Exploring the determinants of students’ academic performance at university level: The mediating role of internet usage continuance intention

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Abstract
This study investigates the impact of integrating essential factors on academic performance in university students’ context. The proposed model examines the influence of continuance intention, satisfaction, information value, and Internet addiction on academic performance. Additionally, it investigates the mediating role of continuance intention on the relationship of satisfaction and information value on academic performance among university students. A survey questionnaire method was adopted to collect data from university students in Jordan. Data was collected from 476 voluntary participants, and the analysis was conducted using SPSS and AMOS. The analysis results show that continuance intention, satisfaction, information value have a significant positive influence on academic performance. Besides, the results show that satisfaction and information value positively and significantly influence continuance intention. While continuance intention full mediation the relationship between satisfaction and academic performance, it partial mediation the relationship between information value and academic performance. This study is the first to examine the integrating of continuance intention, satisfaction, information value, and Internet addiction on students’ academic performance. Furthermore, this study is also distinguished from other studies by investigating the mediating role of continuance intention gap.

Keywords Continuance intention · Satisfaction · Information value · Internet addiction · Academic performance
1 Introduction

There is a significantly increasing influence of using Internet and communication technology in the education industry. University students use the Internet daily to access information, gather data, and conduct research (Bagavadi Ellore et al. 2014). Moreover, they use the internet for entertainment and enjoyment fulfillment. In addition to the importance of the internet as an educational tool, students use the internet for entertainment and enjoyment fulfillment (Al-Fraihat et al. 2020). Students worldwide are reported to spend on average around two hours and 24 min per day on social media alone in 2019 (Statista 2019). The amount of time spent on the internet or social network sites (SNS) provoked researchers in the past to examine the antecedents or determinants of continuous intention. Various media tools have been examined to understand what drives users to spent more time on the Internet (Joorabchi et al. 2011) (Blachnio et al. 2019), Facebook (Kamik et al. 2013) (Houghton et al. 2020), social networking sites (SNS) (Y. Kim et al. 2011) (Marengo et al. 2020).

Previous research showed that using technology enhances academic performance (Basak and Calisir 2015) (Choi 2016) (Naqshbandi et al. 2017) (Bae 2018) (Hou et al. 2020) (Çebi and Güyer 2020). For example, (Naqshbandi et al. 2017) found that Facebook mediates the relationship between different personality dimensions (extraversion, agreeableness and loneliness) and academic performance. Therefore, it is paramount to identify the antecedents of continuous intention. Enjoinment (Choi 2016), satisfaction (Bae 2018), entertainment and status-seeking (Basak and Calisir 2015) are among the many antecedents evidenced in the literature. (Hou et al. 2020) examined the impact of WeChat as a social network site on learning. Besides, it investigates how social network sites would influence university students’ academic performance. They found that WeChat usage played a significant positive role in students’ academic performance by engaging and enhancing sharing information and resources. Another study examined the impact of student interaction with different online learning activity on learning performance (Çebi and Güyer 2020). They found that spending longer time on learning activities enhance their academic performance.

Nowadays, Internet resources have become a very important component in educational systems (Salam and Farooq 2020). Students continuously and extensively use the Internet to interact online, search information, and perform specific tasks and activities. The use of the Internet implicates positive and negative effects on university students’ academic performance (Chang et al. 2019). Nowadays, students are using the Internet excessively to do various tasks and access social networking sites. The Internet’s intensive use is mainly for online communications, socializing, chatting, and gaming purposes (Byun et al. 2009). The overload of information can negatively influence students’ academic performance (Sinha et al. 2001). Students use the Internet to perform tasks related and non-task-related to their study, influencing students’ academic performance (Chang et al. 2019). For instance, (Kolek and Saunders 2011) had not found any association between Facebook use and students’ academic performance. On the contrary, (Kirschner and Karpinski 2010) found students without using Facebook had higher GPAs compare with students had extensive use of Facebook. Thus, the impact of using the Internet and social media network on students’ academic performance is varied. It depends on the type of websites they are visiting and the tools they are using (Michikyan et al. 2015). A research study revealed that Internet use for
academic purposes was influence positively academic performance, whereas the Internet use for other purposes was influencing negatively academic performance (Kim et al. 2017). Recently, another research study conclude the use of Internet affecting negatively physical and mental health of people, while it provides people with information and improves timely work-related data transmission (Saini et al. 2020). Currently, adopting online learning in higher education during COVID-19 Pandemic had a significant impact on learners, educators and learning performance (Ustun 2020). Many research studies examined the impact of using online learning systems on university student’s satisfaction and academic performance (Kapasia et al. 2020) (Maqableh et al. 2015). However, there is a need to understand the factors that positively or negatively influence students’ academic performance from the use of the Internet. Therefore, it emerges a potential research direction to investigate the factors that influence students’ academic performance.

The purpose of this study is to investigate the positive and negative impact of integrating essential factors (continuance intention, satisfaction, information value, and Internet addiction) that influence students’ academic performance. Additionally, it investigates the mediating role of continuance intention on the relationship between satisfaction and academic performance and information value and academic performance gap. This study is the first to examine the relationship between integrating four essential factors and students’ academic performance. Additionally, it is distinguished from other studies by investigating the mediating role of continuance intention and Internet usage on students’ academic performance gap.

