

The relationship between internet addiction and test anxiety among third-year high school students

العلاقة بين إدمان الإنترنت وقلق الامتحان لدى تلاميذ السنة الثالثة ثانوي

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Abstract:

One of the issues that concerns the category of adolescents in high school is Internet addiction, particularly among students preparing for the baccalaureate exam. We hypothesize that as the exam approaches, the frequency of anxiety increases, potentially negatively affecting students' performance. Our current study aims to reveal the relationship between Internet addiction and test anxiety considering demographic variables (gender and academic specialization) among third-year high school students. We randomly selected a sample of 180 students from different academic streams in four high schools in Batna, Algeria. We conducted a descriptive study using Young's Internet Addiction Scale and Sarson's Test of Anxiety. The study indicates that the sample suffers from a mild level of Internet addiction and a moderate level of test anxiety. Additionally, there is no significant relationship between Internet addiction and test anxiety. However, there is a positive relationship between Internet addiction and the behavioral dimension of test anxiety. There are no gender or academic specialization differences in Internet addiction, but there is a difference in test anxiety and the physiological dimension of test anxiety in favor of females. Furthermore, there are no differences in test anxiety based on academic specialization.

Keywords: Internet Addiction; Test Anxiety; Adolescents; Baccalaureate Exam; Behavioral addiction.

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ملخص :

يواجه التلاميذ المقبلون على اجتياز امتحان البكالوريا تحديات أكاديمية يمكن أن تتأثر بإدمان الوسائط الرقمية. ومع اقتراب موعد الامتحان تزداد شدة القلق مما يمكن أن ينعكس سلبًا على أدائهم، حيث يعد إدمان الإنترنت وقلق الامتحان من أهم المشاكل التي قد تواجه تلاميذ البكالوريا. نهدف من خلال دراستنا الحالية للكشف عن العلاقة بين إدمان الإنترنت وقلق الامتحان لدى تلاميذ السنة الثالثة ثانوي، إضافة لإبراز أهم الفروقات الديمغرافية.

تم اختيار عينة عشوائية تضم 180 طالبًا من مختلف التخصصات الأكاديمية في أربع ثانويات بولاية باتنة، حيث تم إجراء دراسة وصفية بالاعتماد على مقياس يونغ لإدمان الإنترنت ومقياس سارسون لقلق الامتحان.

تشير نتائج الدراسة إلى أن العينة تعاني من مستوى خفيف من إدمان الإنترنت ومستوى متوسط من قلق الاختبار. على الرغم من ذلك، لم يتم العثور على علاقة إحصائية بين إدمان الإنترنت وقلق الامتحان. مع وجود علاقة إيجابية بين إدمان الإنترنت والبعد السلوكي لقلق الامتحان. لا توجد فروق دالة إحصائية حسب الجنس أو التخصصات الأكاديمية في مستوى إدمان الإنترنت. بينما توجد فروق في مستوى قلق الامتحان والبعد الفسيولوجي لقلق الامتحان لصالح الإناث. إضافة لغياب الفروق في مستوى قلق الامتحان حسب التخصص الأكاديمي.

الكلمات المفتاحية: إدمان الانترنت؛ قلق الامتحان؛ المراهقون؛ امتحان البكالوريا؛ الإدمان السلوكي.

Introduction

Recently, there has been a challenge for mankind to invent and promote machines. Consequently, it has become necessary to reconsider many issues related to the misuse of digital technology and its deviation from its intended purpose. While modern technological advancements such as the Internet, computers, and smartphones offer numerous benefits in terms of saving time and effort (Gebremeskel et al., 2016), they also have negative influences on various physical, psychological, and social aspects (Tudorel & Vintilă, 2020; Small et al., 2020).

