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Exploring Patterns and Predictors of Internet Usage Among Undergraduate Medical Students in the UAE: A Mixed-Methods Study

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ABSTRACT

Increased digital access has transformed medical education, offering unparalleled access to information and connectivity, raising concerns about unregulated internet use. This study explores how undergraduate medical students used the internet during the pandemic. Conducted at the Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU) using a mixed-methods design, the research combined a survey of students across all years (quantitative phase) with semi-structured interviews (qualitative phase). The quantitative phase utilized a structured survey comprising two sections: the first captured personal demographic data, while the second assessed the frequency of internet use and levels of dependency. The qualitative phase used semi-structured interviews to deepen understanding of usage contexts and coping strategies. Preliminary results indicate that while academic use dominates, leisure and social connectivity are significant drivers of daily internet engagement. Factors like self-regulation, intrinsic motivation, and intentional boundaries predicted healthier internet usage patterns. Findings inform culturally relevant tools and strategies to support balanced digital habits in medical education. This study offers insights into the developmental context of medical students' digital behavior and lays the groundwork for designing targeted interventions and culturally attuned assessment tools. Promoting responsible internet use is essential for academic success and well-being in the digitally saturated landscape of modern medical education.

Keywords: responsible internet use, medical education, digital behaviour, internet usage, self-regulation, mixed methods, UAE higher education.

INTRODUCTION

The digital revolution has transformed daily life worldwide, reshaping how people think, behave, and interact [1]. In the UAE, the internet has been widely accessible since 1995, positioning the country as a regional leader in telecommunications [2]. This digital shift has

deeply influenced education, where students increasingly rely on the internet for communication, learning, and academic tasks.

In higher education, especially among medical students, the internet serves as a critical academic and professional tool. It supports self-directed learning, collaboration, research, and access to real-time information, thereby enhancing clinical and academic competencies [3, 4] However, this increased connectivity also brings concerns about overuse and digital dependency.

During the COVID-19 pandemic, online education became the norm, accelerating the adoption of digital tools and raising questions about sustainable and healthy internet usage. While some studies have examined internet addiction in medical students [5,6], fewer have explored patterns and predictors of usage, especially within the context of the pandemic [7,8].

Given the ubiquitous internet access on modern university campuses [9], understanding how medical students use the internet—and what factors support responsible usage—is increasingly important.

This study aims to:

1. Explore patterns of internet usage among undergraduate medical students.
2. Identify the predictors of responsible internet usage
3. Inform the future development of a culturally relevant assessment tool.

CONCEPTUAL FRAMEWORK

Internet usage is deeply embedded in students' daily lives, serving both academic and personal functions such as communication, social media, and emotional regulation [10,11]. In medical education, students increasingly rely on digital tools for learning, coping, and staying connected—especially amid rising integration of AI, virtual platforms, and e-health services [12].

Students' mindset significantly influences their internet behavior. Those with a growth mindset are more likely to use the internet for self-improvement and problem-solving, whereas those with a fixed mindset may turn to it for escapism and emotional avoidance [13,14]. This highlights the relevance of digital emotional regulation, especially as younger generations often use smartphones to manage discomfort and uncertainty, potentially hindering emotional resilience [15,16].

The study draws upon the I-PACE model [17], which explains how internet-related behaviors result from the interaction of personal traits, affective and cognitive responses, and situational variables. This framework is adapted to include core characteristics, mindset, and self-regulatory capacity to better understand medical students' internet usage. A growth mindset has been shown to positively influence self-regulated learning, particularly under stress [18,19].

This adapted model provides a foundation for examining predictors of responsible internet use within the medical student population.

