Cyberloafing in Educational Settings: A Systematic Literature Review

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Abstract—Integration of information and communication technologies in educational settings offer added learning opportunities to teachers and students. However, these come with the expense of cyberloafing among students and educators in computer-mediated environments. Despite the curiosity it has been arousing, so recent is the concept of cyberloafing, which implies that the knowledge accumulated so far is sparse, broad and fragmented. This study aims to systematically review the current challenges in the domain of cyberloafing. The study reviewed twenty-six peer-reviewed scholarly articles to analyse and reveal information on the methods, factors examined, applications, comprehensive results, and limitations. The findings in this study highlight the need to uncover the phenomenon of cyberloafing in teaching and learning environments, and proposes possible recommendations on issues and gaps open to be explored in future studies.

Keywords—communication technology, cyberbludging, cyberdeviance, cyberloafing, cyberloafing, cyberslacking, educational settings, systematic literature review (SLR)

1 Introduction

While spreading its influence over personal and professional zones of individuals, widespread use of technology has shown both the positive and negative impacts on the overall functioning of societies. The performance and outcome of employees and students have been potentially influenced. Integration of technology in daily lives has led to increased productivity and digital literacy of teachers [1], [2]. However, the darker side of the use of technology has in turn manifested itself, and it covers compulsive use of media that results in cyberloafing [3]. Revealing an alarming statistic, [4] report that cyberloafing takes up to three hours of effective work time per day of employees' accessing the Internet.

Cyberloafing is a contemporary phenomenon that represents the dark side of technology use. The term has been referred in the extant literature using different terminology [5] such as Cyberslacking, Cyberdeviance, Cyberloafing, and Cyberbludging.

The present study uses the term 'Cyberloafing', for referring to all these behaviours discussed in the following text. In general terms, cyberloafing can be defined as the use of Internet and technology during working hours for personal or non-organizational purposes [5], [6].

Education realizes cyberloafing as the use of the internet and other related technologies by students and teachers during allocated time for teaching and learning to achieve personal objectives at educational institutions [7]–[9]. In educational settings, technology usage is typically for entertainment, e.g., chatting, checking emails, online shopping, and watching videos [10] or some other personal work.

Reported as common behaviour, cyberloafing has been intensively researched in the workplace settings. [11] report that 64% of workers acknowledge their engagement in cyberloafing at the work place. Engagement of employees in such a behaviour negatively affects their productivity levels during work time [12]. For example, employees cyberloafing at work have tendencies to postpone tasks and spend most of their time on entertainment [13]. This adds human and financial costs to organizations [14], [15]. Due to high organizational stake, scholars have focused on better understanding of cyberloafing in the workplace settings to provide actionable solutions. [16] state that employees engage in cyberloafing for the sake of their stress management. Reizer et al. and She and Li [17], [18] report that engaging in cyberloafing also puts the organizations security at risk.

In contrast, the research examining cyberloafing in educational settings is not mature yet, and only a handful of empirical studies are available. Scholars suggest that cyberloafing could negatively affect the educational environment in terms of the effectiveness of teaching and learning [19], [20]. For teachers, engagement in cyberloafing can influence their teaching productivity. For students, it can shift their focus and reduce their level of engagement in educational activities by affecting their cognitive resources [21]–[23]. Consequently, it negatively influences their academic success [24]–[26].

Given the role that education plays in society, researchers have shifted their focus on the study of cyberloafing in educational settings from the time the peril was recognized. However, despite being fast-growing, the related findings are diverse, broad and scattered. There is no doubt that it is important to understand the underpinnings of cyberloafing in academic settings since it poses a serious threat to the successful integration of information and communication technology in the educational context. Moreover, it poses a negative influence on the future of the students, since they will be future employees. Therefore, the efforts of future researchers in the area need to be encouraged and supported.

The present research offers support in terms of amalgamating the existing ideas and findings related to cyberloafing in one place through the usage of Systematic Literature Review (SLR) methodology. SLR is an excellent tool that provides deep insights into not only what has been done, but also sheds light on possible areas of focus in future. SLR helps in the synthesis as well as the critical analysis of the domain under consideration, here in this study: cyberloafing in educational settings. The study contributes to the existing knowledge area by critically evaluating the existing findings, implications, limitations, and presenting future recommendations that identify open gaps, which when investigated can offer interesting opportunities for scholars, and inferences for

school administrations endeavouring to integrate technology with education successfully by overcoming its negative aspects like cyberloafing.

2   Methodology

As mentioned in the prior section, the study implements SLR methodology to coagulate comprehensive information on the prior research related to cyberloafing in educational settings. SLR follows well-defined and transparent steps, follows an established protocol to select and review relevant empirical studies [27]. The protocol consists of three main steps: developing the review plan; executing the review plan; and reporting the review. SLR in this study has been conducted as per the stringent, Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [28], recommended by the Cochrane Collaboration [29] and the Standard Quality Assessment Criteria for Evaluating Primary Research Papers [30]. The section next describes the three main steps of the SLR research methodology.

2.1   Planning the review

At this stage the objectives of the SLR, the search procedure, inclusion and exclusion criteria and quality evaluation protocol are specified.

2.2   Research objectives (ROs)

RO1: To identify the research profile of the studies on cyberloafing in education, in terms of publishing timeline and volume, research methods, geographical scope, and moderating, control, and dependent variables utilized in the reviewed studies.
RO2: To identify key themes emerging from the prior relevant studies and outline the scope of uncovered areas.
RO3: To examine the findings, implications, limitations and future work directions presented in the included studies to process implications for future researchers and provide recommendations for future studies.
RO4: To develop an integrated framework for the reference of future researchers in the area of cyberloafing in an educational context.

2.3   Search procedure

SLR was conducted on online databases targeting three bibliographic databases, namely, Scopus, PubMed, and Web of Science. A Google Scholar search was then conducted in an attempt to find additional articles. The selection was limited to peer-reviewed articles that were in the English language and addressed the theme of cyberloafing or cyberslacking until 2019. The key search terms used to formulate search queries were: (TITLE-ABS-KEY (Cyberloafing) OR TITLE-ABS-KEY

(cyberslacking) OR TITLE-ABS-KEY ("mobile-loafing") OR TITLE-ABS-KEY ("mobile loafing") OR TITLE-ABS-KEY ("mobile loafing") OR TITLE-ABS-KEY ("mobile slacking") OR TITLE-ABS-KEY ("Internet slacking") OR TITLE-ABS-KEY ("Internet loafing") OR TITLE-ABS-KEY ("online loafing") OR TITLE-ABS-KEY ("online slacking")). Forward and backward citation chaining search was also conducted to ensure selection of all relevant studies.