The Internet, in particular, is a contemporary trend that negatively impacts individuals' lives. This controversial issue poses risks to both personal and social aspects of human life. Excessive use of the Internet over time can lead to the development of behavioral addiction, where individuals become dependent. Addiction is characterized by four main indicators: preoccupation, withdrawal, tolerance, and negative mood, as well as conflict and relapse (Sussman, 2021). American scientist Kimberly Young coined the term "Internet addiction disorder" after conducting a study on the various negative consequences of Internet addiction, which include academic, social, financial, occupational, and physical consequences. Young defines Internet addiction (IA) as the excessive

and uncontrolled use of the Internet that significantly affects daily life, with a threshold of 38 or more hours per week (Young, 1998). Mahapatra and Sharma (2018) define it as the compulsive and uncontrolled use of the Internet that leads to problems in various areas, such as poor academic and professional performance, low quality of sleep and personal hygiene, and difficulties in social relationships. Based on the component model of addiction proposed by Griffiths (2005), IA exhibits behavioral addiction characteristics such as preoccupation, mood modification, tolerance, withdrawal, conflict, and relapse.

Essentially, IA has numerous negative effects that make it a public health concern. Physically, it can cause sleep disorders (Alimoradi et al., 2019), visual impairment due to radiation emitted by technological devices, and spinal curvature (Bisen & Deshpande, 2018). Socially, it can lead to family problems and conflicts (Niedorys et al., 2018), difficulties in social adaptation and personal relationships (Trumello et al., 2018). Psychologically, it may result in decreased psychological well-being (Tang et al., 2020), depression (Alaca, 2020), and decreased self-efficacy, self-esteem, and self-confidence (Baturay & Toker, 2019). Moreover, it is associated with various mental disorders, such as anxiety (Soulioti et al., 2018).

Adolescents are particularly vulnerable to the risks of Internet use as it occupies a significant part of their time and daily routines (Torrijos-Fincias et al., 2021). Considering the challenges and pressures they face in their daily lives; it becomes important to understand the unique circumstances teenagers go through at their age. Specifically, third-year high school students experience a crucial period as they prepare for the baccalaureate exam, which determines their future paths. The exam preparation evokes feelings of anxiety that are meant to motivate and encourage students to study well. However, sometimes this anxiety deviates from its natural and positive track, becoming a destructive and paralyzing force. Test anxiety (TA) is defined as a physiological, cognitive, and behavioral response resulting from the fear of an exam (Nicaise, 1975). Hashmat et al. (2008) describe it as the emotional response individuals experience before an exam, acknowledging that while it is a logical and appropriate fear, its intensity exceeds the actual demand imposed by the situation. Spielberger et al. (1976) view TA as a specific trait related to a particular situation, whereas Zeidner (1998) believes it is the individual's response and interaction with evaluation situations, characterized by intense tension, automatic thoughts, internal disturbance, and physiological arousal.

TA is a common phenomenon observed in educational institutions and is closely associated with students' performance and academic achievement. It hinders intellectual activities such as concentration and memory, increases the likelihood of mistakes in exams, and leads to resorting to cheating and deceptive methods (Hafezi & Etemadi, 2022).

Given that third-year high school students are about to take the baccalaureate exam, a crucial step in determining their future career paths, and considering their urgent need to use Internet technology to prepare for the exams, we aim to explore the levels of Internet addiction and TA among students. We will also investigate the relationship between IA and TA while examining potential differences in IA and TA based on demographic variables such as gender and academic specialization.

1. Methods

The study was conducted in the city of Banta, Algeria. It consisted of two phases. The first phase focused on the exploratory study, with a sample of 50 third-year secondary students from Mustafa Ben-Bou Al-Eid High School. This phase took place from October 5th, 2022, to November 3rd, 2022. After confirming the psychometric properties of the two scales, the main study was conducted from November 24th, 2022, to January 15th, 2023. The sample for the main study included 180 third-year high school students from four secondary schools: Al-Bashir Al-Ibrahimi, Mustafa Ben-Bou Al-Eid, Muhammad Al-Eid Al-Khalifa, and Salah Al-Din Al-Ayyubi. The sample was selected randomly, with an equal distribution of 90 males and 90 females. It was also representative of different academic specializations, including 30 students from experimental sciences, literature and philosophy, mathematics, mathematical technicians, languages, and management and economics.