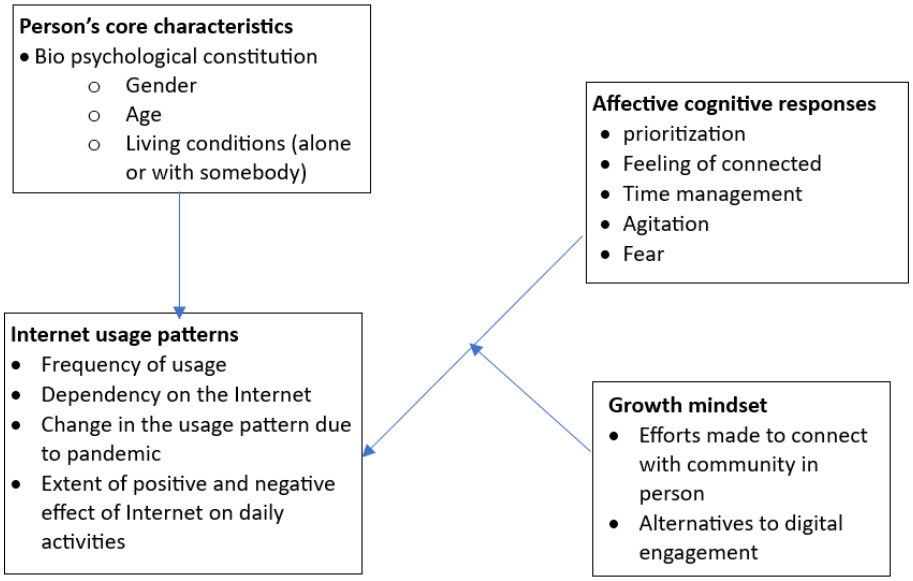

Figure 1: Conceptual Framework

THEORETICAL FRAMEWORK & STUDY AIMS

Cognitive bias, particularly under uncertainty as seen during the COVID-19 pandemic, affects students' ability to regulate online behavior alongside offline responsibilities [20]. A student's core characteristics—including mindset and self-regulation—shape how such biases influence decision-making in digital spaces. Students with a growth mindset are more likely to engage in self-regulated learning, even in challenging circumstances, as they believe in their capacity to adapt and plan for academic success [21] Conversely, some students may fall into patterns of Problematic Internet Use (PIU), as described by [22] which can be specific (e.g., gaming, gambling) or generalized (excessive time online without specific goals), leading to negative academic and psychological outcomes.

Medical students, who are expected to practice high levels of self-directed learning, faced increased digital reliance and reduced offline engagement during the pandemic. This study considers both internal (e.g., mindset, emotional regulation) and external (e.g., confinement, remote learning) factors that influenced their internet usage.

Thus, this study aims to:

1. Examine patterns of internet usage among undergraduate medical students.
2. Identify variables of responsible internet usage
3. Inform the development of a contextually relevant assessment tool.

LITERATURE REVIEW

Internet use among university students serves a range of psychological, educational, and social needs, from entertainment and communication to skill-building and academic research [2]. In medical education, it is widely used for tasks such as information retrieval, virtual collaboration, and simulations, significantly enhancing learning and clinical training [23,24].

The integration of e-learning, telemedicine, and remote education has transformed medical education globally, especially post-pandemic, where students navigated shifts in lifestyle and

learning environments [25]. While the internet has broadened opportunities for academic and personal growth, it also presents risks of overuse, leading to potential negative outcomes such as decreased academic performance, mental health issues, and social withdrawal [26,27]. COVID-19 intensified digital reliance, increasing students' susceptibility to problematic internet use (PIU) due to isolation, stress, and [28,29]. Given their developmental stage, students are particularly vulnerable to compulsive digital behaviors [30]. As most campuses offer unrestricted internet access, proactive efforts to promote balanced usage are essential [9].

METHODOLOGY

This section presents our research context and research design.

Study Context

This study was conducted at the Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU) in Dubai, United Arab Emirates (UAE). The College of Medicine (CoM) at MBRU offers an undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) program—a six-year course divided into three distinct phases.

Phase 1 comprises the first academic year and focuses on foundational concepts in medicine. Phase 2 includes the second and third academic years, during which students study the body's organ systems in an integrated manner alongside clinical medicine. Phase 3 spans the fourth to sixth academic years, where students engage in clinical rotations followed by a final internship year. The program follows a spiral curriculum, where each year builds upon the knowledge and skills acquired in the previous years. The first three years are considered the pre-clinical phase, while the final three years constitute the clinical phase.

MBRU hosts a diverse student body representing over 19 different countries, with approximately 75% of the student population being female (Otaki et al., 2021).

Research Approach and Design

This research employs a cross-sectional mixed-method design that utilizes a survey method followed by semi-structured interviews. Patterns of Internet usage are defined in this study by identifying perceptions about the positive and negative impacts of Internet usage. The first research question is addressed using a quantitative approach, collecting data from a purposive sample using a survey method. The qualitative data analysis from interviews of voluntary participants from the same sample answers the second research question.

A survey instrument is designed to assess usage patterns. The survey in this study is composed of two segments. The first section constitutes the personal demographics such as Age, Gender, Year of study, and who they live with. The next five questions assess their internet usage frequency and dependency on the Internet. Their Internet usage self-assessed profile can be one of the following types: moderate user of the Internet and less dependent on it, somewhat dependent on it, and highly dependent on it. The survey questionnaire also includes questions to assess their feelings of agitation in the absence of the Internet and their perspectives on undertaking non-digital activities. The last question pertains to their willingness to participate in a follow-up interview. The survey instrument was sent to all students of the undergraduate medical program. This was a convenience sample. Out of 238 students, 48 completed the survey, resulting in a 20% response rate.

