karakose et al., 2022
Psychological needs thwarting (online teaching)	A significant positive correlation between psychological need frustration and PSU and PSMU.	Yi et al., 2021
Fear	A positive correlation between PSU and PSMU with the fear of COVID-19.	Yi et al., 2021
Stress	Cultural differences contribute to an increased tendency for internet addiction due to increased pressure.	Kizilok, 2021
Social interactions	As the level of social skills increases on one of the scales, the degree of internet addiction decreases, while as the level of social skills decreases, the level of internet addiction increases.	Ogelman,2015

4. Discussion

4.1. Discussion of the results

(1) Pay attention to teachers' internet addiction problem

With the pervasive use of the internet, concerns regarding teacher internet addiction and excessive internet use have arisen. A study on internet addiction among Norwegian adults revealed prevalence rates of 1% for Internet Addiction (IA) and 5.2% for high-risk IA^[49]. A global meta-analysis reported an overall IA prevalence of 6.9%^[50]. Several studies within the scope of our research suggest that teachers may also experience internet addiction, with a significant proportion of middle and high school teachers facing the risk of internet addiction^{[13][30]}. However, Leekitchwatana et al. (2021) analyzed the internet usage levels of Thai practicum teachers, categorizing their usage as 'appropriate'^[51]. Moreover, not all teachers are at high risk of IA; for instance, physical education teachers were assessed as having 'asymptomatic' internet addiction, interpreted as 'low-level'^[40]. Nevertheless, a significant body of research in this article has revealed the potential risk of internet addiction among teachers. Both individual educators and educational institutions should recognize and address the risk of internet addiction among teachers.

(2) Attention to internet use among specific teacher groups

We observed a higher prevalence of males among teachers at high risk of Internet Addiction, with a tendency towards younger age, shorter service tenure, and part-time positions in private schools. Teachers possessing more internet-connected devices, spending extended periods online, and engaging in entertainment and purposeless internet use are more susceptible to high-risk IA states^[12,18,21]. This finding may reflect the younger generation's greater openness to new technologies, with males exhibiting a more pronounced inclination towards internet usage. Younger teachers may be more receptive to and integrated into digital teaching tools, while males may demonstrate a more adventurous spirit in technology exploration and utilization. The higher prevalence of high-risk IA among new teachers adapting to new environments and private school teachers may be associated with greater job stress, the necessity for electronic device usage in teaching, and a heightened demand for real-time information and resources.

(3) Identification of predictors of internet addiction among teachers

The results confirm that male and younger teachers are more prone to internet addiction^[21,29,40]. Prolonged internet use, having a second job, being single without children, specific internet usage purposes, and insomnia are identified as factors predicting the risk of internet addiction^[21,29,39,40]. This underscores the urgency for targeted interventions and prevention strategies within this demographic. Teachers themselves should pay closer attention to achieving a balance between personal life and professional responsibilities, cultivating healthy internet habits. The importance of schools providing psychological health support is highlighted, with a need to consider gender and age differences in training and support programs, offering gender- and age-specific mental health resources and information. Furthermore, teachers with lower educational levels, moderate monthly incomes, working in high schools, and working in urban schools are more likely to fall into a high-risk internet addiction state^[29,39]. These findings involve disparities in educational levels and regional economic conditions, requiring comprehensive policy measures to enhance education levels and improve regional economic situations to reduce the risk of teacher internet addiction.

(4) Highlighting the impact of teachers' internet addiction on physical and mental health

The potential physical harm of teacher internet addiction is a concerning issue. Excessive use of electronic devices may lead to neck pain, a common occupational ailment^[43]. Prolonged periods of tilting the head to operate computers or smartphones can result in discomfort in the cervical spine, thereby affecting the teachers' work efficiency. Internet addiction may contribute to nighttime use, disrupting the teachers' normal sleep pattern and potentially causing insomnia issues^[38,40,44]. Persistent sleep deprivation can have adverse effects on the body's immune system, cognitive abilities, and emotional well-being. Research indicates a correlation between internet addiction and excessive alcohol consumption and drug abuse behaviors^[29,38]. Teachers may resort to these coping mechanisms to deal with psychological stress and anxiety. Additionally, prolonged excessive internet use may lead to a lack of physical exercise, thereby increasing the risk of developing diabetes^[29].