2 Literature review and hypotheses development

2.1 Academic performance

Academic performance is defined as students’ ability to carry out academic tasks, and it measures their achievement across different academic subjects using objective measures such as final course grades and grading point average (Busalim et al. 2019) (Anthonysamy et al. 2020). Researchers agree that the Internet is becoming more important for students. For example (Bagavadi Ellore et al. 2014) note that the Internet is an important part of college/university students’ lives. Similarly, (Naqshbandi et al. 2017) note that most students use Facebook daily, making it a significant component of their daily lives.

Many studies confirm the benefits that Internet users provide for students. For example: (Mccamey et al. 2015) argue that as a result of the expansion of the Internet, the college students are increasingly having more resources available to help them widen their knowledge. Similarly, (Emeka and Nyeche 2016) argue that the Internet is beneficial for students, which enhances their capabilities and skills which are helpful in their studies, which students use for research purposes, assignments, and presentations in their respective fields of study.

Several studies have examined the relationship between using the Internet’s resources/services and different foci’ academic performance. For example: (Sampath Kumar and Manjunath 2013) found that university teachers and researchers’ use of Internet sources and services positively impacted their academic performance. (Emeka
and Nyeche 2016) found that the use of the Internet has a positive influence on undergraduate students’ academic performance in a university in Nigeria.

2.2 Continuance intention

Continuance intention refers to the user’s initial decision to reuse Internet sites (Al-Debei et al. 2013). According to (Amoroso and Lim 2017) continuance intention refers to the strength of an individual intends to perform a specific activity. Subsequently, in this study, continuance intention refers to Internet usage continuance intention. Many studies examined the initial intention to use technology in the information system (IS) literature based on the technology acceptance model (TAM) (Schierz et al. 2010). Some studies integrated several constructs based on several theoretical perspectives with the TAM to better understand users continuance intention (Nysveen et al. 2005). Consequently, Innovation Diffusion Theory (IDF) (Shin et al. 2010) and Task Technology Fit (TTF) (Junglas et al. 2008) are introduced. Research results were crucial to the development of a better theoretical understanding of technology initial intention to use and the enhancement of different practical practices to encourage users to use technology.

However, the initial intention to use technology is not enough. It is essential also to explore and understand the continuance intention to use technology; aspects that would encourage users to stay loyal and keep using the technology (C. Kim et al. 2010) (Alzougool 2019) (Bölen 2020). Companies have invested their resources to develop technologies based on users’ needs and requirements. They need to protect their investment by applying measure for continuance intention to use the technology. Literature directed towards understanding the continuance use of technology is growing (Authors et al. 2016) (Pai et al. 2018) (Bölen 2020). However, the Internet is rich cases for studying as they have high levels of interactions between users and would help researchers explore the different factors that affect continuance intention to use technology (Gao et al. 2014) (Fang and Liu 2019). Consequently, it is necessary to do exploratory research to identify and measure factors affecting continuance intention to use Internet sites. Overall, continuance intention previous has mainly examined in the literature as dependent variable literature (Yang and Lin 2014; Yang et al. 2018; Yang; Zhang et al. 2017; Zong et al. 2019). However, we will examine its relationship with satisfaction, Internet addiction and students’ academic performance. Based on these arguments, it is expected that students’ continuance intention to use the Internet and its resources will help them improve their academic performance. Thus, the following hypothesis is proposed:

H1: Continuance intention significantly influences students’ academic performance.

2.3 Satisfaction

User satisfaction refers to the general feeling of fulfilment resulting from using the internet (Patwardhan et al. 2011). Satisfaction is an old but contemporary construct that has been used by many researchers in different disciplines (Ki Hun Kim et al. 2019). It has been used in the work context to measure job satisfaction (Locke 1976) (Saari and
Judge 2004) and in the organizational context to customer satisfaction (Oliver and Gerald 1981) (Barrett 2004). Satisfaction is measured in the IS literature as well as many theories have been deployed accordingly. An Expectation-Confirmation Model of continued IT usage (ECM-IT) developed by Odel and Bhattacharjee (2001) compares user continued IT decisions to consumer repeat purchase decision. The research found that continuous usage of an IT has three antecedents, one of which is satisfaction with the IT used (Odel and Bhattacharjee 2001). Chen et al. (2009) found that consumers’ satisfaction positively and significantly influences continuance intention to use self-service technologies (S. C. Chen et al. 2009). In relation to the reuse health information, Kim et al. (2010) found that customer satisfaction had a significant positive influence on the decision to reuse health information provided by the internet (Kyoung Hwan Kim 2010). Bae (2018) found satisfaction with social network sites to have a significant impact on continuance intention to use social network sites (Bae 2018).