Participants were invited to participate in the research voluntarily. They participated in interviews and completed the survey, which collected information about their frequency of Internet usage, dependency on the Internet, and perceptions about the positive and negative impact of Internet usage on various aspects of their daily lives. The degree of change in Internet usage during and after a pandemic was also explored. During the interview, participants were asked to elaborate on their experiences with regard to the above-mentioned topics. Ten students who volunteered to participate were interviewed.

Data Collection

The data was collected using a survey designed specifically for this research project called the 'Patterns of Internet Usage scale. This was done by one of the members of the research team. This was followed by semi-structured interviews that were conducted via Teams by another member of the team.

ETHICAL CONSIDERATION

The study's ethical approval was granted by the MBRU, Institutional Review Board (MBRU IRB-2022-154). Informed consent for participation was obtained from the information page given to participants before they started the survey through a survey link and through verbal consent before the start of the interviews. It was emphasized to the participants that their participation was completely voluntary, and they could withdraw from the study at any time during the research.

DATA ANALYSIS

Results of the Quantitative Analysis

Data collected from surveys was analyzed using SPSS 24 and Excel. Descriptive statistics and cross-table analysis are done to explore summary statistics and patterns across different demographic variables.

Descriptive Statistics

Undergraduate medical students were randomly chosen to be a part of this research. The proportion of female to male students is approximately 4:1 which closely matches the population proportion. The distribution of demographic variables is summarised in the following table.

Table 1: Distribution of demographic variables

Variable	Categories and their frequencies
Personal information	
Gender	Female: 77%, Male: 23%
Age group	16 – 18: 30% 19 – 21: 32% 22 – 24: 30% 25 and above – 8%
Year of study	Preclinical years Year 1: 32%, Year 2: 11%, Year 3: 4%) Clinical years (Year 4: 15%, Year 5: 23%, Year 6: 15%)
Who do you stay with?	Alone: 13% With family: 81%, With friends: 4%, With partner: 2%
Patterns of Internet Usage	

Up to what extent do you use the Internet in your typical day	Less than 6 hours: 17% Between 6 and 10 hours: 57% Above 10 hours: 26%
Do you check your professional university email on your mobile phone?	Yes: 98% No: 2%
In a day, how often do you check your professional university email on your mobile phone?	0 to 5 times: 72% 6 to 10 times: 22% More than 10 times: 6%
Over the past two years (during the pandemic), what change have you observed in your Internet usage?	My Internet usage decreased: 6% My Internet usage remained the same: 4% My Internet usage increased minimally: 13% My Internet usage increased moderately: 43% My Internet usage increased a lot: 34%
Have you made new contacts on the Internet over the past 2 years?	I have made new contacts on the Internet and I have met them in person: 28% I have made new contacts on the Internet, but I have never met them in person: 36% I have made no new contacts on the Internet: 36%
Do you feel a strong necessity to go onto the Internet when you are not online?	Strongly agree: 11% Agree: 43% Neutral: 23% Disagree: 19% Strongly disagree:4%
Awareness about excessive usage of the Internet	
How many people do you know who need to use the Internet almost all the time?	None: 4%, 1 to 3: 26%, 4 to 6: 15%, More than 6: 55%

From the above summary, it can be seen that 83% of respondents use the Internet for at least 6 hours. A total of 54% of respondents agreed that they feel a strong necessity to go onto the Internet, and a total of 77% of respondents expressed that their Internet usage increased either moderately or a lot during the pandemic.

Most of the respondents are living with family or friends or partners. Only 13% are living alone. Most of the respondents use the Internet for between 6 and 10 hours. Students in the first three years of study are in the pre-clinical stage of their study, where the focus is on learning basic concepts of medicine and body organ systems and how they are integrated with clinical medicine, while the students in the fourth, fifth, and sixth year are in the clinical stage of their study that predominantly involves being within clinical settings. The percentage distribution of this variable is 47% and 53%. The differences in their Internet usage patterns are shown below.