Inclusion and exclusion criteria. To select most relevant studies, four inclusion criteria were specified:

1. Empirical studies on cyberloafing in educational settings will be included.
2. Peer-reviewed, journal articles published in English will be included.
3. Studies published on the topic until July 2019 will be included.
4. Only empirical studies on cyberloafing that include students or teachers as participants will be included.

To further ensure a robust selection, four exclusion criteria were specified for eliminating non-relevant studies:

1. Empirical studies on cyberloafing that focuses on the non-educational setting will be excluded.
2. Duplicate studies appearing on different databases will be excluded.
3. Master and doctoral thesis will be excluded.
4. Studies that do not satisfy the quality evaluation protocol described below will be excluded.

Executing the review plan. At this stage the search procedure, inclusion and exclusion criteria discussed above are put into action to identify the candidate studies. The online literature research resulted in 140 articles from Scopus, 11 articles from PubMed, 111 articles from Web of Science and 13 articles through forward and backward search, which make a total of *n*=275 articles; where *n* represents the count of articles.

Titles and abstracts of manuscripts were screened for eligibility. After the first screening, a second screening was undertaken for duplicates. Titles and abstracts were then examined to iteratively apply the pre-specified inclusion and exclusion criteria to the remaining articles. Studies that meet inclusion criteria were retrieved and their contents were coded to ensure eligibility. All 272 studies found through the search procedure were evaluated thoroughly for selection, however, only 32 articles were found eligible after applying the inclusion and exclusion criteria. Finally, six more were dropped as they failed to meet the quality evaluation protocol and remaining 26 articles were carried forward for synthesis. The process and the articles excluded at each stage is presented in Figure 1.
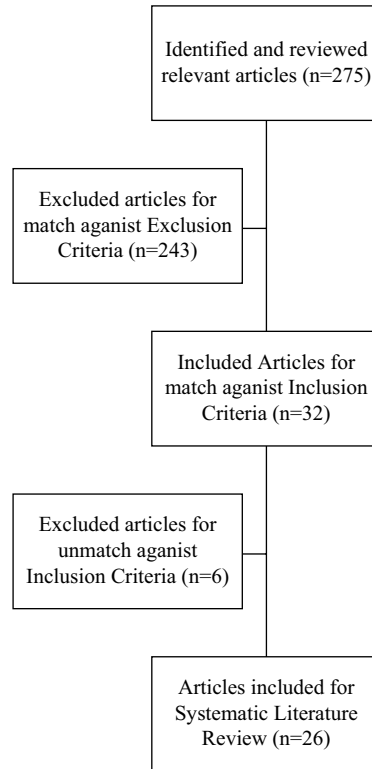
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│   Identified and reviewed│
│  relevant articles (n=275)│
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│ match aganist Exclusion  │
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│    Articles included for │
│  Systematic Literature   │
│      Review (n=26)       │
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Fig. 1. Selection procedure

2.4   Reporting the review

The third stage includes the presentation of the profile and findings of the reviewed studies. The next section represents the profile of the reviewed studies, followed by the section discussing the themes of the reviewed studies.

2.5   Study characteristics

From the 26 articles selected for the present SLR, three used qualitative method of analysis for a total subsample size of 509 participants, and 23 studies used quantitative method of analysis, for a total subsample size of 25,558 participants. The overall sample size for the 26 studies is 26,067 participants. Studies included, focused on students and teachers (see Figure 2). Profiles of student participants are shown in Figure 3.
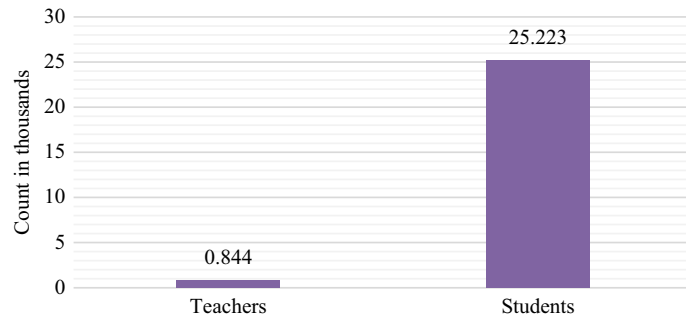
Fig. 2. Student and teacher participants

Four studies were conducted on teachers with a total sample of 844 participants and 22 studies were conducted on students, with a total sample of 25,223 participants. The student sample was diverse and contains university students and school students. Furthermore, of the qualitative studies, two used open-ended questions; one used the interview. The coding analysis was generally used by qualitative studies. Of the quantitative designs, all of them used a survey to collect data and one study validated a measure. Details about the included studies' characteristics are provided in Table A1 in appendix.
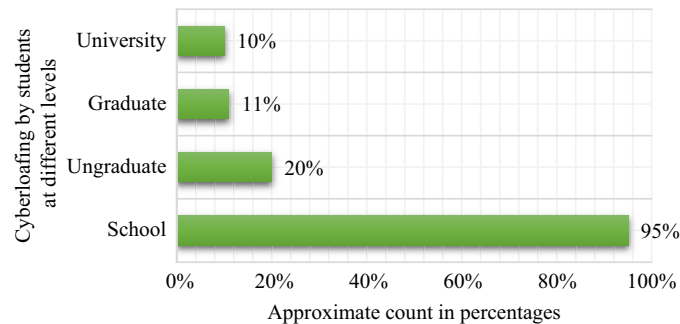

Fig. 3. Profiles of students surveyed

2.6 Geographic scope of the selected studies

Regarding the location, studies included in the present review were distributed around the world, as shown in Figure 4. The studies' researchers were based in Turkey for 13 of the studies, the United States for three studies, and Spain, United Kingdom, and China, Malaysia, Singapore, and Canada for one study each. Although the studies from Spain were only two, 60% of the sample were Spanish.

Fig. 4. Geographic scope of the selected studies

2.7 Publication timelines

As shown in Figure 5, publication dates of the studies ranged from 2001 to 2019; 18 studies were published within the last five years, a further six were published within the last ten years, and another two were published over ten years ago.

2.8 Evolving conceptualization and measurement of cyberloafing

Technological advancement and improved access to the latest technologies by individuals, requires changes in the existing conceptualization of cyberloafing. [31] report the need to redefine cyberloafing since the previous conceptualization mainly addressed from the perspective of institutional setting. However, such conceptualization is quite limited and is outpaced by the evolving technology trends. Internet access is no longer limited to organizational settings, as individuals have uninterrupted access to the Internet through their personal connections, wireless network and other modes of online connectivity. Emphasizing the point, [32] report that cyberloafing is different from the conventional deviant behaviour. Furthermore, different kinds of cyberloafing behaviours exhibit different prevalence rates [31].