Based on the Expectation Confirmation Model (EDM), satisfaction is analyzed to understand the relationship between satisfaction and experiences while using technology (Melone 1990) (Bhattacherjee 2014); customers usually expect the performance of a product or a service before the actual usage. If their expectations relatively match their experience, then they would be satisfied. Therefore, the positive customer experience at first glance is a crucial determinant of user satisfaction. (Kuo et al. 2009) suggested that satisfaction can also be the aggregated positive emotional states developed through several experiences with the product or the service. Users’ IT continuance use behaviour is positively influenced by their satisfaction with prior IT usage (Bhattacherjee and Lin 2015). The uses and gratification theory is also performed as a theoretical basis to ground a better understanding of satisfaction and its relationship with continuance intention to use social networking systems. (Chiu and Huang 2015) revealed that user satisfaction with contents and features of social networking systems had a positive relationship with continuance use. Another research study examined the relationship between students satisfaction from Internet usage and students performance (Goyal et al. 2011). They found that Internet usage satisfaction had a significant positive impact on students academic performance. (Samaha and Hawi 2016) found that a low level of life satisfaction were less likely to achieve satisfactory cumulative GPAs. Based on the significant influence of satisfaction on continuance usage intention and academic performance, the following hypotheses are proposed:

H2: Satisfaction significantly influences continuous intention to use the Internet.
H3: Satisfaction significantly influences students’ academic performance.

2.4 Information value

Some research studies proposed another antecedent to continuous usage of an IT product/service is perceived usefulness which is closely related to information value (Zhang et al. 2017) (S. Yang et al. 2018) (Wang et al. 2020). The benefit of acquiring useful information through using the internet determines information value, especially if the information helps the user solve problems of developing his skills and abilities (Zhang et al. 2017). The uses and gratifications theory (U&G theory) explains why users select and adopts certain medium to fulfil their social and psychological needs
(Ku et al. 2013) (Ma and Lee 2012). This theory has been linked with continuous intention, factors that satisfy users’ gratification needs, such as information needs and social needs. As found by (Wei et al. 2015), those two needs are critical factors to motivate users to interact with each other and enhance their stickiness towards using social networking sites. Moreover, (Chiang 2013) found that informativeness, social interactivity and playfulness needs affect users’ continuance intention towards social networking sites.

Information value refers to the useful information acquired from friends or information providers (Zhang et al. 2017). (Chiang 2013) argues that website informativeness is a potential influence on a user’s intentions and behaviours. (Liao and Shi 2017) found that web content (i.e. the accuracy, usefulness and completeness, and website information) directly influences the continuance intention to use online tourism services. (Zheng et al. 2013) found that information quality directly affects user satisfaction which in-turn influences a user’s continuance intention to use information-exchange virtual communities. Similarly, (Valaei and Baroto 2017) found that information quality had a positive impact on continuance intention to follow a government’s Facebook page. (Jin et al. 2007) found that information usefulness positively and significantly affects the continuance intention to use information-exchange virtual communities. Based on these results and arguments, the following hypotheses are proposed:

H4: Information value significantly influences continuous intention to use the Internet.

H5: Information value significantly influences students’ academic performance.

2.5 Internet addiction

Facebook addiction refers to the excessive use of Facebook due to being psychologically reliant on its use that somewhat hinders other essential actions that the user could perform and, in the process, yield negative results (Moqbel and Kock 2018). About 350 million Facebook users are between 16 and 25 years old showing Facebook addiction syndrome (Leong et al. 2019). Overall, previous literature has mainly examined the concept of continuance intention as a dependent variable (Yang and Lin 2014; Yang et al. 2018; Yang 2019; Zhang et al. 2017; Zong et al. 2019). However, we will examine its relationship with Facebook addiction. Numerous theories and findings have established the relationship between behavioural intention and actual behaviour (Obeidat et al. 2017; Pelling and White 2009; Turel et al. 2010). Consequently, if the continuance intention of Facebook use is present, the user will continue to do so, thereby increasing the chances of addiction to the website. Furthermore, previous studies found that when a certain behaviour is exhibited, and the person is willing to do it again, future behaviour becomes an automatic, aligned response (Ronis et al. 1989). Therefore, the more a person uses social media to communicate with others, the more likely it will become a habit and lead to addiction (Turel et al. 2010). (J. V. Chen et al. 2008) conducted a research study that confirms higher Internet addiction can lead to a high degree of Internet abuse. Also, (Samaha and Hawi 2016) conducted a research study that showed smartphone addiction had a negative impact on students’ academic performance.
Following the same logic, we propose that the Facebook continuance intention resulting from the perceived values will increase Facebook addiction. Thus, this study is the first study that investigates the relationship between continuance intention and addiction gap. Generally, this factor strongly influences the association between online purchase intention and actual behaviour (Miyazaki and Fernandez 2001; Nepomuceno et al. 2014). Thus:

H6: Internet addiction significantly negative influences on students’ academic performance.