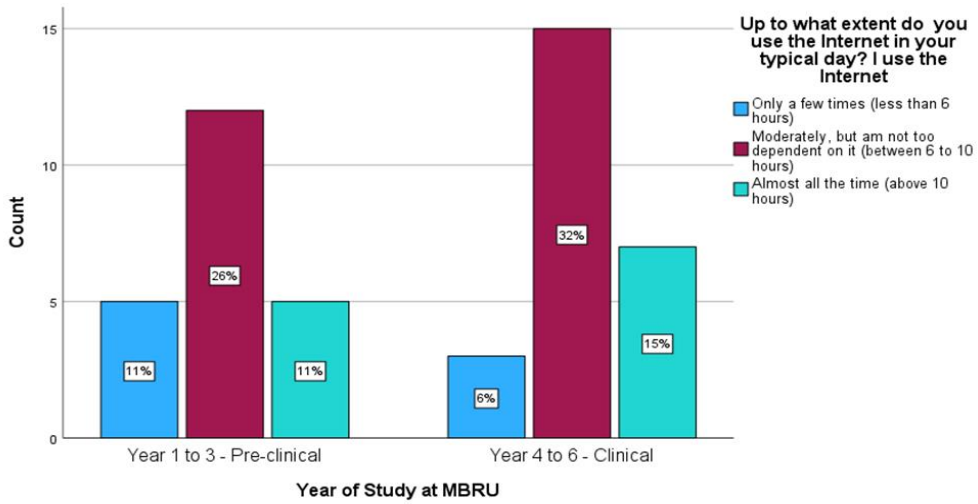

Figure 2: Study year-wise Internet usage hours

Although only a few (6%) use the Internet for more than 10 hours, many reported that they know other people who are addicted to the Internet. Most (64%) are careful about making new friends on the Internet. 36% reported that they have made new friends on the Internet but have never met them. As it is a growing trend to use the Internet for almost all regular needs, such as education or work, banking, shopping, socializing, hobbies, and support groups, respondents were asked to assess the level of positive and negative impact of Internet usage on these regular needs. A detailed analysis of these responses is given below.

A respondent chose the level of positive and negative impact on each category. A combined score was calculated by adding the two scores on each category. For example, if a respondent's positive impact score is 4 and negative impact score is 3 on the category of Banking, then the combined score for that category is 4-3=1. A negative combined score indicates that the person felt that Internet usage had an overall negative impact on that category, while a zero indicates a neutral impact. The following table shows a summary of the frequency distribution of combined scores.

Table 2: Frequency distribution of combined scores on each category

Possible Score	Combined Score Work/ Education	Combined Score Online Shopping	Combined Score Online Banking	Combined Score Family Life	Combined Score Personal Life (Such as Hobby	Combined Score Self-help
-4	0	0	0	2	1	1
-3	1	0	0	0	0	1
-2	0	0	1	3	3	2
-1	1	1	0	8	4	3
0	8	7	6	12	10	18
1	11	12	8	11	8	4
2	17	9	13	7	12	10
3	6	9	12	3	5	6
4	3	9	7	1	4	2

It can be seen from the above table, that most respondents have a positive impact of the Internet on Work, education, online shopping and banking. Four respondents felt a negative impact of the Internet on their family life, hobbies and self-help.

Patterns of their engagement in non-digital activities to stay away from the Internet, were assessed by asking them a question: How often do you prefer the following activities to stay away from the internet? They chose their frequency of engaging in the following non-digital activities: watching tv, reading books, shopping in shops, outdoor physical activities, and participating in social activities. Their preferred non-digital activities are presented on the following graph.

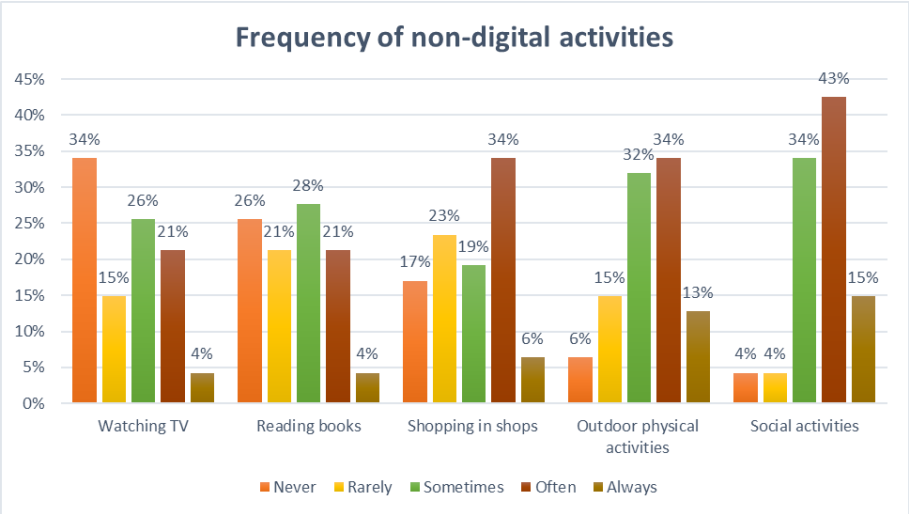

Figure 3: Frequencies of preferred non-digital activities

Their responses were coded on a scale of 1 to 5. (1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always). The average score is calculated across all types of non-digital activities. The following graph shows the distribution of responses according to three categories of time spent on non-digital activities.