The demanding nature of teaching, requiring continuous knowledge acquisition and adaptation, can be a significant stressor. Such stress can culminate in various addictive behaviors, ranging from internet and sexual addictions to work and shopping compulsions^[17]. The ripple effect of this stress not only influences the teaching environment but also extends to a teachers' personal life and, critically, the well-being of the students they educate^[52]. Burnout, a prevalent concern in the teaching profession, stems largely from occupational pressures^[21]. It is characterized by emotional exhaustion, where individuals feel drained of physical and emotional reserves; depersonalization, marked by feelings of detachment or cynicism; and a diminished sense of personal achievement, where one feels ineffective and unaccomplished^[53,54]. Given the established link between burnout and internet addiction^[21,19], addressing burnout becomes paramount^[55]. Moreover, a

significant correlation has been found between the severity of teachers' depression and their problematic internet usage^[41]. Numerous studies further underscore the intricate relationship between depression and internet addiction^[56-58]. Additionally, the psychological distress experienced by teachers warrants attention. It's not only significantly tied to internet addiction^[39] but also emerges as a predictor of it^[59]. Given that such distress, in conjunction with problematic internet usage, may impede teaching effectiveness, it is imperative to implement interventions designed to alleviate these concerns. Such measures are crucial for maintaining optimal teaching performance and enduring teacher motivation^[39].

(5) Measures to prevent and alleviate teacher internet addiction

Teachers, as the cornerstone of society, bear the significant responsibility of nurturing the future. However, in modern society, the internet has permeated every aspect of education. Teachers need to utilize the internet for lesson planning, teaching, assessment, communication, and various other tasks. Throughout this process, they inevitably come into contact with a vast amount of information, which may strongly attract their attention, leading to potential internet addiction. Research indicates that teachers are at risk of internet addiction, and this addiction can impact their physical health, give rise to certain psychological issues, and significantly affect their professional duties. For teachers at the forefront of academic instruction, charged with the responsibility of maintaining educational quality^[20,21], internet addiction may compromise their focus on teaching activities^[19], degrade the quality of instruction, and consequently, negatively impact the students associated with them^[22]. Therefore, this phenomenon requires attention from both teachers themselves and school administrators. It is essential to promptly identify signs of internet addiction among teachers and implement corresponding measures to prevent or reduce the occurrence of teacher internet addiction.

Teachers are encouraged to remain vigilant regarding their susceptibility to Internet addiction and to adopt efficacious strategies to forestall its onset. Initially, it is advisable for teachers to formulate structured work schedules and timelines, ensuring a balanced allocation between professional duties and leisure, thereby minimizing prolonged engagement with electronic devices. Additionally, indulgence in physical activities, literary pursuits, and travel can serve as beneficial avenues for relaxation and stress alleviation. In instances of persistent Internet addiction, seeking specialized assistance through psychological counseling or rehabilitative services is recommended. Concomitantly, educational institutions ought to implement supportive measures to aid teachers in mitigating the risk of Internet addiction. This entails a comprehensive understanding of the symptoms and predictive factors associated with Internet addiction among teachers. Particular attention should be directed towards individuals who are male, younger, unmarried, childless, in the nascent stages of their teaching careers, engaged in part-time teaching, possess an array of Internet-connected devices, exhibit a predilection for online gaming, entertainment, and aimless internet browsing, spend excessive durations online, and demonstrate a propensity for purposeless internet usage.