To collect data, two written questionnaires were distributed to the students: Young's Questionnaire for Internet Addiction (IA) and Sarson's Questionnaire for Test Anxiety (TA). These questionnaires were used to gather quantitative data for the descriptive correlational study, which aimed to establish relationships between variables.

2. Measures

2.1. Young Internet Addiction Test (IAT)

(IAT) was originally developed by American researcher Young (1998). It was later translated and adapted into Arabic by Dr. Ibrahim Al-Shafei (2009). In a study conducted by Ben Dibli and Ben Aisha (2019), the validity of its use in the Algerian context was re-verified, and its psychometric properties were calculated. This research involved 360 students from the University of Algiers 2 and the University of Algiers 3.

The questionnaire consists of 20 positively worded items that assess normal and satisfactory Internet use. Each item is accompanied by five response options: Never=0, Rarely=1, Occasionally=2, Frequently=3, Almost constantly=4, Always=5. Participants are required to select the response that best represents their behavior. The scores for the twenty questions are then summed, and the resulting score is evaluated based on the following criteria: (0-30) indicates normal Internet usage; (31-49) suggests mild IA; (50-79) indicates moderate IA, and (80-100) suggests severe IA (Rosenthal et al., 2018).

2.2. Test Anxiety (TA)

(TA) scale was originally developed by Dr. Sarason and Mandler (1952). Subsequently, it was translated into Arabic by the Palestinian researcher Chahin (2004). In an Algerian context, the scale demonstrated an acceptable level of Cronbach's alpha, split-half reliability, and a good level of internal consistency validity in a study involving 97 secondary school students (Chrik, 2017). Additionally, Ziani (2018) substantiated the psychometric properties of the scale by conducting a study that included 170 high school students. The study demonstrated good levels of internal consistency validity, discriminant validity, and criterion-related validity. Additionally, the scale exhibited favorable levels of split-half reliability, Cronbach's alpha coefficient, and test-retest reliability. The TA scale aims to measure the level of test anxiety and consists of 38 items. These items are divided into three dimensions:

Cognitive dimension: This dimension includes 23 items, numbered 1, 2, 4, 7, 10, 12, 14, 15, 17, 18, 20, 21, 22, 23, 25, 28, 29, 30, 31, 32, 33, 36, 38.

Behavioral dimension: This dimension includes 4 items, numbered 3, 11, 24, and 27.

Physiological dimension: This dimension includes 11 items, numbered 5, 6, 8, 9, 13, 19, 26, 34, 35, 37.

The scale provides four response options, with the following degrees of agreement: Strongly disagree=1, Disagree=2, Agree=3, Strongly agree=4.

The scores on the scale range from 38 to 152. Based on these scores, TA is classified into three main categories: Normal anxiety (38-75), Moderate anxiety (76-104), and Severe anxiety (105-152).

3. Statistical Analysis

The data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 22 for Windows. Several statistical techniques were utilized to calculate the psychometric characteristics and examine the relationships and differences in the variables.

Cronbach's alpha was computed to assess the internal consistency and reliability of the scales used for measuring IA and TA. Spearman-Brown coefficient was likely used to estimate the reliability of tests or scales over a period of time. Descriptive statistics were employed to determine the levels of Internet addiction (IA) and test anxiety (TA). Pearson correlation analysis was utilized to investigate the relationship between IA and TA. Independent samples T-tests were conducted to identify any gender differences in IA and TA. A one-way analysis of variance (ANOVA) was used to explore potential differences in IA and TA based on academic specializations.

4. Results

Tables 1,2,3,4 present the psychometric properties of the scales after their application to the sample of 50 students. Following the confirmation of the reliability and validity of the two measurements, the responses of 180 students were collected in the final secondary phase.