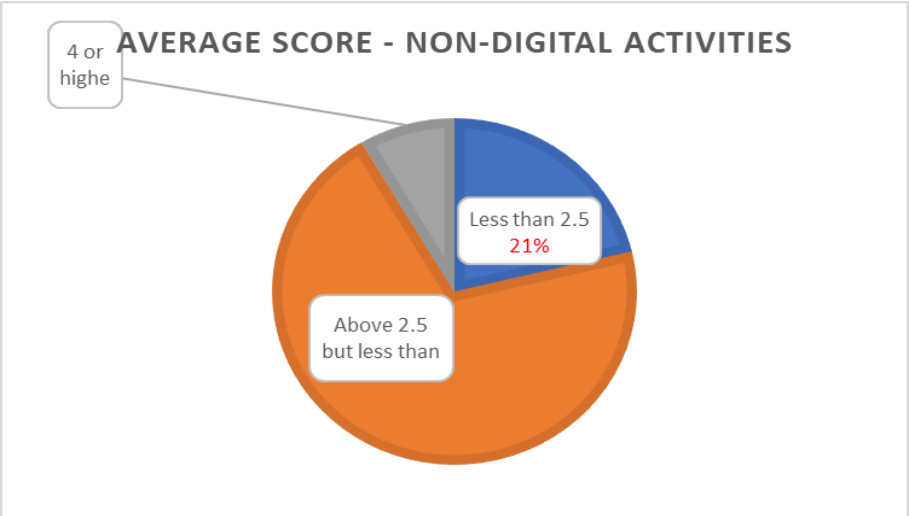

Figure 4: Distribution of average time spent on non-digital activities

It can be seen that 70% of respondents spent at least 2.5 hours on non-digital activities, which is an indication of awareness of the negative consequences of excessive usage of the Internet.

It can be seen that 34% of respondents do not prefer to watch TV, and 26% do not read books as an alternative to any digital activity. The most preferred alternative to avoid the Internet is engaging in social activities. This reflects a tendency to avoid isolation and be a part of the community.

In the demographic section, respondents reported their time spent using the Internet. Based on their responses, we can see three usage profiles: low usage (less than 6 hours), medium usage (between 6 and 10 hours), and heavy usage (more than 10 hours). The following table shows the number of respondents in each category and the average of their time spent on non-digital activities.

Table 3: Average time spent in non-digital activities in each group

Use of the Internet in a day	Frequency	Average time spent on non-digital activities
Only a few times (less than 6 hours)	7	2.83
Moderately, but am not too dependent on it (between 6 to 10 hours)	27	2.85
Almost all the time (above 10 hours)	13	3.29

It can be seen that the average time spent on non-digital activities in low and moderate user groups is almost equal, whereas the third group of heavy users spent more time on non-digital activities also.

The following two questions were asked to assess their self-control or lack of it.

- *Do you feel a strong necessity to go onto the Internet when you are not online?*
- *How would you generally describe your state of mind when the connection to the Internet is slow?*

The following figure shows the frequency distribution for each response for the first question across each usage category.

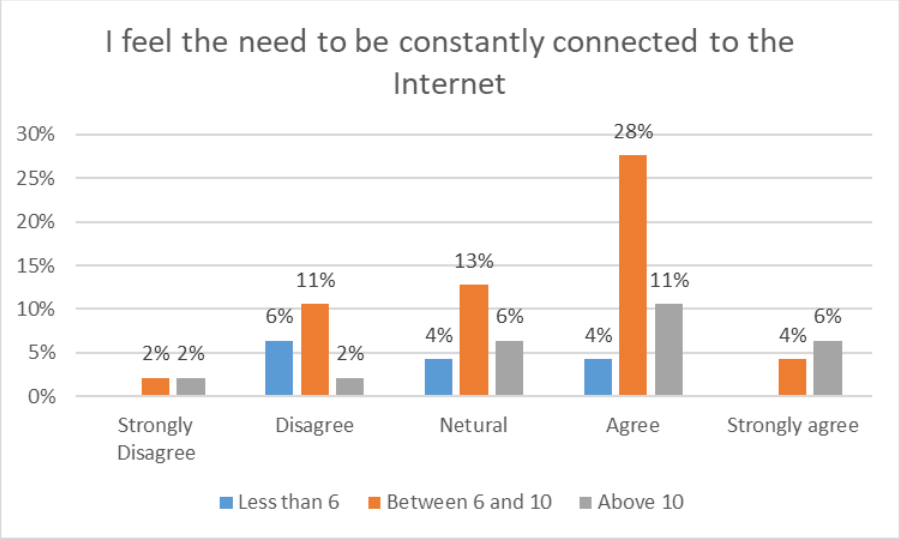

Figure 5: Responses to feeling a strong need to access the Internet

Almost 50% of the users use the Internet for more than 6 hours, and they agree that they constantly feel the need to access the Internet.

