



Exploring the Influence of E-Learning Systems on Information Overload and Social Media Addiction During the Covid-19 Pandemic

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Abstract

Objective: This paper investigates the association of information overload and social media addiction with academic attainment among a sample of college students in Kuwait as they switched from face-to-face to e-learning systems during the COVID-19 pandemic. The closure of universities and colleges made this a mandatory transition. Educators posit information overload (IO) would increase due to the ease of creating, sharing, and duplicating information through social media platforms. **Method:** This cross-sectional study surveyed a sample of 230 college students who participated by answering the information overload scale and Bergen social media addiction scale. **Results:** Data were analysed using SPSS; Correlations, *t*-tests, and linear regression were conducted. The findings showed an increase in information overload during e-Learning. Perceived course stress and social media addiction were significantly associated with levels of information overload. However, academic attainment was not significantly correlated nor predicated by information overload and social media addiction during e-learning. **Conclusion:** Information overload scores were shown to have increased during e-learning when compared to the results of a previous study. The negative consequences of information overload on students' academic wellbeing were observed. However, more research is required on this population to devise ways to assist students to deal with information overload during the ongoing pandemic.

Keywords: Information overload; Social media addiction; eLearning; Covid-19 pandemic; Academic attainment.

1. Introduction

In March 2020, the World Health Organization (WHO) announced that COVID-19 was a global pandemic and warned of its highly infectious spread of contagion (World Health Organisation, 2020). In response, the entire population of Kuwait was ordered into partial lockdown; schools, government institutions, and universities shut down to limit human interaction and curb the spread of the virus. This, in turn, led different institutions, including educational institutions, to shift to remote online work and education. In Kuwait, the shift was slow, and the required infrastructure was incomplete, especially for educational institutions. Accordingly, the change to online education took more time when compared to other Gulf countries such as Saudi Arabia and the UAE. This was also because e-learning systems were not as widespread in Kuwait, and their use was limited to a few private-sector universities. Although the internet infrastructure in Kuwait is robust (Global Connectivity Index, 2020), with significant growth in information and communication technologies (ICTs; (Razzaque, 2020)), other factors such as crisis management planning, purchase of remote tools and software for educational needs, training of staff and students on selected virtual tools, converting teaching materials to suitable formats for online teaching were not as robust and contributed to the slow transition to online learning. It took approximately five months (up to August 2020) for universities to initiate e-learning systems and resume courses fully online.

Use of the internet and social media also increased during the pandemic, as the population's need to seek information and news about COVID-19 played a major role in the increased uptake. The use of ICT during the pandemic was recommended to reduce social isolation and anxiety due to the world lockdown and quarantine (Mucci *et al.*, 2020). However, finding trusted sources of information was positively correlated with positive wellbeing, while "COVID-19-related information overload and panic" were associated with negative wellbeing. This was also due to the pervasiveness of false or fake information and prolonged periods of information-seeking through the internet and social media (Fan and Smith, 2021).

1.1. Switching to e-Learning

Students and faculty shifted from traditional face-to-face teaching and classroom methods to fully online digitised instructional mode. Although it came two months after training in online teaching methods, the shift was intense and swift for both groups. Students had to read the information and instructions themselves and find the

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related information for their courses. This process was vastly different from the usual oral delivery of lectures. The weighting of course attainment varied from the norm, leading to new ways of evaluating student work via, e.g., increased homework and projects, which required dealing with and understanding more information. Students had to submit assignments through automated portals that closed off if submissions were late. They were also under pressure to deal with large amounts of information and meet deadlines in a new way. With advanced ICTs, today's learning systems offer different formats of learning resources, such as text, images, audio, and video (Al-Fraihat *et al.*, 2020), and it is perceived students benefit because of a richer learning experience. However, they also add to the information shared through these systems, which means more information is received in different formats. This study explores information overload from e-learning systems and their impact on student stress and academic attainment.

E-Learning research began in 2001 with explorations surrounding its adoption and intentions to use. From about 2007, research focused on user satisfaction and then moved to the examination of the overall success of e-learning from 2013 (Cidral *et al.*, 2018). There is now more pervasive research on the technology side of e-Learning since ICTs have become more advanced, reliable, and accessible. Research into e-Learning now focuses more on students' and instructors' attitudes and interactions, which is an important part of the e-Learning process (Cheng, 2011; Liaw *et al.*, 2007; Selim, 2007). Since e-learning is a mixture of information systems or technologies and the humans who interact with them (Al-Fraihat *et al.*, 2020), how humans feel is as important as how these systems operate.