Table 5 displays the demographic characteristics of the core sample.

Table 6 displays the levels of IA and TA in the sample. The results indicate that 28% of the students have normal use, 35% experience mild addiction, 33% experience moderate addiction, and 4% suffer from severe addiction. In terms of TA, 16% of the students have normal anxiety, while 57% experience moderate anxiety and 27% experience severe anxiety.

Table 7 examines the relationship between IA, TA, and its three dimensions. The Pearson correlation coefficient between IA and TA is estimated at 0.10,

which is statistically significant at the 0.05 level. This suggests a weak positive relationship between IA and the behavioral dimension of TA (correlation coefficient of 0.185*). However, no significant relationships are found between IA and the cognitive and physiological dimensions of TA.

Table 8 investigates the differences in IA, TA, and its three dimensions based on gender. The results indicate no significant differences in IA between males and females. However, there are significant differences in TA between genders, favoring females (T-value of -2.20, $p < 0.05$). No significant gender differences are observed in the cognitive and behavioral dimensions of TA, but there are significant differences in the physiological dimension, favoring females (T-value of -2.48, $p < 0.05$).

Table 9 reveals no significant differences in the levels of IA, TA, and its three dimensions based on academic specializations.

Table 1. Correlation of items with the total score of IA, TA

Correlation of items with the total score of IA	items	Pearson correlation	sig	items	Pearson correlation	sig
	01	,626**	,000	11	,505**	,000
	02	,548**	,000	12	,570**	,000
	03	,513**	,000	13	,543**	,000
	04	,465**	,000	14	,578**	,000
	05	,532**	,000	15	,693**	,000
	06	,575**	,000	16	,632**	,000
	07	,436**	,000	17	,575**	,000
	08	,633**	,000	18	,378**	,000
	09	,408**	,000	19	,214**	,000
	10	,445**	,000	20	,694**	,000
	01	,296**	,000	20	,606**	,000
	02	,195**	,009	21	,470**	,000
	03	,357**	,000	22	,556**	,000

Correlation of items with the total score of TA	04	,305**	,000	23	,601**	,000
	05	,512**	,000	24	,562**	,000
	06	,610**	,000	25	,468**	,000
	07	,528**	,000	26	,593**	,000
	08	,427**	,000	27	,584**	,000
	09	,578**	,000	28	,537**	,000
	10	,571**	,000	29	,590**	,000
	11	,312**	,000	30	,592**	,000
	12	,483**	,000	31	,583**	,000
	13	,475**	,000	32	,546**	,000
	14	,444**	,000	33	,565**	,000
	15	,645**	,000	34	,582**	,000
	16	,640**	,000	35	,704**	,000
	17	,561**	,000	36	,572**	,000
	18	,540**	,000	37	,590**	,000
	19	,651**	,000	38	,668**	,000

*p<0.05, **p<0.01, Pearson correlation analysis was used

Table 2. Discriminatory validity of IA, TA

Discriminatory validity of IA	classes	Mean	Std deviation	T	sig
	lower class	23,00	7,90	-25,11	,000
	upper class	66,28	10,75		
Discriminatory validity of TA	lower class	71,96	12,09	-21,41	,000
	upper class	11,83	9,1	-21,41	,000

*p<0.05, **p<0.01, Independent Samples T Test was used

Table 3. Cronbach's alpha of IA, TA

Cronbach's alpha of IA	0,86	Good
Cronbach's alpha of TA	0,92	Exllent

Table 4. Split half Reliability of IA, TA

Split half Reliability	Correlation Between Forms	Spearman-Brown Coefficient
IA	0,78	0,88
TA	0,90	0,95

Table 5. Demographics characteristics of students

Sample	Variables	N
Gender	Male	90
	Female	90
Academic specialization	Natural Sciences	30
	Philosophy and Literature	30
	Mathematical Sciences	30
	Technical sciences	30
	Languages	30
	Economics and Management	30