For example, in general, cyberloafing is more prevalent in males as compared to females, and students as compared to employees. However, employees cyberloaf more than students when it comes to satisfying their impression management needs [31]. Taking this thought forward, successive attempts have been made to establish new scales to measure cyberloafing. This is necessary, taking into account the advancement in the information and communication technology [33]. Authors in [34] introduced and validated a new scale for cyberloafing, that takes into account five factors: shopping, sharing, accessing online content, gaming/gambling and real-time updating. This scale went beyond the previous factors, namely, browsing and emailing. The frequently occurring words found in the literature are depicted in the Figure 6.
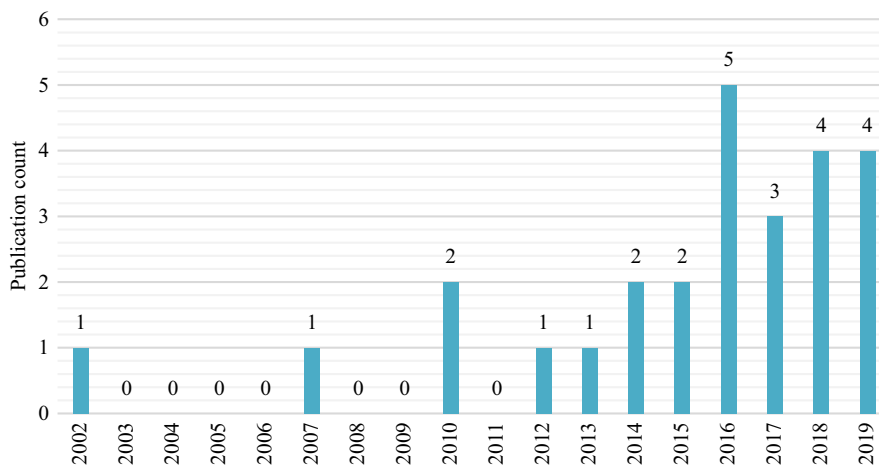

Fig. 5. Publication timelines

2.9 Antecedents of cyberloafing

Uncovering the antecedents of cyberloafing has been a key focus of the extant literature. The research studies investigating the predictors of cyberloafing can be categorized into three categories. First category reports about the antecedent with regards to cyberloafing in general. This stream found following antecedents of cyberloafing: demographic variables, technology usage status, academic variables [3], [35], addiction [36]–[38], stress, social support [39], nature of online learning activities [3] [40], trait procrastination [38], self-regulation [41], cyberloafing anxiety, distractions from peers engaging in cyberloafing [42]. The study by Durak and Saritepeci [43] reports that personality traits do not predict cyberloafing.

Second category lists the predictors for specific kinds of cyberloafing. Prior literature has found the following categories of cyberloafing: {socialization, news follow-up, personal business or individual} [35], [37], and search [37]. The socialization cyberloafing mainly addresses activities related to social networking, instant messaging, discussing on discussion boards, and checking emails. News follow-up as a cyberloafing activity addresses the engagement with keeping oneself up to date with the latest happenings around the world. Personal business or individual cyberloafing addresses

the cyberloafing activities dealing with issues such as online banking, shopping, job seeking, and planning vacations. Finally, Search cyberloafing addresses the issue of engaging in searching information irrelevant to set out learning goals. Studies have revealed that for specific kinds of cyberloafing , internet addiction exerts significant positive influence on individuals, Search cyberloafing and Social cyberloafing [37].
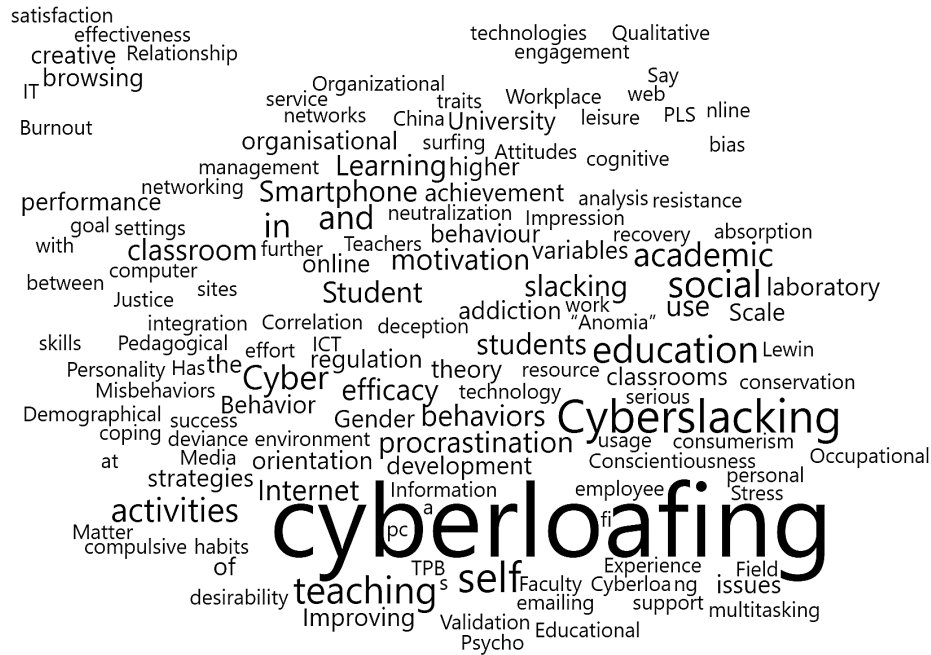
Fig. 6. Word cloud

Final category comprises studies that examine the antecedents of cyberloafing intentions, behaviour and attitude. Intentions to engage in cyberloafing are derived from the attitude towards cyberloafing [44], [45], {subjective norms, perceived behavioural control} [8], [42], [44], {escapism, perceived threat} [44], multitasking [8], prescriptive norms [45], descriptive norms [42] and cognitive absorption [8]. cyberloafing intentions and habit predict cyberloafing behaviour, including, class engagement influenced attitude towards cyberloafing [45].

Consequences of cyberloafing. The extant literature also investigated the consequences of engaging in cyberloafing behaviour in a learning environment. Majority of the reviewed studies have reported that cyberloafing affects performance of individuals. However, [32] report that the influence over individual performance is only valid over the Internet. Durak [3] states that cyberloafing exerts positive influence over academic procrastination. Additionally, engaging in cyberloafing in educational settings negatively influences academic success [3], [10]. Specifically, Wu et al. report that in-class cyberloafing activities negatively influence academic performance [10]. On the other hand, cyberloafing also leads to smartphone addiction [39], [46]. The negative outcomes become detrimental since cyberloafing diverts attention and focus

of teachers and students by diverging them from the tasks that they would execute and complete effectively and efficiently. An example of such distraction is engaging in cyberloafing instead of learning and performing course work during online teaching. Surprisingly, cyberloafing has been found to have some positive outcomes as well. Page [1] found that cyberloafing by teachers at work leads to increased productivity of teachers. Intuitively, accessing the web for personal satisfaction at work may enhance the abilities of teachers to manage stress and balance personal and professional life. Additionally, such personal usage of the web also enhances digital literacy of teachers that contributes towards successful integration of technology with teaching and learning in educational context [1]. Wu et al. [10] report that out-class cyberloafing has small, but significant positive influence on academic performances. However, Wu et al. also report that excessive out-class cyberloafing activities may have negative impact. This implies that cyberloafing at work in moderate amounts brings positive outcomes, nonetheless excessively engaging may equally prove to be detrimental.