The term e-learning is known globally by different names, such as distance education, online education, and home-schooling. However, in this research, we interpret e-Learning as "emergency remote education (ERC)". The difference between ERC and those other terms is that the "latter is an option while the former is an obligation" (Bozkurt *et al.*, 2020). Other related terms such as "Teams" and "Zoom" have become part of everyday language, as they have become part of all our lives since the start of the pandemic (Dwivedi *et al.*, 2020).

The impact of this swift shift to digital technologies on the economy, culture, and users' well-being is relatively unknown (Dwivedi *et al.*, 2020). A recent study on a sample of Chinese students showed that college students had higher anxiety rates throughout online learning during COVID-19 (Shi *et al.*, 2020). It is, therefore, important to analyse the outcome of information systems use and adoption during the pandemic to develop their use post-COVID (Dwivedi *et al.*, 2020). However, Research about e-Learning use in developing countries is limited (Sukendro *et al.*, 2020), However, research aims to fill a gap in the literature.

1.2. Information Overload

Information overload (IO) is the state of stress a person experiences when the given information exceeds the limit of cognitive capacity, which results in difficulty in understanding an issue and decision making (Miller, 1956; Toffler, 1970). The high flow of information forms a cognitive barrier that blocks or limits information processing and lowers the user's performance, causing frustration (Savolainen *et al.*, 2018). The negative consequences of information overload in the workplace have been widely investigated and documented. However, there are few studies about the effects of information overload on students' wellbeing and academic attainment (AlHeneidi and Smith, 2020). In light of this ongoing pandemic, it is crucial to investigate the impact of a complete switch to e-Learning systems on students' perception of information. Recent studies on information overload during the pandemic state show that information production exceeded all previous pandemics due to the ease of accessing, creating, and sharing information (Valika *et al.*, 2020). The association of this over-abundance of information has been shown to reduce wellbeing, as Fan and Smith (2021) (in press) demonstrated in their study on Chinese adults.

1.3. Information Overload and Social Media Addiction

Empirical studies have shown the correlation between information overload and internet addiction. Although information overload and internet addiction negatively influence wellbeing, their influence does not overlap, as each variable influences different wellbeing outcomes (Alheneidi, 2019). Shi *et al.* (2020), found that social media overload caused technostress to information users and information overload caused exhaustion. Both variables negatively influence students' wellbeing and academic attainment. A recent study also showed that the use of all social media platforms predicts information overload, negatively influencing the individual's wellbeing (Matthes *et al.*, 2020).

1.4. Information Overload and e-Learning

Although more studies on information overload studies are being conducted, there is still a limited number of empirical studies investigating university students (Alheneidi, 2019; Binti and Binti, 2017). Using a qualitative technique, (Al-Kumaim *et al.*, 2021) looked at the causes, effects, and remedies of IO on postgraduate scholars. Most participants indicated that IO was unavoidable and impacted their performance while conducting research. The students indicated that they faced three types of IO in their studies: first, an excessive number of information resources. Second, difficulty in identifying high-quality information related to their studies, and third, the inability to process this information. The most frequent form of IO was the excessive amount of information they found online when conducting research. Al-Kumaim *et al.* (2021), also found three causes of IO to be: personal, environmental, and technological. The technological cause of IO is a fast-growing topic for academic research on the internet; the production and spread of academic and scientific information are equally high and fast. IO has been found to have negative consequences on students' performance and progress, with phrases used including "poor research quality", "time-consuming", "low productivity", and "less innovation" (Al-Kumaim *et al.*, 2021). IO has also been shown to

negatively affect students' health and personal relations. This present study aimed to start the conversation for future studies in other settings, cultures, and universities and thus fill a part of this research gap.