Table 6. levels of IA, TA

	levels	N	Mean	percentage
IA levels	Normal Use	50	43,81	28%
	Mild IA	63		35%
	Middle IA	59		33%

	Severe IA	8		4%
TA levels	Normal anxiety	29	93,15	16%
	Middle anxiety	102		57%
	Severe anxiety	49		27%

Table 7. The association of IA and TA and its three dimensions

variables	Pearson correlation	sig
IA and TA	,10	,14
IA and cognitive dimension of TA	,10	,14
IA and behavioral dimension of TA	,185*	,013
IA and physiological dimension of TA	,590	,43

*p<0.05, **p<0.01, Pearson correlation analysis was used

Table 8. Gender Differences of IA, TA

Variables	gender	N	Mean	Std deviation	T	sig
IA	Male	90	44.91	72.20	,75	,45
	Female	90	42.72	18.33		
TA	Male	90	90.00	30.21	-2,20	,029
	Female	90	96.30	16.78		
Cognitive dimension of TA	Male	90	55.76	12.57	-1.88	,061
	Female	90	59.04	10.68		
behavioral dimension of TA	Male	90	9.53	2.52	-1.40	,162
	Female	90	10.02	2.13		

physiological dimension of TA	Male	90	22.40	6.73	-2.48	.014
	Female	90	24.63	5.24		

*p<0.05, **p<0.01, Independent Samples T Test was used

Table 9. Academic specialization Differences of IA, TA and its three dimensions Table

Variables	Academic specialization	N	Mean	Std deviation	F	sig
IA	Natural Sciences	30	51,23	20,66	1,74	,12
	Philosophy and Literature	30	40,73	22,84		
	Mathematical Sciences	30	38,10	15,48		
	Technical sciences	30	42,90	16,38		
	Languages	30	46,96	20,53		
	Economics and Management	30	42,96	19,11		
TA	Natural Sciences	30	94,26	15,63	0,99	,42
	Philosophy and Literature	30	95,03	22,14		
	Mathematical Sciences	30	92,06	16,84		
	Technical sciences	30	94,53	19,92		
	Languages	30	96,43	15,91		
	Economics and Management	30	86,56	24,22		
	Natural Sciences	30	57,73	9,25		

Cognitive dimension of TA	Philosophy and Literature	30	58,73	10,61	1,44	,21
	Mathematical Sciences	30	56,86	15,06		
	Technical sciences	30	58,63	9,62		
	Languages	30	59,86	12,84		
	Economics and Management	30	52,60	11,63		
Behavioral dimension of TA	Natural Sciences	30	10,06	1,94	,41	,84
	Philosophy and Literature	30	10,03	1,62		
	Mathematical Sciences	30	9,36	2,82		
	Technical sciences	30	9,83	1,91		
	Languages	30	9,83	3,14		
	Economics and Management	30	9,53	2,35		
Physiological dimension of TA	Natural Sciences	30	24,13	5,98	,43	,82
	Philosophy and Literature	30	23,73	5,81		
	Mathematical Sciences	30	23,36	6,99		
	Technical sciences	30	23,60	5,15		
	Languages	30	24,13	6,56		
	Economics and Management	30	22,13	6,37		

*p<0.05, **p<0.01, One Way ANOVA was used

5. Discussion and analysis of results

Firstly, the results of our study indicate a mild level of IA, which contradicts the findings of some previous studies suggesting higher levels of IA, such as Lin et al. (2018) and Rashid et al. (2021). However, the mild level of IA in our sample does not mean its absence; rather, it highlights the need for prompt intervention to investigate its causes. IA can be attributed to the widespread availability and use of digital tools by all segments of society, as well as internal factors such as the phase of adolescence, which is considered a significant risk factor associated with IA (Hassan et al., 2020).