Moderators and mediators. A limited number of studies investigate the role of moderators and mediators in predicting cyberloafing. Prasad et al. [41] report that self-efficacy, conscientiousness and achievement orientation moderate association of self-regulation and cyberloafing. For example, being high on self-efficacy and self -regulation reduces the tendency to engage in cyberloafing. Additionally, it should be taken into consideration that tendency to indulge in cyberloafing is contingent with the students' self-regulation despite them being highly efficacious and task-oriented. On the other hand, Gerow [8] found cognitive absorption to mediate the association of multitasking and intentions to engage in cyberloafing.

User characteristics. The prior literature reports about the linkages between user characteristics and cyberloafing. The user characteristics can be understood in terms of demographic variables and nature of the users. The popular demographic variable that has received ample attention from the researchers is gender. Literature reporting absence of any relation of gender with cyberloafing is scant [3]. In contrast, most literature reports the presence of association between gender and cyberloafing [37], [47], [48]. Males have usually been found to cyberloaf more as compared to females [35], [37], [47], [48]. In a contradictory finding, Durak & Saritepeci [43] reveal that female teachers show more cyberloafing behaviour than male teachers.

When it comes to specific cyberloafing activities, gender influences differ. For example, Batury & Toker [35] state that females become active when it comes to cyberloafing for social reasons. However, Keser et al. [37] report no gender differences with regards to social cyberloafing. Furthermore, males prefer news and individual cyberloafing activities [37]. Finally, no gender differences were reported in terms of search cyberloafing [37]. Age was one of the demographic variables that was rarely studied in the cyberloafing field. Durak and Saritepeci [43] found that age is negatively related to cyberloafing. cyberloafing would be higher among younger individuals. However, Yan and Yang [38] indicated that age and cyberloafing are not associated with each other. Other demographic variables such as residence location and family income exert no influence on cyberloafing [39]. In relation to the nature of the user, self-regulation and general self-efficacy have no influence on cyberloafing [46]. Furthermore, habit and consumerism indirectly influence cyberloafing via different neutralization techniques such as denial of responsibility, appeal to higher loyalties, metaphor of ledge, and denial of injury [49].

Technology usage. This theme addresses the influence of the factors related to use of technology on cyberloafing. In this regard, internet experience is correlated with cyberloafing [35]. The individuals who engage in technology and access to the internet every day or more often, tend to cyberloaf more than the users, who use the internet less often [35], [48]. Within this, individuals use the Internet daily cyberloaf for socialization and personal business, rather than news follow-up [35]. Additionally, in terms of skills, advanced or expert users of internet cyberloaf more than the those who are at novice or intermediate level [35], [37], [47]. Interestingly, location and time of internet access has no effect on cyberloafing [26].

Educational characteristics. Educational characteristics address the influence of level of education, academic performance, nature of study and learning environment on Cyberloafing. Gökçearslan et al. [39] reports that level of education has no influence on Cyberloafing. Comparatively, [47] reports that students at higher levels of studies (or senior students) have a high tendency to exhibit cyberloafing behaviours compared to their counterparts at lower levels. Academically, low performing students have a high chance to remain engaged in cyberloafing [47]. Arabaci [47] has examined the influence of the number of hours the educational degree or course requires the student to spend online. Karaoğlan Yılmaz et al. [26] report that time spent on online courses or course activities requiring an online environment is positively correlated with cyberloafing. For example, students spending more time in lab courses, cyberloaf more. This also implies that students of certain study disciplines such as management information systems cyberloaf more as compared to students of other disciplines, such as history [26]. Similarly, some streams of education (e.g., theology teaching department) exhibit more disciplined behaviour than others that influences their tendency to manage or engage in cyberloafing [47]. Additionally, the nature of learning strategies also positively influences cyberloafing [48]. Learning strategies influence class attention of students. The attention in class as also driven by the instructor's encouragement, reduces the tendency to engage in cyberloafing [44]. Furthermore, physical proximity of the leader also results in reduction of cyberloafing [48]. On the other hand, motivation towards the course or learning does not directly influence cyberloafing [48]. Lack of attention, subjective norms and apathy towards course material share positive correlation with cyberloafing [50]. Psycho-social perceptions formulated by the learning environment (e.g., student cohesiveness, involvement, support from teacher, cooperation, equity, attitudes and task orientation etc.) is weakly correlated with cyberloafing [48].

Gaps and limitations. The examination of the different studies on cyberloafing led to the extraction of mainly nine limitations. These are discussed in the following sections and references to the concerned studies are presented in Table 1.

I. **Gender imbalance:** refers to the dominance of a specific gender group over others. Two studies have reported the prevalence of dominance of males over females [3], [31]. This is important to have gender balance since it influences the study findings in general, and more specifically where gender is one of the study variables.

II. **Self-reporting bias:** as a limitation refers to the possibilities of under-reporting of the behaviour by the respondents. A total of thirteen studies have reported self-reporting to be one of the limitations of their research [3], [43]. This could

be due to different reasons, such as lack of consideration of the behaviour to be a hindrance [8], or anxiousness in revealing confidential information regarding their involvement in the deviant behaviour [42]. This could pose a problem since it can influence study findings by falling prey to common method variance that could inflate or deflate the associations among investigated behaviours.

III. **Context of research:** refers to the limitations posed by context in which the research is being conducted. Sixteen studies have found it to be a problem [44], [48]. This could be due to the region in which the research is conducted, or the type of respondents considered for the study or focusing on a restricted service or institute being investigated. This influences the universal applicability of the research findings.

IV. **Distinction:** refers to the failure in considering the distinction between the antecedents and consequences of cyberloafing. Only a single study has reported a limitation [3]. For example, lack of distinction between antecedents and consequences of in-class and out-class activities, while investigating cyberloafing behaviour [3]. This gives an unclear picture of the phenomenon.

V. **Generalizability:** refers to the inability of the study findings to be extrapolated to explain the cyberloafing behaviour of the general user population. About eight studies have specifically reported it as their limitation [45], [49]. However, it might be implicitly meant by other studies when they discuss research context or study design to be the limitations faced by them. Moreover, this is one of the major restrictions faced by the empirical research being conducted in general as well.