In response to the second question, 'How would you generally describe your state of mind when the connection to the Internet is slow?' respondents chose their options from frustrated, very frustrated, neutral, anxious, or very anxious. A cross-table summary of their responses to the above two questions is given below.

Table 4: Cross-table summary

	I feel the need to be constantly connected to the Internet →				
I feel the need to be constantly connected to the Internet ↓	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Srongly agree**
Very frustrated	1	2	2	5	2
Frustrated	0	6	4	9	2
Neutral	1	1	3	3	0
Anxious	0	0	1	3	0
Very Anxious	0	0	1	0	1

A total of 18 respondents (approximately 38%) reported that they don't feel the constant need to go to the Internet, but when they don't get access, they get anxious or very anxious. Only 11 respondents (approximately 23%) remain neutral.

Results of the Qualitative Analysis

The data from the semi-structured interviews was analyzed using a deductive approach for coding and thematic analysis. The conceptual model was the basis for the analysis.

Positive Effect of the Internet:

Several students highlighted the positive role of the Internet in their daily lives, emphasizing its utility as a tool for accessing information. Many specifically reported using it to obtain

medical and clinical knowledge that supports their academic progression. Beyond academic purposes, students also noted using the Internet for various practical functions, including online banking, charitable activities, shopping, navigation, and entrepreneurial ventures. Additionally, some students described the Internet as a valuable resource for personal development and well-being, with a few attributing improvements in their mental health to access to online support and self-help materials.

Several Students Mentioned How the Internet Had Helped Them Mature
Efforts to Connect with the Community:
Several students emphasized the Internet's vital role as a means of communication, particularly during the COVID-19 pandemic. For some, it was perceived as a preferred mode of interaction over face-to-face communication, offering convenience, accessibility, and a sense of psychological safety.

Several students reported that the Internet supported their ability to prioritize tasks through the use of productivity applications and collaboration with online study partners. Additionally, the Internet was noted to play a significant role in the development and pursuit of personal hobbies by providing accessible resources and communities of interest. Some students also highlighted the Internet's influence on their fitness routines, citing online workout programs, fitness tracking tools, and health-related content as key motivators in maintaining physical well-being.

Negative Effect of the Internet:
Several students also acknowledged the negative impact of internet use on their daily lives. Concerns were raised regarding its effect on sleep hygiene, with some students noting difficulties in maintaining consistent sleep patterns due to late-night internet use. Others highlighted the limitations of written digital communication, citing instances of miscommunication and misunderstanding in online interactions. A number of students perceived the internet as a source of distraction that compromised their productivity and contributed to procrastination.

Students further reported that excessive internet use had implications for both their physical and emotional health. Emotionally, many described heightened feelings of anxiety, particularly related to the fear of missing out (FoMO) when not constantly connected. Additional negative emotions—such as anger, frustration, boredom, and misery—were associated with internet use, especially during periods of poor connectivity or limited access. Despite these challenges, the personalization of internet usage was evident; students described intentionally curating their online experiences by selecting content that aligned with their individual interests and preferences.

Change in Patterns of Internet Usage:
There is a heightened awareness regarding the use of the internet post-pandemic times. Some students reflected on the change in usage of the internet pre- and post-pandemic.

Dependency on the Internet:
Students expressed various reasons for their perceived need to remain constantly connected to the internet. Some reported feeling pressured to maintain continuous digital connectivity,

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driven by academic, social, or cultural expectations. Others articulated the perception that maintaining an ongoing online presence had become a normative requirement, reflecting broader societal trends that equate constant connectivity with engagement, relevance, and social belonging.

Affective Cognitive Responses:

Feeling of Connectedness:

A few students reported feeling obligated to remain connected to others online, reflecting a sense of responsibility to maintain digital relationships.

Fear:

Several students highlighted the experience of fear, particularly the fear of missing out (FOMO), which influenced their online behaviors.

Procrastination:

Some students acknowledged that their use of the internet often served as a tool for procrastination, allowing them to avoid tasks at hand.