Another noteworthy finding is that students in our study exhibit moderate levels of TA, with 57% experiencing moderate anxiety and 27% experiencing severe anxiety. This contradicts the results of Chrik et al. (2019), which suggest normal levels of TA. The increased level of TA in our sample can be attributed to the culturally symbolic nature of the baccalaureate exam in Algerian society. The exam holds significant importance in determining students' future paths, and there is excessive emphasis placed on the results by families, society, and the media. This elevates the exam's significance beyond a mere assessment of students' academic abilities and their readiness to enter university. Moreover, Algerian society is grappling with an unemployment crisis (Lahmar, 2019), so those who succeed in the baccalaureate exam tend to prioritize majors that offer better job prospects. Many universities and institutes require high acceptance rates for these majors.

Regarding the relationship between IA and TA, our results indicate no correlation between the two variables, which aligns with the findings of Salahawi and Khizar (2022) in their study on Algerian third-year high school students. This is contrary to the results of Naeim et al. (2022) in Iran and Truzoli et al. (2020) in Italy. The discrepancy may be attributed to cultural factors that influence the level of social privacy and communication preferences.

Secondly, our results reveal no relationship between IA and the cognitive and physiological dimensions of TA. However, a weak positive correlation is found between IA and the behavioral dimension of TA. Caplan (2005) explains that individuals with poor social communication skills, such as social phobia, low self-confidence, low self-esteem, low emotional intelligence, high loneliness, and shyness, are more likely to resort to avoidance coping strategies, such as using digital media, as a means of indirect communication.

Furthermore, our study finds no gender or academic specialization differences in IA, which aligns with the results of the Palestinian study conducted by Atiq (2021). This contradicts the findings of Karacic and Oreskovic (2017) and Chi et al. (2020), who reported that males are more susceptible to IA. These differences may be attributed to cultural and social variations among the study populations.

Moreover, our results demonstrate gender differences in TA, with females exhibiting higher levels of anxiety in the physiological dimension compared to males. This supports the findings of Cotner et al. (2020). Biological factors, such as differences in brain structure and hormonal fluctuations, may contribute to females being more expressive of anxiety emotions than males (Farhane-Medina et al., 2022). Additionally, socialization in Arab societies plays a role, as women's chances of gaining freedom within society often depend on their academic success and their ability to enroll in university.

Finally, our study finds no differences in TA based on academic specialization, which is consistent with the results of Ibrahim et al. (2022). This could be attributed to the freedom students have in choosing secondary disciplines, which may contribute to higher levels of satisfaction in their studies. Therefore, TA appears to be more related to the baccalaureate exam itself rather than the specific academic specialization being examined.

6. Conclusion

The challenges associated with the development of technology and the need to address its negative effects are increasing. As the educational sector in Algeria undergoes digital transformation and explores blended learning approaches, the Internet becomes a crucial area of research. This raises questions about the problems students face, particularly as it is a tool that attracts a growing number of adolescents.

Based on the findings of this study, we conclude that there is no correlation between IA and TA among students preparing for the baccalaureate exam. However, the levels of addiction and anxiety indicated by the results necessitate immediate interventions to address the situation before it worsens. Support and assistance must be provided to final-year high school students to mitigate the risks associated with IA and alleviate the anxiety related to the possibility of not succeeding in the baccalaureate exam.

In light of the study results, we propose implementing a set of measures to enhance the academic experience of students preparing for the baccalaureate exam, and we advocate for additional research and studies specific to the Algerian context, as education systems vary across different regions of the world. We also call for educational campaigns and awareness programs tailored to the realities faced by adolescents, focusing on teaching appropriate methods of time management and safe Internet usage.

Furthermore, it is crucial to establish multidisciplinary teams that can design intelligent electronic protection programs integrated with Internet-connected digital media. These programs should be age-appropriate and enhance the role of families, particularly parents, in instilling and cultivating proper social communication values. Lastly, we recommend redefining the concept of success within society and minimizing its association with solely achieving a baccalaureate degree.

By implementing these suggestions, we can work towards improving the academic journey of students during their baccalaureate exam preparation.

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