Iqbal *et al.* (2020), reported on the use of "Telegram" to support online education for medical students. They found that it brought many advantages, such as positive functionalities in terms of technology. It also helped students to employ collaborative learning, and sustained student wellbeing, and kept them feeling secure. On the other hand, there were some disadvantages, including IO, and wasted time through distractions (Iqbal *et al.*, 2020). Others have found that IO harmed some students' participation and engagement, but that some students learned to manage it (Chen *et al.*, 2012). Other researchers investigated 249 Chinese university students and reported that information, communication, and social overload all led to "technostress". However, only IO had a significant impact on exhaustion. Both technostress and exhaustion harm academic performance (Yu *et al.*, 2019). The dark side of information technology overload in business has been explored from different perspectives, and the impact on employees has been reported. However, its impact on university students needs further exploration (Yu *et al.*, 2019), especially since university students are prominent users of information technology and social media. This means that investigating the impact of this on their performance is particularly important. (AlHeneidi and Smith's, 2020), findings are instructive in this regard as they suggested that information overload and internet addiction do not always influence academic attainment. The current situation of the pandemic has greatly increased information flow, especially with the addition of e-Learning. Information overload influencing academic attainment has not been investigated within this context. Therefore this paper fills part of this gap in the literature.

1.5. Internet Use During COVID-19

During the COVID-19 lockdown, there was a rise in internet use since this was the main source of information, and persons relied on the internet for communication through social media. Globally, people had been strongly encouraged by governments and doctors to stay home and reduce face-to-face contact. Consequently, the internet dominated most people's daily lives (Zhang *et al.*, 2020). The increased use of the internet may have resulted in internet addiction by some internet users due to the high rise of loneliness among adults during COVID-19 lockdowns, as reported in Alheneidi *et al.* (2021). Dwivedi *et al.* (2020), also found that internet use had risen 40% during the lockdown for work-related use and a 31% rise for social media.

1.6. Perceived Information Overload Scale

The Perceived Information Overload Scale was developed by Misra and Stokols (2011). The scale has been validated and has a good internal consistency ($\alpha = .86$). It consisted of 16-items and was divided into two subscales, the first being cyber-based information overload, which consists of nine items, that explored the user's perception of information overload from cyber-based sources in the previous month, using a 5-point Likert scale (0 = never and 4 = very often). Misra and Stokols (2011), found that information overload scores did not overlap with perceived stress. Moreover, the two scales, cyber-based information overload and environment-based information overload, examined different concepts.

1.7. The Bergen Social Media Addiction Scale (BSMAS)

The Bergen social media addiction scale is a short and effective psychometric measure consisting of six items measuring on a 5-point Likert scale (1 = very rarely to 5= very often) the user's attachment to social media. The BSMAS measures core addiction components that have been proposed by Griffiths (2005), namely tolerance, conflict, withdrawal, relapse, mood modification, and these examine the user's attachment to social media over the last year (Andreassen *et al.*, 2012). A high score indicates strong social media addiction. The scale has been translated into Arabic and tested in a pilot study on a sample of participants to test its validity.

1.8. The Aim of the Present Study

This research investigated the increase in IO triggered by the compulsory shift to e-Learning among college students during COVID-19. Associations between perceived information overload, social media addiction, and students' stress and academic attainment were examined.

2. Methodology

The study was based in Kuwait and was conducted online using Qualtrics with a sample of college students, all of whom were currently e-Learners. The study investigated whether information overload had increased due to e-Learning by comparing the present sample with data collected pre-COVID. The cross-sectional association between information overload, hours spent online for e-Learning, perceived course stress, and academic attainment during the COVID-19 pandemic was examined. Students' course grades were collected at the end of their course.

2.1. Participants

A sample of two hundred thirty (230) college students participated in the study as part of their course requirement. Only 190 returned completed data instruments. For the others, the variable mean replaced missing values. Eighty-nine per cent (89.5%) of the participants were females; ages ranged from 19 – 40 years; 81% were single, 17.7% were married, and 1.3% were divorced.

2.2. Measures

Students answered the Information Overload Scale, Bergen Social Media Addiction Scale and rated their perceived course stress and the number of hours spent online. Students' course grades were collected at the end of the course/semester. A consent form with the key features of voluntary participation, anonymous databases, and instructions was provided.

2.3. Analysis Strategy

SPSS 26.00 was used to conduct all statistical analyses. Data met the assumption of normality. The missing variables were replaced by their mean value; a *t*-test was conducted to test any differences between the two data sets (pre-and-post COVID). Pearson univariate correlations were conducted to assess the association of social media addiction, the number of hours spent online studying, and information overload score (independent variables), and perceived course stress and academic attainment (dependent variables). Using (Cohen standards, 1988), regressions were conducted to assess the e-Learning variables' influence on students' perception of stress and academic attainment.

3. Results

3.1. Comparison of IO Scores Pre- and Post-COVID.

The data from the present study were compared with data from a pre-COVID cohort (Alheneidi, 2019).