Defensiveness and Justification:

A subset of students expressed defensiveness regarding their internet usage, while others sought to justify their online habits, highlighting the perceived necessity of constant connectivity.

Prioritization:

Students also noted an increased awareness of the potential harms associated with excessive internet use, including the risk of self-harm. Several students expressed concerns about the possibility of internet addiction linked to overuse.

Conscious Decision-Making and Self-Control:

Many students recognized the need for conscious decision-making to limit their internet use, with some acknowledging the importance of self-control in maintaining balance. They emphasized the need to distance themselves from excessive usage to prevent potential negative impacts. In this context, self-discipline emerged as a key strategy for setting boundaries and ensuring that online activities did not interfere with personal well-being.

Willpower and Time Management:

Students also discussed willpower as an essential tool for regulating their time online, particularly on social media platforms, to avoid excessive consumption and maintain focus on academic and personal goals.

Alternatives to Digital Engagement:

Students shared various strategies they employed to detox from digital engagement during and after the pandemic. One student mentioned using the time to begin writing a book, while others took up music and voice lessons as a means of reducing screen time. Several students highlighted the importance of socializing with family and friends as an alternative to digital interaction. A few students also noted engaging in physical activities, such as exercise, as an effective distraction from excessive online use. Students discussed their efforts to keep track of

time and manage their digital consumption. Many expressed awareness of the time lost to social media and emphasized the importance of balancing self-care with social media use. They indicated using digital tools to track their time online, reflecting a growing awareness of the need to regulate their online habits for improved well-being.

Integration of Qualitative and Quantitative Data

For each interviewee, a profile is developed based on the demographic variables gender, age group, study year, and hours of Internet usage. Additional information about their perceived impact of the Internet on various aspects, their preferred non-digital activity and average time spent on those activities is taken from the quantitative data. These are supplemented with their responses to interview questions. The following table shows the findings after integrating results from the qualitative and quantitative data.

Table 5: Integration of qualitative and quantitative data

code	Demographics	Positive/ negative impact remark	State of mind when no internet	Average time spent on non-digital activities/ preferred activity	Coping strategy	Growth Mindset in relation to the mindful use of internet
10	Gender: F Age group: Above 25 Year of study Clinical Living with family Daily Internet usage: Moderate	No negative impact on any aspect but impact on self-help is neutral.	Frustrated	Average time spent on non-digital activities= 3.2 Preferred activity: Shopping in shops	Socializing, cooking & physical activities "hanging out with my friends, going to restaurants, going to eat out, working out in the gym"	Awareness of the reasons for overuse of the internet leading to making conscious choices "I think really it's just the boredom of having nothing else to do. …it's become a habit I guess" I think it's just about self-control, you know, because you can easily spend hours and hours online…and I just switch it off"
19	Gender: M Age group: 16-18 Year of study: Pre-clinical	No negative impact on any aspect and there is positive impact on	Frustrated	Average time spent on non-digital activities=2.6	Social media "I spend much of my time on social media,	Self-realization leading to the creation of boundaries

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	Living with family Daily Internet usage: Moderate	work/education and shopping.		Preferred activity: Watching TV	particularly on YouTube….during the weekend"	"I do not think you can completely remove the Internet. But I feel like there needs to be some sort of self-control, with some boundaries that you create for yourself, create some distance - hereafter the pandemic, I realized I am wasting so much of my time on social media"
22	Gender: F Age group: 16-18 Year of study: Pre-clinical Living with family Daily Internet usage: Moderate	No negative impact on any aspect and there is positive impact on work/education and shopping. Neutral impact on work/education and self-help.	Frustrated	Average time spent on non-digital activities=4 Preferred activity: Outdoor / Social activities	Creative Pursuits "my siblings and I would do musical productions and you can do that on apps online…I also read books"	Self-awareness "That is something I have learned over the past two years. I just look back and reflect on how distracted I was, but it is definitely something that I have worked on"