VI. **Conceptualization of cyberloafing:** reflects issues in relation to the way the concept of cyberloafing was conceptualized for analysis and investigation. For example, considering cyberloafing in general rather than specific cyberloafing behaviour [45], investigating limited sub-dimensions of cyberloafing behaviour and activities [26], failing to explore cyberloafing explicitly [44], lack of exploration of context, where cyberloafing is being investigated, for example sampling issues Zoghbi-Manrique-de-Lara [32], consideration of old scales that fail to incorporate current changes in information and communication technology [38]. Six studies have highlighted this to be their limitation [44], [45].

VII. **Inadequate sampling and sampling size:** refers to the problems related to low sample size, convenience sampling and failing to incorporate random sampling. This has been reported to be a problem by five studies [44].

VIII. **Limitations to study design:** refers to the usage of cross-sectional design for data collection rather than longitudinal. However, it also addresses other issues such as the choice of using surveys as a data collection tool that involves self-selection bias. This influence the drawing of the dynamic associations among variables being investigated. Six studies have reported study design as their limiting point [42], [45]. Lastly, the possibility of other variables highlights the limitation in terms of ignoring the other variables that could be incorporated in the study since they could influence cyberloafing behaviour of respondents. Two studies emphasize upon the possible loss of information subjective to lack of consideration of other important variables [44], [50]. For example, multi-tasking, cognitive

absorption, awareness of instructor monitoring, individual traits, learning style, goals, interests etc. [44], [50].

The review of the extant literature has led to the identification of the eight open gaps in existing knowledge on cyberloafing in educational settings. These gaps existing in knowledge domain of cyberloafing are discussed in the following section:

I. The detrimental consequences of cyberloafing behaviour require more comprehension [34]. This will help in assisting the individuals suffering intentionally or unintentionally from indulging in cyberloafing.

II. Serious cyberloafing behaviour requires further investigation [26]. For example, hacking and spreading viruses.

III. Cyberloafing lacks treatment as a broad concept [43]. Majority of the extant research considers a limited view of cyberloafing, which fails to present a more holistic picture. This could be achieved by bringing out associations of varied kinds of variables and cyberloafing. For example, variables such as addiction, social support, cognitive absorption, readiness levels, interests, learning styles, obedience, individual's personality, and self-efficacy perceptions can be considered [32], [41], [42], [48]. Considering additional variables could also help in overcoming the extant limitations by increasing the existing percentage of cyberloafing explained.

IV. There also exists an open gap that requires better understanding of the factors that trigger or prevent cyberloafing behaviour in different contexts [26], [31], [35]. For example, influence of control, role of job types, characteristics of activity that needs to be engaged in while users get distracted by cyberloafing, and addiction.

V. There is a need to consider the influence of cyber activities of the users while analysing the cyberloafing behaviour and drawing implications from the same [3].

VI. Exploration of the cross-cultural nature of cyberloafing demands attention from the research community. It will be interesting to know the cultural aspects that have positive or negative influence on cyberloafing behaviour [35], [39].

VII. Nature of association between addiction and cyberloafing is also an open issue. There have been some attempts at understanding their association [37], [46], however, in-depth exploration is needed for attaining better comprehension of their association.

VIII. There is a need to bring forth the underpinnings of the differences among the cyberloafing behaviour exhibited by students and employees [35], [41]. Finally, there is a need for redefining cyberloafing since initial conceptualization mainly dealt with the misuse of the Internet in the institutional settings [31]. However, the situation has changed since individuals have continuous access to the Internet via different ways.

Table 1. Study limitations

Limitations	Authors
Gender imbalance	Durak, 2019; Akbulut et al., 2017
Self-reporting	Durak, 2019; Akbulut et al., 2017; Yilmaz & Yurdugül, 2018; Taneje et al., 2015; Gokçearslan et al., 2016; Zoghbi-Manrique-de-Lara, 2012; Wu et al., 2018; Li & Titsworth, 2015; Page, 2014; Gerow et al., 2010; Yan & Yang, 2014; Soh et al., 2018; Durak & Saritepeci, 2019
Research context	Durak, 2019; Yilmaz & Yurdugül, 2018; Rana et al., 2016; Akbulut et al., 2016; Gokçearslan et al., 2016; Zoghbi-Manrique-de-Lara, 2012; De-Lara, 2007; Prasad et al., 2010; Li & Titsworth, 2015; Keser et al., 2016; Rana et al., 2019; Gerow et al., 2010; Yan & Yang, 2014; Soh et al., 2018; Durak & Saritepeci, 2019; Varol & Yildirim, 2017
Distinction	Durak, 2019
Generalizability	Yilmaz et al., 2015; Rana et al., 2016; Sharma, 2019; Zoghbi-Manrique-de-Lara, 2012; Prasad et al., 2010; Li & Titsworth, 2015; Rana et al., 2019; Soh et al., 2018
Cyberloafing conceptualization	Yilmaz et al., 2015; Zoghbi-Manrique-de-Lara, 2012; Prasad et al., 2010; Rana et al., 2019; Yan & Yang, 2014; Soh et al., 2018
Sampling issues	Rana et al., 2016; Taneje et al., 2015; Sharma, 2019; Li & Titsworth, 2015; Rana et al., 2019
Study design	Taneje et al., 2015; Prasad et al., 2010; Wu et al., 2018; Gerow et al., 2010; Sharma, 2019; Soh et al., 2018
Possibility of other variables	Rana et al., 2016; Rana et al., 2019

2.10 Recommendations for future research

The studies analysed using SLR provide some interesting recommendations for conducting future research in the area of cyberloafing. Outlines these recommendations is given in the next section:

I. The findings from the existing studies should be replicated with users of varied age range, different socio-cultural structures, different regions and different backgrounds to have a more generalizable understanding of cyberloafing [3], [34], [42], [44], [46]–[48].

II. The future studies on cyberloafing should be longitudinal in nature to capture changes over time [3], [8], [10], [49].

III. The existing literature suggests that researchers consider study designs that are based on different research methodologies to gain holistic understanding of cyberloafing phenomenon, such as considering using focus groups, observations, triangulation, interview and surveys [38], [43], [46], [49]. Further, researchers suggest the usage of think-loud protocols in the research design, such as semi-structured interviews and eye-tracking tools [48].

IV. Further investigations on cyberloafing should take into consideration the dynamic nature of information and communication technology [32], [34]. This will enable more accurate estimation of cyberloafing behaviour.

V. Future research could examine the distractions causing engagement in cyberloafing by an individual after viewing others in near proximity practicing the same. This could be examined through variables, such as the role of morality, values and concern for others, learning in a classroom or performing work efficiently [42].

VI. Future studies should consider having larger sample sizes [26], [44], [50].

VII. Future research should try to use log-based environments that can help in minimizing the bias brought as a result of self-reporting nature of study design [3], [10], [44], [45].