2.6 The mediating role of continuance intention

In research, mediating factors are used to understand the mechanism that establishes the underlying relationship between the independent and dependent variables. The mediating role of employees’ satisfaction on the relationship between Internet actual usage and performance impact was examined (Isaac et al. 2017). The analysis results confirmed the mediating role of satisfaction. Moreover, some researchers examined the mediating role of social interaction on the relationship between network externalities on perceived values (Zhang et al. 2017). Also, satisfaction has been considered a mediating variable for the relationship between perceived security and continuance intention (Ki Hun Kim et al. 2019). Finally, another research study examined the mediating effect of perceived value between the relationship of security and continuance intention in mobile government service (Wang et al. 2020). In this research, it proposed to have continuance intention as a mediating variable to measure the following relationships:

H7: Continuance intention mediates the relationship between satisfaction and academic performance.
H8: Continuance intention mediates the relationship between information value and academic performance.

3 Research methodology

This section provides the methodology applied in the current study. It consists of the research model of the study’s independent and dependent variables, research hypotheses, besides data collection tool and research population and sample.

3.1 Research model

In this research, the proposed model examines the impact of continuance intention, satisfaction, information value, and Internet addiction on students’ academic performance gap. Moreover, it investigates the mediating role of continuance intention on the relationship between satisfaction and academic performance and information value and academic performance gap. Figure 1 shows the proposed research model.
3.2 Data collection and sample

Data were collected from targeted participants with Internet experience using an online survey. Participants were selected opportunistically from 4000 bachelor students from the School of Business at the University of Jordan in the Hashemite Kingdom of Jordan. However, what constitutes an adequate sample size for regression analysis is uncertain among researchers. Some researchers (O’Rourke and Hatcher 2013) recommend that the sample size of a study that applies multiple linear regression should be 100 participants or more than five times the number of items measured. The questionnaire was made up of 22 items, so the sample size should be over 110 students. Also, (Joseph Hair et al. 2014) recommended between 100 and 200 while (Krejcie and Morgan 1970) required 351 from a population of 4000. Therefore, the number of returned surveys is 476 that meets the sample size requirement for a structural equation model and shows adequate representation with the highest probability assessment. In Table 1, the respondents’ characteristics of this study are summarized.

The 476 valid responses compromised of 70.6% female student. The sample’s dominant age range was 20 to 23 years, with a percentage of 73.3%. The respondents were mainly in their second and third years at the university, with 65.6% of the sample. 44.7% of students spend 1 to 3 h daily on internet activities. Moreover, almost 33% uses the internet from 10 to 29 h weekly. The full respondent’s profiles are shown in Table 1.

3.3 Measurement development

The 5-points Likert scale is used to explore the associations among the research variables. It varies between strongly disagree =1 and strongly agree =5. Reliability
Table 1: Characteristics of the research sample ($n = 476$)

| Category                                      | Frequency | Percentage% |
|-----------------------------------------------|-----------|-------------|
| Gender                                        |           |             |
| Male                                          | 140       | 29.4        |
| Female                                        | 336       | 70.6        |
| Total                                         | 476       | 100%        |
| Age                                           |           |             |
| 17–19                                         | 81        | 17.0        |
| 20–23                                         | 349       | 73.3        |
| 23 and above                                   | 46        | 9.7         |
| Total                                         | 476       | 100%        |
| Academic Level (Year)                         |           |             |
| First                                         | 34        | 7.1         |
| Second                                        | 168       | 35.3        |
| Third                                         | 144       | 30.3        |
| Fourth                                        | 97        | 20.4        |
| Fifth and above                               | 33        | 6.9         |
| Total                                         | 476       | 100%        |
| Students spend on Internet activities daily (Hour Daily) |           |             |
| Less than 1                                   | 53        | 11.1        |
| 1–3                                           | 213       | 44.7        |
| 4–6                                           | 151       | 31.7        |
| More than 6                                   | 59        | 12.4        |
| Total                                         | 476       | 100%        |
| Using the Internet (Hours weekly)             |           |             |
| Less than 10                                  | 47        | 9.9         |
| 10–29                                         | 158       | 33.2        |
| 30–50                                         | 120       | 25.2        |
| More than 50                                  | 151       | 31.7        |
| Total                                         | 476       | 100%        |

and validity analyses were conducted, descriptive analysis was used to describe the characteristics of the sample and the respondent to the questionnaires besides the independent and dependent variables. Besides, SEM analysis was employed to test the research hypotheses. Table 2 shows the measured constructs and the items measuring each construct.

### 4 Data analysis and results

#### 4.1 Validity and reliability

To check for the research model validity, and since all the measures were previously established, confirmatory factor analysis (CFA) was conducted using SPSS 20.0 and AMOS 22.0. The standardized factor loading of the item was examined since 0.55 represent a good fit (Harrington 2008) any item with standardized factor loading less than 0.55 was eliminated. Accordingly, item (Academic Performance 1), (Addiction 1, 2, and 3), (Information Value 4) were excluded from any further calculations. The full-standardized factor loading values from the CFA are presented in Table 3. The model
fit was assessed relaying on the model fit summary results, the cut points used in this research were $\chi^2$/df < 5, Root Mean Square of Error Approximation (RMSEA) <0.08, while all the other indices (i.e. GFI, CFI, TLI, IFI and NFI) should be close to 1 where higher than 0.9 is acceptable (Harrington 2008). Results are shown in Table 3.