At the same time, schools should also adopt corresponding support strategies to help teachers prevent and reduce the risk of Internet addiction. First, schools should understand the manifestations of teachers' internet addiction and the predictors of teachers' internet addiction. Pay special attention to men, young, single without children, shorter teaching career, part-time teachers, have more internet-connected devices, prefer to use the internet for games, entertainment and surfing the internet, spend more time online, and use the internet without purpose Teachers who behave more. At the same time, attention should also be paid to teachers who feel lonely, unsociable, and impulsive. They are not only manifestations of teachers' internet addiction but also predictors of teachers' internet addiction^[30,40,41]. Secondly, schools should provide corresponding administrative support. Because administrative support is an important protective factor for school teachers not to develop PIU^[46]. For example, provide psychological counseling services or provide mental health education courses to provide teachers with mental health counseling; formulate internet usage guidelines to clarify the regulations that

teachers should abide by when using the internet; invite professionals to provide network security training for teachers to help them understand the internet Security knowledge and skills, improve awareness of cyber risks and prevention capabilities, etc.

4.2. Recommendations for future research

Regarding the issue of internet addiction among teachers, based on a comprehensive literature review, future research could explore the following aspects:

(1) Gain a deeper understanding of the causes of internet addiction among teachers: By delving into the underlying causes of internet addiction among teachers, targeted preventive and intervention measures can be formulated by schools and relevant organizations.

(2) Investigate the underlying causes or determinants that may account for disparities in the prevalence of Internet addiction among teachers from diverse geographical locales. This inquiry will enable the crafting of bespoke, empirically grounded initiatives aimed at ameliorating Internet addiction among educators on a national or regional scale. Such an approach will facilitate optimal resource distribution, bolster international cooperation and the exchange of expertise, refine risk evaluation methodologies, and augment the efficacy of early intervention strategies. The overarching goal of this endeavor is to forge novel strategies for mitigating challenges associated with Internet addiction within the teaching profession.

(3) Study the impact of internet addiction on teachers' work and life: Internet addiction may have negative implications for teachers' work efficiency, career development, family life, and more. Future research could extensively examine the mechanisms and extent of internet addiction's effects on teachers, thus aiding in the development of more scientifically effective intervention strategies.

(4) Investigate the effectiveness of interventions for internet addiction: Schools and organizations need to implement intervention measures to address internet addiction among teachers. It is essential to evaluate the effectiveness of these measures in preventing and treating internet addiction, and to propose recommendations for improvement.

(5) Establish a collaborative mechanism involving schools, families, and communities: The issue of internet addiction involves various fields such as psychology, education, and society, necessitating interdisciplinary and cross-departmental cooperation. Future research could establish interdisciplinary collaboration mechanisms to foster the involvement of schools, families, and societal forces, pooling efforts to collectively address the problem of internet addiction among teachers.

5. Limitations

This study also has limitations. While Web of Science and Google Scholar provide comprehensive coverage of literature, it is still possible that other websites contain relevant research on teacher internet addiction. Therefore, this paper may not have included all articles pertaining to teacher internet addiction. Furthermore, certain studies in this review targeted school staff, including administrative personnel beyond teaching positions. Finally, due to the limited research on teacher internet addiction, the inclusion of a relatively small number of articles in this study may lead to inconsistencies with future research findings. A more comprehensive comparison can be made as more studies on teacher internet addiction become available.

6. Conclusion

While the internet has unquestionably enhanced the convenience and quality of many aspects of our lives, the accompanying physical and psychological repercussions of its excessive use necessitate unwavering

awareness and prudence. This study embarked on a meticulous review of prevailing research on internet addiction, particularly among educators at the heart of our educational system. Leveraging both the WOS database and Google Scholar, we distilled insights from 15 select articles, methodically structured using the PRISMA framework. The derived insights underline that educators do confront a discernible risk of internet addiction, with ramifications not just on their physical well-being but also interlinked with specific psychological elements.

In this digital era, the gateway to boundless information is just a click away, making it imperative for educators to judiciously harness the internet for pedagogical enhancement. While being wary of their susceptibility to internet addiction, teachers can leverage this digital connective tissue to amplify their knowledge base and weave it seamlessly into their pedagogical methods, thus optimizing educational outcomes. To support this endeavor, educational institutions must proactively extend both IT and administrative assistance, equipping educators with the tools they need while safeguarding them from the snares of excessive online engagement.

Conflict of interest

The authors declare no conflict of interest.

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