3   Comprehensive framework

Based on the process of the reviewed literature, this study proposes a framework that consists of five main components as shown in the Figure 7. The boxes and the dotted lines represent the investigated relationships between cyberloafing and other characteristics. Proposed framework may be employed by future researchers to further guide them in the field of cyberloafing in various educational settings. Framework offers support to research efforts aimed at exploring the consequences antecedents, mediators, and moderators that might affect Cyberloafing. The different components of this framework are as follows:

User characteristics

It is argued that there is a link between user characteristics, such as demographic variables and the nature of users and Cyberloafing. The extant research has focused on gender; however, gender influences differ [35], [37]. Future studies may consider inclusion of gender effects and associations with Cyberloafing. Among the demographic variables the age of the participants was rarely focused on in the literature. Few researchers suggested that the nature of users such as self-regulation and general self-efficacy has no influence on cyberloafing [46]. Furthermore, habit and consumerism indirectly influence cyberloafing by means of different mechanisms such as metaphor of ledge and denial of responsibility [49].

Technology usage

Extant literature has focused on investigating cyberloafing with relation to technology usage. Few researchers have also suggested that the internet experience and internet skills are correlated with cyberloafing [37]. individuals engaging in Internet activities every day would cyberloaf more than the users, who use the internet less often. Individuals with advanced internet skills cyberloaf more than the ones who don't have advanced internet skills. However, cyberloafing does not get influenced by location and time of internet use [26].

Educational characteristics

Educational characteristics, such as grade, academic performance, nature of study and learning environment have been studied with relation to cyberloafing. Research has shown that higher grades and academically low performing students and time spent on online courses have a higher tendency to show cyberloafing behaviours [26], [47]. However, Psycho-social perceptions formulated by the learning environment

(e.g., student cohesiveness, involvement, support from teacher, cooperation, equity, attitudes and task orientation etc.) has a weak relationship with cyberloafing [48].

3.1 Framework methodology

This study aims to build a comprehensive framework on previous research on cyberloafing in educational settings by implementing SLR methodology. Limitations have been reported by prior studies for gender imbalance, self-reporting bias, and research context. Authors posit the need for gender balance in the sample in future research. Further, self-reporting measures may not be considered for collection of cyberloafing data. The context of research should be rich and unlimited to benefit the progress of undertaken research. Further, distinction between antecedents and consequences on cyberloafing should be considered in future research.

Conceptualization of cyberloafing in prior research, reflects the issues with regards to the way the concept of cyberloafing was conceptualized for investigation. For example, as general examination, limited sub-dimensions of cyberloafing behaviour and activities, and failing to explore cyberloafing explicitly [26], [44], [45].

Antecedents. One of the limitations studies referenced in the prior sections reveal lack of distinction between antecedents and consequences. Antecedents, such as demographic variables, academic variables, stress, social support and self-regulation have been studied with relation to cyberloafing. Research has shown that stress and social support have significant effects on cyberloafing [39]. While perceived social support has a small though significant effect on cyberloafing, it was found that the higher the level of stress the higher the level of cyberloafing [39].

Age and gender as demographic variables have been studied in relation to teachers, who cyberloaf. Young aged teachers show higher levels of cyberloafing behaviour than older teachers. Further, female teachers show higher levels of cyberloafing behaviour than male teachers [43].

Academic procrastination and education level, as academic variables have been studied with relation to cyberloafing behaviour. The findings highlight a conceptual relation between cyberloafing and academic procrastination and education level of teachers. Students would give up their academic studies to cyberloaf more. Further, higher the level of education of teachers the higher the level of cyberloafing [43]. However, research has shown that self-regulation has no effect on cyberloafing [46]. The negative effect of self-regulation was not statistically significant [46].

Consequences. The extant literature in this paper showed the positive and negative consequences of engaging in cyberloafing behaviour in a learning environment. Majority of the reviewed studies have reported that cyberloafing has a negative effect on the performance of individuals [3], [38]. Smartphone addiction is one of consequences of cyberloafing [39], [46]. Gokçearslan et al. find that the level of activities of cyberloafing increase individuals' interest towards smartphone addiction.

[45] reported that class engagement was significantly and negatively related to cyberloafing attitudes. An engaging lesson would decrease students` capability to cyberloaf. Cyberloafing is a source of distractions not only for students, but for teachers as well. The engagement in cyberloafing instead of focusing on learning or teaching, is the source of distraction. Research has shown that distraction caused by cyberloafing acts of others have a negative impact on the attitude toward cyberloafing [44]. Distractions

experienced by cyberloafing acts of others would decrease the perception of cyberloafing as fun and enjoyable behaviour [44].

On the other hand, cyberloafing has positive outcomes as well. [1] argues that cyberloafing by teachers while at work results in an increase of work productivity. This could be due to their ability to manage stress and balance personal and professional life as a result of using the web for personal purposes at work. Additionally, such personal usage of the web also enhances digital literacy of teachers, which could contribute towards successful integration of technology with teaching and learning in educational context [1]. Wu et al. [10] report that out-class cyberloafing has a small but significant positive influence on academic performance. However, they also report that excessive out-class cyberloafing activities will have a negative impact. This means that cyberloafing at work in moderate amounts brings positive outcomes, nonetheless engaging excessively in cyberloafing may ultimately prove detrimental.

Moderators and mediators. Cognitive absorption, conscientiousness trait, achievement goal orientation and academic self-efficacy have been studied as moderators and mediators with relation to cyberloafing.

Research has shown that cognitive absorption and academic self-efficacy were considered as predictors of cyberloafing [43]. Prasad et al. [41] report that academic self-efficacy, conscientiousness and achievement orientation moderate the relationship between self-regulation and cyberloafing. Individuals with high self-efficacy and self-regulation tend to engage less in cyberloafing. On the other hand, Gerow et al. [8] found that cognitive absorption mediates the relationship between the ability to multi-task and intentions to engage in cyberloafing.
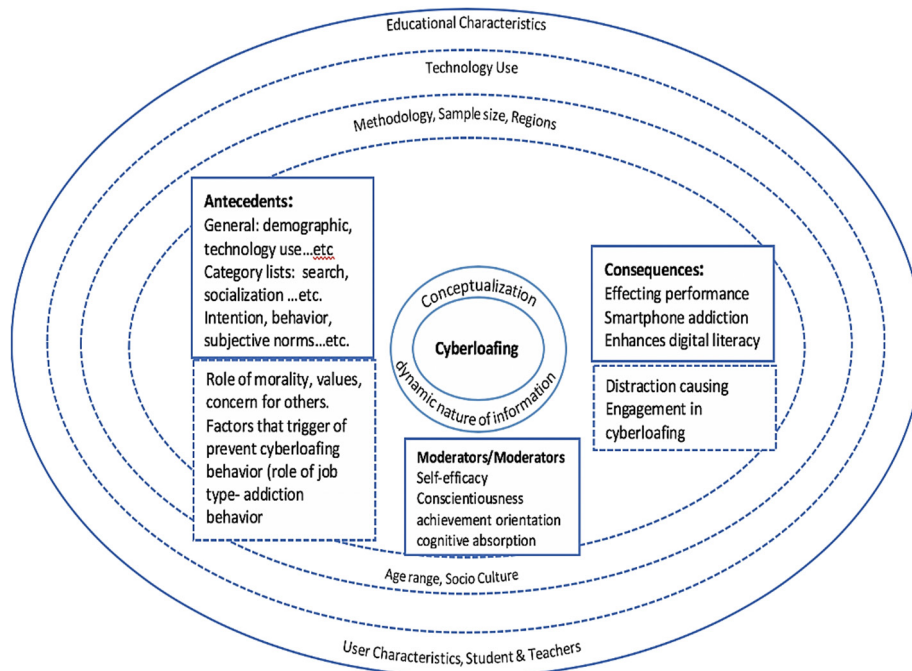