To check the reliability of the scale, Cronbach’s-Alpha test was used to assess the internal consistency the cut point usually used in researches is 0.7, but it can be lowered to 0.6 (Joe Hair et al. 2011). Cronbach’s-Alpha results in this research were between 0.754 and 0.864. Results are shown in Table 3.

4.2 Descriptive statistics and correlations

Pearson’s correlation coefficient results are presented in Table 4. Pearson’s correlation coefficient indicates the existence of a linear association between the variables according to person correlations values. No significant linear effect was found between the demographic variables and the dependent variable except for the demographic variable using the Internet (Hours per week) was found to have a significant negative correlation with academic performance ($r = -0.114^*, p < 0.01$).
The highest mean score for information value (3.73) indicates a high positive respondents’ attitude toward continuance intention regarding the descriptive statistics. In contrast, the lowest mean score was for satisfaction (2.69). The skewness and kurtosis values were within the range of $-2$ to $+2$ (Garson 2012), which indicates normally distributed data. The results are provided in Table 5.

### 4.3 Hypotheses testing

Multiple linear regression was used to test Hypotheses 1, 3, 5 and 6, where continuous intention, satisfaction, information value, and Internet addiction were the independent variables, and academic performance was the dependent variable. The normality plot p-p indicates that most of the points are near the best fit line, and the scatter plot produces no pattern and no multicollinearity issue was not detected. The tolerance ranged between 0.755 and 0.987, which are $>1$, and the variance inflation factor (VIF) statistics ranged between 1.013 and 1.325, which are less than 4, respectively (Garson 2012). The results are shown in Table 6, the overall model was significant ($F = 32.323$, $p = 0.000 < 0.05$), the R-value indicates that the whole model is correlated with the dependent, $R = 0.464$, $R^2$ indicate the amount of variance in the dependent variable that is caused by the independent variables $R^2 = 21.5\%$. The adjusted $R^2 = 20.9\%$ is an indicator of the variance caused by the independent variables if the whole population

| Item                        | Standardized Factor loading | Cronbach’s Alpha |
|-----------------------------|-----------------------------|-------------------|
| Information Value 1        | 0.721                       | 0.837             |
| Information Value 2        | 0.925                       |                   |
| Information Value 3        | 0.754                       |                   |
| Satisfaction 1             | 0.681                       | 0.864             |
| Satisfaction 2             | 0.807                       |                   |
| Satisfaction 3             | 0.864                       |                   |
| Satisfaction 4             | 0.785                       |                   |
| Continuous Intention 1     | 0.711                       | 0.810             |
| Continuous Intention 2     | 0.795                       |                   |
| Continuous Intention 3     | 0.785                       |                   |
| Continuous Intention 4     | 0.612                       |                   |
| Internet Addiction 4       | 0.545                       | 0.825             |
| Addiction 5                | 0.643                       |                   |
| Addiction 6                | 0.670                       |                   |
| Addiction 7                | 0.708                       |                   |
| Addiction 8                | 0.753                       |                   |
| Addiction 9                | 0.674                       |                   |
| Academic Performance 2     | 0.778                       | 0.754             |
| Academic Performance 3     | 0.789                       |                   |
| Academic Performance 4     | 0.590                       |                   |

Model fit summary: $\chi^2:337.03$, $\chi^2/df: 2.106$, NFI: 0.915, IFI: 0.953, CFI: 0.953, GFI: 0.933, RMSEA: 0.048
|     | 1        | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      |
|-----|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1   | Gender   | 1.00    |         |         |         |         |         |         |         |         |
| 2   | Age      | −.225*  | 1.00    |         |         |         |         |         |         |         |
| 3   | Level    | −.167*  | .630*   | 1.00    |         |         |         |         |         |         |
| 4   | Daily    | 0.04    | −0.03   | −0.04   | 1.00    |         |         |         |         |         |
| 5   | Weekly   | −.07    | 0.01    | −0.04   | .569*   | 1.00    |         |         |         |         |
| 6   | Information | −.06    | 0.01    | −0.05   | 0.04    | 0.00    | 1.00    |         |         |         |
| 7   | Satisfaction | −.03    | −0.07   | −0.01   | −0.01   | −0.02   | −0.01   | 1.00    |         |         |
| 8   | Intention | −.07    | −0.04   | −.112*  | 0.05    | 0.02    | .451*   | .198*   | 1.00    |         |
| 9   | Addiction | −.03    | −.03    | 0.00    | 0.05    | 0.03    | .096*   | 0.05    | 0.08    | 1.00    |
| 10  | Performance | 0.00    | −.07    | −0.05   | −0.04   | −.114*  | .295*   | .161*   | .439*   | −0.01   | 1.00    |

*Correlation is significant at the 0.05 level (2-tailed).

*Correlation is significant at the 0.01 level (2-tailed).
were tested, the differences between R2 and Adj-R2 are 0.006. The regression coefficients values revealed that continuous intention, information value, and satisfaction have a significant positive effect on academic performance with effect values of $B = 0.153$, $p = 0.003 < 0.05$, $B = 0.085$, $p = 0.026 < 0.05$, and $B = 0.424$ and $p = 0.000 < 0.05$ respectively. Nevertheless, in this model, Internet addiction negatively affects academic performance $B = -0.057$, $p = 0.169 > 0.05$. Accordingly, hypotheses 1, 3 and 5 were supported, while hypothesis 6 was not supported. Results are shown in Table 6.