- Pre-covid: N=110 mean = 30.3 sd=9.5
- Present study: N=230 mean = 43.2 sd =12.9
- A *t*-test showed that the difference between the groups was highly significant ($t=9.89$ df 338 $p < 0.00001$)

3.2. Associations between Information Overload, Hours Online, Social Media Addiction, Perceived Stress, and Academic Attainment

Correlations showed that perceived course stress was significantly correlated with information overload score ($r = 0.31, p < 0.00$). The number of hours spent online was not significantly correlated with the information overload score. The number of hours spent online studying was negatively correlated with social media addiction (SMA) ($r = -0.13, p < 0.03$), which indicates that social addicts spend fewer hours online studying. SMA was significantly correlated with information overload ($r = 0.39, p < 0.00$).

The first linear regression examined predictors of information overload. The model significantly predicted IO; $F(3,226) = 15.31$ $p = .00$. SMA was the only significant predictor of information overload. The results of the regression are shown in Table 1.

Table-1. Regression Predicting Information Overload

	<i>B</i>	<i>SD</i>	<i>Beta</i>	<i>t</i>	<i>Sig</i>
Constant	29.48	6.94		4.2	.00
SMA	1.11	.17	.40	6.51	.00
Age	-.33	.24	-.08	-1.34	.18
Number of hours spent online	.52	.54	.06	.97	.33

Dependent Variable: IO

A second regression was conducted to assess the prediction of perceived course stress by SMA, age, number of hours spent online, and IO. Again this model was a significant predictor: $F(4,229) = 7.12$ $p = .00$. Only IO was significant in predicting perceived course stress.

Table-2. Regression Predicting perceived course stress by SMA, age, number of hours spent online, and IO.

	<i>B</i>	<i>SD</i>	<i>Beta</i>	<i>t</i>	<i>Sig</i>
Constant	2.99	1.57		1.90	.05
SMA	-.04	.04	-.08	-1.18	.23
Age	-.00	.05	-.005	-.07	.93
Number of hours spent online	.12	.11	.06	1.04	.29
IO	.07	.01	.34	5.06	.00

Dependent Variable: perceived course stress

A third regression was conducted to examine the influence of IO, SMA, age, and the number of hours spent online on academic attainment. However, the predictors were not significant in predicting students' academic attainment ($F(4,229) = .85$ $p = .492$).

4. Discussion

The study aimed to examine whether the integrated online learning system increased information overload for college students at one university in Kuwait. The results showed that IO scores were considerably higher in the post-COVID, e-Learning stage than scores from a sample of students assessed pre-COVID. In the previous pre-COVID study (Alheneidi, 2019), the IO mean was 30.3 in a sample of Kuwait university students. In the current study, the IO mean was 43.2, which indicates a noticeable rise (over 40%) in the information overload scores during e-Learning. Results indicate that e-Learning increases IO, which leads to more stress. It is unclear whether this increase in IO reflects the cyber-based information overload due to the change of learning and the excessive amount of notifications the student may receive for academic purposes or is simply due to social media and calls. Besides the information overload due to their change in learning, most students were studying from their homes, and the surrounding environment may have been too noisy and not ideal for education. The results show that information overload score is significantly correlated with social media addiction, which confirms the results of the previous study (Alheneidi, 2019; AlHeneidi and Smith, 2020). It also suggests that the excessive information from social media at least contributes to IO.

The students were trained to use the Learning systems for two months. Nevertheless, it is likely, both the environmental and cyber challenges of e-Learning (Brazendale *et al.*, 2017) led to an increase in the students' perception of IO. Social media became the main source of social interaction and communication during the lockdowns because social restrictions of the lockdowns and restrictions were necessary to avoid the virus's spread. Excessive use may lead to addiction or misuse of social media, and it is important to highlight this is the first pandemic in the social media era (Valika *et al.*, 2020), where information is quickly generated, shared, and spread.

It is important to highlight that both IO and SMA reduce wellbeing (Alheneidi, 2019; AlHeneidi and Smith, 2020). Students have to be aware of IO and SMA's negative consequences and be taught how to use the internet in a way that prevents negative consequences. Perceived stress was one of the outcomes associated with IO in this study. Academic attainment was not reduced by information overload. This may be because the students can cope with the increased IO for a short period. Longitudinal studies are now required to determine whether longer exposure to the high IO eventually impairs performance.

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