Fig. 7. Comprehensive framework

4   Study implications

This study offers various theoretical and practical implications, which are discussed in the following sub-sections:

Theoretical implications

SLR methodology adopted is the first attempt at reviewing the phenomenon of cyberloafing in the context of educational settings. This is vital to research and analysis since cyberloafing during the teaching and learning process acts as a threat to achievement of academic goals and successful integration of technology with education. Moreover, current realization on cyberloafing in educational context is broad, diverse and fragmented. In this regard, SLR provides comprehensive understanding by providing information in a concise way on the cyberloafing behaviour. For example, antecedents, outcomes, role of user characteristics in general and specifically related to their technology usage and educational status and its conceptualization. Furthermore, it introduces gaps in the current literature concerning cyberloafing, and it also provides future research directions for researchers. In future, researchers could focus on cyberloafing behaviour investigation rather than intentions that may be researched via experimental or log-based study design. SLR provides an integrated framework for comprehending cyberloafing in an educational context.

Practical implications

The SLR methodology adopted in this study guides to the following three practical implications.

I. First, it provides insights to educators and policy makers regarding avoiding or reducing cyberloafing in the teaching and learning environments. It has been found that increased engagement with technology for educational purposes increases the tendency to engage in cyberloafing. However, educators and policy makers must understand that limiting the usage of technology in educational curriculum is not the right solution. This may refrain the reaping the benefits that integration of technology with education could offer. Moreover, students' possession of smartphones or personal connections to the internet do not let that happen in reality. Hence, educators should think about other ways to limit sources allowing access to the internet at ease. For example, role models of students could be established to refer to and limit the negative consequences of engaging in cyberloafing among the students. Furthermore, policy-makers could introduce policies in their curriculum and educational institutions guidelines that explicitly inform students about the negative outcomes of engaging in such behaviours. Adoption of such strategies have been quite useful in controlling ragging in educational institutions in India [51], [52].

II. Second, SLR findings can help teachers in understanding cyberloafing more broadly and in a concise way. The findings recommend that teachers should bring in changes in their teaching and learning strategies. For example, informing students about the importance of taught content, physical monitoring, designing of educational activities that are gamified; or to engage students and drive them to engage in flow experience by balancing their skills and level of difficulty tasks etc.

III. Third, findings also assist parents, guardians, therapists and psychologists. For example, self-regulation has been identified as a useful strategy for controlling

cyberloafing. In this regard, parents and guardians could help their children to learn the importance of self-regulation. Furthermore, psychologists and therapists could help students in learning ways to practice self-regulation skills. Furthermore, parents can also teach their children ethics and their importance in their life. Being ethically conscious could also help them in refraining from engaging in cyberloafing. This is especially important since students of today represent the future of the world and nations. They are future employees and it has already been reported that cyberloafing by employees leads to great functional as well as financial losses to the organizations.

5   Limitations

Despite the benefits offered by SLR, it suffers from two limitations.

I. The current review is subjective and qualitative in nature with regards to inclusion of articles for SLR. This might bring in some bias that could ultimately influence the findings of the conducted research. This recommends future researchers intending to conduct SLR in cyberloafing, or in other themes to incorporate quantitative measures while choosing the articles for inclusion in SLR. For example, they could use meta-analysis for such purposes. Using a quantitative approach for conducting review of cyberloafing in the educational domain may also result in some findings that probably current SLR failed to capture with its current approach.

II. The current research considers understanding cyberloafing among students and teachers in general. It does not provide specific information on how cyberloafing varies across students and teachers at school, college or university level. Such information could highlight the need for usage of different strategies especially for students depending on the severity level across all three formal stages of education. The future research could focus on spotting such differences so that appropriate actions could be taken to curb the situation and assist the students as early as possible.

6   Conclusion

This study employed Systematic Literature Review (SLR) methodology for reviewing 26 articles and provided a detailed description of: (i) research profile of existing cyberloafing research; (ii) key themes covered by extant research; (iii) provision of future recommendations for research based on the examination of findings, implications, limitations and future research directions; and (iv) proposing an integrated framework for reference of future researchers. The study focussed on the concept of cyberloafing that emerges as a huge barrier to the success of achieving academic goals, as set out for the students and teachers. Cyberloafing poses a threat to the successful integration of technology in educational settings. The findings of this study offer several theoretical and practical implications of research on cyberloafing. Investigation

on cyberloafing in educational context is still in the infancy stage, in addition to being a broad and fragmented concept. The educational environments demand an in-depth understanding and comprehension of the issue of cyberloafing.

7   Acknowledgment

8   References

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9 Appendix

Table A1. Prior literature on Cyberloafing in educational settings

Authors & Year	Sample	Research Design	Variables		Statistical Analysis	Study Focus	Mediator	Moderator
			Dependent	**Independent**				
Durak (2019)	171 Turkish University Students (70% female) $@	Survey	Cyberloafing behaviour, Academic success, Academic procrastination	Gender, Technology usage status, Online learning activities, self-efficacy, Motivation, Cognitive absorption, Success intention, Cyberloafing	Regression	model explains the relations of students Cyberloafing with demographic and academic variables	–	–
Rana et al. (2019)	188 British Undergraduate and Postgraduate Students (48% female) $@	Survey	Cyberslacking	Lack of attention, Apathy, Distraction, Subjective attitude, Subjective norm, erceived threat, Perceived behavioral control, Escapism	Regression, Factor analysis	factors influencing Cyberloafing through the theory of planned behaviour	–	–
Sharma (2019)	303 American Undergraduate University Students (45% female Mean age 29 years	Survey	Cyberslacking behaviour	Habits, Consumerism, Neutralization	Regression	the role of habits, consumerism and neutralization on cyberslacking behaviour	–	–
Varol & Yildirm (2019)	184 Turkey University Students (51% female) $@	Qualitative study	Instructor, Student,Course content learning environment		Coding	Students Cyberloafing reasons and solutions	–	–