To test Hypotheses 2 and 4, multiple linear regression was used where satisfaction and information value were the independent variables, and the continuous intention was the dependent variable. The normality plot p-p indicates that most of the points are near the best fit line, and the scatter plot produces no pattern. No multicollinearity issue was not detected. The results are shown in Table 7 indicate that the overall model was significant ($F = 76.564$, $p = 0.000 < 0.05$), the R-value indicates that the whole model is correlated with the dependent, $R = 0.495$ and $R^2 = 24.5\%$. The adjusted $R^2 = 24.1\%$ is an indicator of the variance caused by the independent

Table 5 Descriptive statistics

|                          | Mean | SD    | Skewness | Kurtosis |
|--------------------------|------|-------|----------|----------|
| Perceived image          | 2.96 | 0.747 | 0.05     | 0.05     |
| Enjoyment                | 3.84 | 0.645 | -0.971   | 2.44     |
| Information Value        | 3.85 | 0.667 | -0.999   | 1.99     |
| Emotional Value          | 2.90 | 0.793 | -0.888   | -0.276   |
| Academic Performance     | 3.45 | 0.829 | -0.616   | 0.47     |
| Satisfaction             | 2.30 | 0.890 | 0.25     | -0.512   |
| Continuance Intention    | 3.46 | 0.663 | -0.452   | 0.90     |
| Internet Addiction       | 2.98 | 0.897 | -0.095   | -0.386   |

Table 6 Regression Analysis results (H1, 3, 5 and 6)

| Outcome                   | B     | t     | p     | Tol.   | VIF   |
|---------------------------|-------|-------|-------|--------|-------|
| Constant                  | 1.293 | 5.464 | 0.000 |        |       |
| Information Value         | 0.153 | 2.977 | 0.003 | 0.782  | 1.279 |
| Satisfaction              | 0.085 | 2.230 | 0.026 | 0.947  | 1.056 |
| Continuance Intention     | 0.424 | 7.721 | 0.000 | 0.755  | 1.325 |
| Internet Addiction        | -0.057| -1.378| 0.169 | 0.987  | 1.013 |
| R                         | 0.464 |       |       |        |       |
| R²                        | 0.215 |       |       |        |       |
| F                         | 32.323|       |       |        |       |
| p                         | 0.000 |       |       |        |       |

Dependent: Academic Performance, significance level 0.05.
variables if the whole population were tested, the differences between R2 and Adj-R2 are 0.004. The regression coefficients values revealed that both information value and satisfaction have a significant positive effect on continuous intention. The effect values were $B = 0.431$, $p = 0.000 < 0.05$ and $B = 0.157$, $p = 0.000 < 0.05$ respectively. Accordingly, both hypotheses 2 and 4 were supported. Results are shown in Table 7.

To test Hypotheses 7, a multiple linear regression was used to test the mediation effect using PROCESS Macro by Hayes V 3.3. Using PROCESS, the mediation effect will be tested based on 5000 Bootstrapped sample. The results of the mediation paths are shown in Table 8. Where $C$ represents the effect of satisfaction on performance (i.e. Total effect), $(a)$ represents the effect of satisfaction on continuous intention, $b$ is the effect of continuous intention on performance in the presence of satisfaction and $C'$ is the effect of satisfaction on performance in the presence of continuance intention (i.e. Direct effect). The mediation path can be calculated either by multiplying path $a$ coefficient with path $b$ coefficient or by subtracting path $C$ coefficient form path $C'$ coefficient (Hayes 2015).

**Table 7** Regression Analysis Testing Hypothesis 2 and 4

| Outcome | Predictors | B     | t     | p    | Tol. | VIF |
|---------|------------|-------|-------|------|------|-----|
|         | Constant   | 1.406 | 8.365 | 0.000|      |     |
|         | Information Value | 0.431 | 11.341| 0.000| 1    | 1   |
|         | Satisfaction| 0.157 | 5.052 | 0.000| 1    | 1   |
|         | R          | 0.495 |       |      |      |     |
|         | $R^2$      | 0.245 |       |      |      |     |
|         | F          | 76.564|       |      |      |     |
|         | P          | 0.000 |       |      |      |     |

Dependent: Continuance Intention, significance level 0.05.