34	Gender: F Age group: Above 25 Year of study: Pre-clinical Living with Partner Daily Internet usage: Low	Negative impact on family life and impact on work/education and self-help are zero.	Frustrated	Average time spent on non-digital activities=3.2 Preferred activity: Shopping in shops	Socializing & physical activities "hanging out with friends/sister swimming and going to the gym. Whenever I'm struggling with my mental health, I always go to them as my support system"	Self-discipline "I basically just have to discipline myself. I feel like it is taking up much longer than it should, I immediately just close my phone. No matter what I am looking at, no matter who I am talking to, I just close my phone"
36	Gender: F Age group: Above 25 Year of study: Pre-clinical Living with Partner Daily Internet usage: Low	Negative impact on family life and self-help.	Frustrated	Average time spent on non-digital activities=3. Preferred activity: Reading	Social media "I started following accounts of positive news, good things happening in the world"	Conscious usage "I have matured. I feel it's (the internet) is not new anymore and I'm more aware what it can do to me and I now use it to my advantage rather than ending up mindlessly scrolling"
42	Gender: F Age group: Above 22 to 24 Year of study: Clinical Living with Friends Daily Internet usage: Low	Positive impact on shopping and self-help. Negative impact on family life. Neutral impact on banking.	Frustrated	Average time spent on non-digital activities=2.8 Preferred activity: Reading	Creative pursuits & relaxation "Joining for music and voice lessons, interest in a writing course and sleep have helped me to grow and relax…"	Will power and control Time Management "I go to sleep early so that reduces the chances of spending a lot of time on any social media platform. I sleep at a specific time because I value my sleep. It is a habit and a

						conscious decision. I also spend lesser time on social media to manage my time by installing a timer.

Mapping the quantitative and qualitative findings offers a holistic understanding of undergraduate medical students' internet usage. Regardless of age, gender, study stage, or living conditions, students demonstrated awareness of their online habits and the negative emotions associated with disconnection. This awareness prompted deliberate efforts to engage in non-digital activities, exercising willpower, self-control, and self-discipline. While they acknowledged the internet's vital role in their academic and personal lives—especially during the pandemic—they also recognized its drawbacks. A detailed analysis of these findings follows.

DISCUSSION

Medical students primarily use the Internet for education, entertainment, and socialization, consistent with global trends [42]. They acknowledge its benefits—academic support, communication, skill-building—as well as the risks of excessive use [43,44,45]. Most report daily use exceeding six hours, aligning with pre- and post-pandemic studies [38,46,47,48,49]. Constant connectivity drives multitasking and cognitive overload [50,51]. Students report social pressure to stay online, constructing identities via social media [52,53,54]. The pandemic intensified digital dependence [55] with students often justifying prolonged use for academic growth and hidden curriculum navigation [56,57,58]. Social media remains central to peer connection, especially during isolation [59,60,61,62,63,64] though some now prefer virtual to in-person interaction [19,65,66,67]

Health impacts include poor sleep, headaches, and anxiety [68,79]. Feelings of distress when disconnected suggest 'Permanently Online, Permanently Connected**-** POPC' behaviors [80,81].

Post-pandemic, students report greater self-regulation [82] using strategies aligned with impulsiveness theory [83]. They actively avoid algorithmic distractions to support focus [84,85] recognizing that self-discipline is vital for academic and personal wellbeing [86.89]

Students link low discipline with unhealthy behaviors and academic decline ([90.95], but increasingly balance screen time with hobbies, nature, and rest. Those who are online over 10 hours daily now engage more offline (Table 3), showing digital maturity. They advocate early intervention in medical curricula and structured, offline engagement opportunities [96]. This shift reflects a growing digital mindset—an intentional, reflective approach to technology use [97], consistent with uses and gratifications theory [98].

CONCLUSION

While the internet offers valuable benefits—academic support, communication, and professional growth—excessive use among medical students can lead to distraction and health

issues. Students increasingly recognize the need for self-discipline to maintain a healthy online–offline balance. The pandemic intensified digital use but also spurred more mindful engagement.

Given the rapid evolution of social media, these platforms are now deeply embedded in students' lives. Rather than resist their influence, educational institutions should harness them it to enhance collaboration and learning. Promoting self-regulation and purposeful digital engagement will be key to helping students thrive both academically and personally.

LIMITATIONS AND FUTURE WORK

The nature of this research is exploratory. Due to the convenient and small-sized sample, the data from the quantitative analysis did not yield any inferential statistics. This is identified as a limitation of this study. We acknowledge the constraints on generality, given that the study was conducted within a single medical school in the United Arab Emirates. However, we believe the insights generated hold relevance and offer potential transferability to comparable educational and cultural contexts. As the study is cross-sectional, the trend of internet use over time cannot be determined. There could be some bias as all data were self-reported by undergraduate medical students.

This research aimed at exploring students' patterns of Internet usage and their coping strategies, which led to optimized usage of the Internet during the pandemic. These findings will be useful in developing a survey instrument that can lead to the identification of predictors of responsible usage of the Internet.

Authorship Confirmation/Contribution Statement (based on CRediT)

Dr Bhavana (first and corresponding author)- Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Data curation, Writing, Visualization, Project administration
Dr Anita (first author)- Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Data curation, Writing, Visualization
Dr Maha- Investigation, Review & Editing

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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