Durak & Sariepeci (2019)	194 Turkish Teachers (70% female) Mean age 33 years @	Survey	Cyberloafing	Demographic variables, ICTUS, Personality traits, Occupational variables	Factor analysis, Regression	The investigation of factors that predict the Cyberloafing	–	–
Yilmaz & Yurdugul (2018)	607 Turkish Undergraduate Students (58% female) $, Age Range 17–26	Survey	Cybeloafing,	Psycho-social perception, Attitudes, Motivation, Learning strategies	Factor analysis, Correlation, Regression	The level of Cyberloafing / relationship between Cyberloafing and other variables	–	–
Soh, Koa, & Lim (2018)	283 Malaysian University Students (57% female) $@	Survey	Cyberloafing behaviour	Habit, Intention, prescriptive norms, Descriptive norms, Preceived behavioural control, Class engagement	Regression	Examination of students Cyberloafing behaviour	–	–
Wu, Mei, & Ugrin (2018)	1050 Chines Undergraduate students (50% female) $@	Survey	Academic performance	In-class, Out-class Cyberloafing	Regression	in-class and out-class Cyberloafing	–	–
Akbulut, Donmez & Dursun (2017)	1339 Turkish Students,375 High School, 964 University Students 19 years @	Survey	Cyberloafing by taypes	Gender, Social desirability	Anova, Ancova	the preverlance of Cyberloafing and social desiability bias	–	–
Arabaci (2017)	232 Turkish University Students (44% female) $@	Survey	Perecvied Cyberloafing behaviour	Gender, grade, department, internet usage skills, internet usage seniority	Factor analysis	Investigation of the states of showing Cyberloafing	–	–

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Table A1. Prior literature on Cyberloafing in educational settings *(Continued)*

| Authors & Year | Sample | Research Design | Variables | | Statistical Analysis | Study Focus | Mediator | Moderator |
			Dependent	Independent				
Gokcearslan, Uluyo& Sahin (2018)	885 Turkish Undergraduate university Students (59% female) $@	Survey	Smartphone addiction/ Social support/ Stress	Cyberloafing/ Smartphone addiction	Factor analysis, Regression	the relationship between smartphone addiction and Cyberloafing	–	–
Gokcearslan, Mumcu, Haslaman & Cevik, 2016	589 Turkish University Students (71% female) $, Age Range 19–20	Survey	Cyberloafing/ General self-efficacy	Smartphone addiction/ Cyberloafing	Correlation, regression	the role of Cyberloafing in smartphone addiction	–	–
Rana, Dwivedi, Slade & Lal (2016)	211 Undergraduate Students (33% female) $@	Survey	Attitude to cyberslacking, Intention to cyberslacking	Attitude, Apathy, Lack of attention, and Subjective norm	Correlation	factors impact student cyber-slacking behavior	–	–
Keser H., Kavuk† K., Numanoglu G. (2016)	139 Turkish University Students (60% Female) $@	Survey	Cyberloafing Internet addiction	Gender Grade level Internet usage Internet ability	Correlation	the relationship between teacher's addiction level and Cyberloafing	–	–
Akbulut, Dursun, Dönmez & Şahin (2015)	Phases 1 33 Turkish Teacher (72% female) 479 Turkish Graduate Students (54% female) 63 Turkish Undergraduate Students (47% female) Phase 2 471 Turkish Undergraduate Students, (59% Female) Phase 3, 73 Students (32 Female) $@	Survey	Cyperloafing	Sharing Shopping Real-time updating Accessing online content	Factor analysis	Search for measures to investigate syberloafing	–	–

Baturay & Toker (2015)	282 Turkish Students grade 9–12 (47% Female) $@	Survey	Cyberloafing Types	Gender Grade Internet skills Internet usage Internet experience	Correlation	the impact of demographic behavior on Cyberloafing	–	–
Karaoğlan Yilmaz, Yilmaz, Öztürk, Sezer & Karademir (2015)	288 Turkish University Students, (52% Female), $, @	Survey	Cyberloafing level	Gender Department Location Daily time on the internet.	Factor analysis, Anova	Cyberloafing behaviors of university students in computer lab.	–	–
Page, (2014)	110 UK teachers, (64% Female), $, @	Qualitative study/	Type of PWU personal web use reasons		Descriptive	type and reasons of PWU	–	–
Taneja, Fiore, & Fischer, (2015)	267 American udergraduate students, (40% Female), $, @	Survey	Intention to Syberslaking	Attitude Subjective norm Descriptive norm Perceived behavioral control	Regression	the factors influencing students' attitude and intentions to use technology	–	–
Yan & Yang (2014)	255 Chinese Graduate students, (54% Female, $, @	Survey	Prevalence cyperloafing	Gender Age Trait procrastination Internet compulsive use	Regression	Personal characteristics and Prevalence Cyperloafing	–	–
Yasar & yurdugul, (2013)	215 Turkish University Education Students (48% Female), $, @	Survey	Cyberloafing behaviors and Cyberloafing activities		Descriptive	Cyberloafing behaviors and Cyberloafing activities.	–	–
Manrique-De-Lara, (2012)	270 Spanish University teachers and students, (Female 35.4%), $, @	Survey	Cyperloafing	Organizational service Interpersonal deviance SSTS	Correlation	cyperloafing potential online characteristics.	Cyberloafing	–

(Continued)

Table A1. Prior literature on Cyberloafing in educational settings *(Continued)*

Authors & Year	Sample	Research Design	Variables		Statistical Analysis	Study Focus	Mediator	Moderator
			Dependent	Independent				
Prasad, Lim, & Chen, (2010)	128 Singaporean undergraduate students, (62% Female), $, @	Survey	Cyberloafing	Self –efficacy Conscientiousness Achievement Self-Regulation Cyberloafing	Regression, Moderation	personality variables related internet use.	–	individual characteristics (self-efficacy, conscientiousness and achievement orientation)
Gerow, Galluch, & Thatcher, (2010)	654 American University students, $, @	Survey	Cyber-slacking	External factors, Internal factors	Regression, Factor analysis	What causes students to cyber-slack in the classroom?	–	–
Manrique-De-Lara, (2007)	270 Spanish university teachers (35.4%Female), $	Survey	Cyberloafing	Gender Age Work anomia Distributive justice Procedural; justice Interactional justice	Correlation, Regression	the moderating role of work anomia in the relationship between employees' perceptions of organizational justice and Cyberloafing.	–	Work anomia
Davis, Flett, & Besser, (2002)	211 Canadian undergraduate students (51%Female), MAge=21.73	Survey	Problematic internet use	OSC dimensions	Manova, Factor analysis	empirically based predictable model of problematic internet use.	–	–

10 Authors

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