**Table 8** Testing the mediating role of Continuance intention on the relationship between satisfaction and academic performance (H7)

| Effect (B) | t     | p    | R    | $R^2$ | F   | p    |
|------------|-------|------|------|-------|-----|------|
| Sat-CI (a) | 0.1538| 30.07| 0.000| 0.198 | 0.04| 19.315| 0.000|
| CI-Per. (b) | 0.4953| 10.0864| 0.000| 0.445 | 0.198| 58.53 | 0.000|
| Sat-Per. (C') | 0.0703| 1.8405| 0.0663 (InSig.)| 0.1611 | 0.026| 12.633 | 0.0004|
| Sat-Per. (C) | 0.1464| 3.554| 0.0004| 0.1611 | 0.026| 12.633 | 0.0004|

C: Effect of satisfaction on performance (Total effect) – significant.
a: Effect of satisfaction on continuous intention - significant.
b: Effect of continuous intention on performance in the presence of satisfaction - significant.
C': Effect of satisfaction on performance in the presence of continuance intention (Direct effect) -Insignificant.
Indirect effect = $C-C'$ or $a*b \rightarrow 0.0762$ significant. (BootLLCI 0.0350, BootULCI 0.1214) - Full mediation.
Findings showed that 95% bias-corrected bootstrap confidence intervals based on 5000 bootstrap samples ((BootLLCI) and (BootULLCI)) for specific indirect effects through continuance intention do not include zero accordingly the mediation path was found to be significant. Additionally, since the direct effect is insignificant, continuance intention fully mediates the relationship between satisfaction and continuance intention, which indicates that satisfaction affects academic performance because of continuance intention.

To test Hypotheses 8, multiple linear regression was used to test the mediation effect using PROCESS Macro by Hayes V 3.3; using PROCESS, the mediation effect will be tested based on the 5000 bootstrapped sample. The results of the mediation paths are shown in Table 9. Where C is the effect of information value on performance (i.e. Total effect), a is the effect of information value on Continuous intention, b is the effect of continuous intention on performance in the presence of information value and C’ is the effect of information value on performance in the presence of continuance intention (i.e. Direct effect). The mediation path can be calculated either by multiplying path a and b (i.e. Indirect effect = C-C’ or a*b).

Table 9  Testing the mediating role of continuance intention on the relationship between information value and academic performance (H8)

| Effect (B) | t    | p    | R   | R²   | F     | p     |
|-----------|------|------|-----|------|-------|-------|
| Inf.-CI (a) | 0.429 | 11.015 | 0.000 | 0.451 | 0.2038 | 121.33 | 0.0000 |
| CI-Per. (b) | 0.4491 | 8.356 | 0.000 | 0.452 | 0.2044 | 60.754 | 0.0000 |
| Inf.-Per. (C’) | 0.1351 | 2.643 | 0.0085 | | | |
| Inf.-Per. (C) | 0.3279 | 6.7183 | 0.000 | 0.2949 | 0.0869 | 45.135 | 0.0000 |

C: Effect of information value on performance (Total effect) - significant.
a: Effect of information value on continuous intention - significant.
b: Effect of continuous intention on performance in the presence of information value - significant.
C’: Information value effect on performance in presence of continuance intention (Direct effect) - significant.
Indirect effect = C-C’ or a*b → 0.1928 - sig. (BootLLCI 0.1293, BootULCI 0.2616) - Partial mediation.

Table 10  Hypotheses test results

| Hypothesis                                                                 | Result         |
|--------------------------------------------------------------------------|----------------|
| **H1.** Continuance intention significantly influences students’ academic performance. | Supported       |
| **H2.** Satisfaction significantly influences continuous intention to use the Internet. | Supported       |
| **H3.** Satisfaction significantly influences students’ academic performance. | Supported       |
| **H4.** Information value significantly influences continuous intention to use the Internet. | Supported       |
| **H5.** Information value significantly influences students’ academic performance. | Supported       |
| **H6.** Internet addiction significantly negative influences on students’ academic performance. | Not Supported   |
| **H7.** Continuance intention mediates the relationship between satisfaction and academic performance. | Supported (Full Mediation) |
| **H8.** Continuance intention mediates the relationship between information value and academic performance. | Supported (Partial Mediation) |
coefficient with path b coefficient or by subtracting path C coefficient form path C’ coefficient (Hayes 2015).

Findings showed that 95% bias-corrected bootstrap confidence intervals based on 5000 bootstrap samples ((BootLLCI) and (BootULLCI)) for specific indirect effects through continuance intention do not include zero accordingly the mediation path was found to be significant. Additionally, since the direct effect is significant, information value partially mediates the relationship between satisfaction and continuance intention, which indicate that information value affects academic performance directly and because of continuance intention. Table 10 show the results of tested hypotheses in this research.

5 Discussion and conclusion

Former research studies have not investigated the impact of integrating essential factors that influence students’ academic performance. Thus, this study investigates the impact of continuance intention satisfaction, information value, and Internet addiction on students’ academic performance gap. Moreover, it investigates the mediating role of continuance intention on the relationship between information value and academic performance and the relationship between satisfaction and the academic performance gap. Therefore, we also tested the relationships between satisfaction and continuance intention and information value and continuance intention. The analysis results in Tables 6 and 7 show that the overall model was significant, and the whole model is correlated with the dependents. The analysis results show that most of the proposed hypotheses are supported. It shows that continuance intention, satisfaction, and information value explain 21.5% of academic performance variance. It also shows that the independent variables of continuance intention cause 19% of variances.

The research results show that continuance intention to use the Internet has a significantly positive effect on students’ academic performance. This finding supports previous research such as (Emeka and Nyeche 2016) (Sampath Kumar and Manjunath 2013) that confirmed the advantages of using the Internet as students. Using the Internet can help students search for information related to their modules and assignment. In addition, using the Internet can help students working together as groups to connect and collaborate online. Many universities nowadays integrate online learning with traditional teaching methods to create more interactive student-centred learning. Another research study showed that Facebook usage increase students’ academic performance (Naqshbandi et al. 2017).

The analysis results confirmed the positive influence of satisfaction on students’ academic performance, which is aligned with previous research results (Goyal et al. 2011) (Samaha and Hawi 2016). Moreover, it also confirmed that information value has a positive and significant impact on students’ academic performance. Regarding the impact of Internet addiction, the results show that Internet addiction is insignificant influence academic performance. The analysis results show that Internet addiction has a negative but insignificant effect on academic performance $B = -0.057, p = 0.169 > 0.05$, which is consistent with the finding of (Kolek and Saunders 2011). This can be explained as the type of the tools students are using and the type of the website would had a major role on the impact of the students’ academic performance. For instance, the
students who use Internet tools that support their study might be improve their academic performance, whereas the extensive use of Internet on unrelated website to their study might be reduce academic performance. Instead, a balance use of Internet between related and unrelated websites might be not effect students’ academic performance. Therefore, the impact of extensive use of Internet on academic performance might be varied from one group to another based on the type of visited websites and time spent on each type of websites. Moreover, based on the Pearson correlation coefficient, there was no significant linear effect between the demographic variables and the dependent variable except for using the Internet (hours per week). It found that Internet usage has a negative significant correlation with academic performance ($r = -0.114^*, p < 0.01$). This can be justified as the students spend a long time using the Internet; they will waste their time on irrelative contents to their academic study that negatively affects their academic performance. This finding supports the results of previous research (J. V. Chen et al. 2008)(Samaha and Hawi 2016).

This study investigated the relationship between satisfaction and continence intention. The results confirmed that satisfaction has a significant positive impact on students’ Internet continuance intention. This finding supports previous research that found satisfaction with social network sites to have a significant impact on continuance intention to use social network sites (Bae 2018). Furthermore, this study examined the influence of information value on continuance intention. The research findings confirmed that information value exhibits a significant influence on continuing intention, which is consistent with (S. Yang et al. 2018). The descriptive statistics show the information value has the highest mean score (3.73), which indicate a high positive respondents attitude toward continence intention.

The mediating role of continuance intention on the relationship between satisfaction and academic performance is examined. The analysis results show that while satisfaction has a significant effect on academic performance, the direct effect of satisfaction on student academic performance in the presence of continuance intention is insignificant. These results indicate that continuance intention is fully mediate the relation between satisfaction and continuance intention. Finally, this research examined the mediating role of continuance intention on the relationship between information value and academic performance. The results confirmed the significant direct effect of information value and the significant effect of information value on academic performance in the presence of continues intention. These findings confirmed the partially mediating role of continuance intention on the relationship between satisfaction and academic performance.

To conclude, this study investigated the impact of integrating four main factors of Internet usage in students’ context that influence students’ academic performance. It investigated the effect of continuance intention, satisfaction, information value, and Internet addiction on academic performance. The analysis results showed that continuance intention, satisfaction, and information value are positively influencing the students’ academic performance. Moreover, the analysis results showed that satisfaction and information value significantly influence continuance intention to use the Internet. In addition, this study investigates the mediating role of continuance intention on the relationship of satisfaction and students’ academic performance and information value and academic performance gap. The results showed that while continuance intention partially mediates the relationship between information value and academic performance, it fully mediates the relationship between satisfaction and academic performance.
performance in university students. Finally, the analysis results showed that Internet addiction does not influence students’ academic performance. Still, it has a negative impact and the number of hours to use the Internet has a negative impact on academic performance. This research study contributes to the emerging body of knowledge by extending the associations between four main factors that influence academic performance. It also contributes to the evolving body of knowledge about the mediating role of continuance intention to use the Internet on the relationship of satisfaction and information value on students’ academic performance. The finding of this research can help educators to advice their students to use Internet appropriately for academic purpose especially for students with low academic performance and grades to improve their academic performance.

6 Limitations and future research

This study was conducted on undergraduate students at one university in Jordan, which would limit the generalizability to other contexts. Therefore, future research can investigate other demographic groups, for example, employees or students from different year levels (or postgraduates). Besides, future research can address cultural differences to investigate if culture can influence continuance intention and academic performance. Furthermore, future research can be applied across different countries to compare and contrast the findings considering contextual factors peculiar for each country or region. This research only focused on four integrating factors that would influence students’ academic performance. Thus, future research can investigate another variable, such as perceived enjoyment and perceived usefulness to enrich the current research. A noteworthy result is that against our expectation, Internet addiction is not a factor that determines academic performance. It can be suggested based on the literature that perceived enjoyment and emotional experience could affect Internet addiction. Therefore, further studies can examine the impact of Internet addiction with another group of variables to identify its effect on academic performance.

Code availability  (Not applicable)

Data availability  (Not applicable)

Declarations

Conflict of interest  All author has participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version. This manuscript has not been submitted to, nor is under review at, another journal or other publishing venue.

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