The role of new media literacy in shaping online learning satisfaction: Evidence from Egyptian universities

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ABSTRACT

The pervasive adoption of online learning in educational systems worldwide has resulted in delivering this learning to digital natives, today’s university students. In this context, it is crucial to acknowledge the significance of students’ satisfaction in determining the success or failure of online learning. This study examines the impact of the four New Media Literacy (NML) dimensions on students’ satisfaction with online learning (SOL). A total of 640 university students from four universities in Egypt were included in the data collection process. The findings derived from structural equation modelling revealed that the four dimensions of (NML), namely functional consumption, critical consumption, functional prosumption, and critical prosumption, exhibited statistically significant and positive impacts on students’ (SOL). The primary determinant of students’ (SOL) was functional consumption. The results yield noteworthy practical implications for stakeholders involved in formulating strategic goals to enhance the efficacy of online courses.

Keywords: new media literacy, students’ satisfaction, online learning, Egyptian universities.
INTRODUCTION

Universities’ pervasive adoption of online learning can be attributed to the implementation of the social distancing policy, as recommended by the World Health Organization (WHO), to mitigate the transmission of COVID-19 (Adedoyin & Soykan, 2023; Al-Rahmi et al., 2022). The COVID-19 pandemic has necessitated the transition to online learning for many universities across 190 nations (Xu & Xue, 2023) without a clear understanding of its efficacy (Hadavi & Wakefield, 2021).

Online learning presents many advantages, including heightened accessibility to educational materials, improved educational efficacy, and reduced financial burdens associated with education and training (Tran-Duong, 2023). Moreover, proper content delivery, standardization, self-paced learning, interactivity, and enhanced convenience (Elshami et al., 2021; She et al., 2021). Students have more control over the content and learning time based on their individual learning needs and autonomy (She et al., 2021).

On the other side, online learning is associated with several disadvantages, such as a lack of interpersonal motivation, time management, limited resource availability, and technical difficulties (Bolliger & Halupa, 2012; Xu & Xue, 2023); inadequate digital devices, particularly for students residing in rural areas or from low-income families (Coman et al., 2020), a dearth of practical knowledge and poor academic performance (Xu & Xue, 2023), anxiety associated with computer use (Bolliger & Halupa, 2012), education quality concerns (Dziuban et al., 2015). In this context, Egyptian students have longed for their universities and in-person interactions with their professors. Furthermore, examination methods were deemed unsatisfactory (Basuony et al., 2021).

Within the framework of developing countries, in particular rural areas, a notable deficiency exists in the quality and quantity of online materials and resources, mainly attributed to a lack of digital infrastructure, poor Internet connections, and incompatibility between online learning platforms and digital devices (Xu & Xue, 2023). In Egypt, internet access in urban areas was 81%, compared to 68.1% in rural areas (Statista, 2023). Furthermore, 6 out of 10 university students live in rural areas (THE WORLD BANK, 2023).

Despite students in the online course consistently scoring higher on the final exam than those in the lecture course, they expressed lower satisfaction levels (Rivera & Rice, 2002); therefore, assessing the degree of student satisfaction is one of the primary indicators for determining the quality of online learning, which is used to determine whether the advantages of online learning outweigh its disadvantages (Xu & Xue, 2023). According to Bolliger and Halupa (2012), student satisfaction is among the five fundamental principles of quality in online learning, alongside learning effectiveness, access, faculty satisfaction, and institutional cost-effectiveness. The degree of satisfaction derived from online learning is crucial in promoting effective educational processes since a positive association exists between students’ satisfaction, engagement, academic achievements (Elshami et al., 2021; Hadavi & Wakefield, 2021), learning outcomes (Eom et al., 2006), leading to higher levels of motivation and overall success (Bolliger & Halupa, 2012; She et al., 2021). Satisfaction assessment is a significant determinant in evaluating the quality of online educational programs (Xu & Xue, 2023). Additionally, it measures the effectiveness of online learning (Basuony et al., 2021; She et al., 2021).

Student satisfaction is influenced by various aspects, including technical challenges that have been found to diminish satisfaction levels (Dziuban et al., 2015; Elshami et al., 2021). According to Bolliger and Halupa, (2012), computer-related problems, difficulties in understanding online media, and anxiety associated with technology reduce student satisfaction. In addition, She and others (2021) found that technical issues, insufficient technical skills, limited interactions, lack of motivation, limited accessibility, and high costs associated with Internet usage negatively impact students’ satisfaction with online learning. Students engaged in online learning must possess the necessary digital skills to succeed in this learning mode, such as computer literacy, Internet navigation competencies, and effectively utilizing various digital devices (Bolliger & Halupa, 2012).

With the spread of online learning, numerous studies have been conducted to explore students’ satisfaction with online learning (Basuony et al., 2021; Bolliger & Halupa, 2012; Dziuban et al., 2015; Elshami et al., 2021; Eom et al., 2006; She et al., 2021; Xu & Xue, 2023); Additionally, a body of research examines media literacy’s role in online learning. This includes studies that measure new media literacy levels among online learners (Zafer Can Ugurhan et al., 2021), and explore the impact of media literacy on effective online learning outcomes (Tran-Duong, 2023). Furthermore, the role of media literacy (Akcayoglu & Daggol, 2019), and digital media literacy (Nasr, 2020) in English language learning
has been investigated. The significance of media literacy in online learning during the COVID-19 pandemic has also been examined (Hidayat, 2021), along with the contribution of online learning to developing learners’ media literacy skills (Crosby, 2019).

The empirical emphasis given to studies investigating the impact of new media literacy on students’ satisfaction with online learning has been limited. Considering this, this research examined the relationships between students’ new media literacy and their satisfaction with online learning. The correlation between new media literacy and university students’ satisfaction may differ in developing countries, such as Egypt, which has inadequate digital infrastructure, limited resources, and poor Internet access; therefore, the present study can assist educational administrators and stakeholders in developing a better context for enhancing the online learning environment.

Consequently, the present study addresses the following research questions to accomplish the study’s overall objective.

1. Do university students’ new media literacy skills (Functional Consumption, Critical Consumption, Functional Prosumption, and Critical Prosumption) impact their satisfaction with online learning?
2. Which dimension of new media literacy predicts university students’ satisfaction with online learning?

The purpose of this study is to evaluate the relationship between university students’ new media literacy (NML) and their satisfaction with online learning (SOL) using the following specific aims:

3. Examine the relationship between Functional Consumption (FC) and SOL.
4. To investigate the connection between Critical Consumption (CC) and SOL.
5. Determine the relationship between Functional Presupposition (FP) and SOL.
6. To investigate the connection between Critical Presumption (CP) and SOL.
7. Determine which NML dimension best predicted the SOL.

The subsequent sections of this paper are structured as follows: the next section presents the literature review, followed by the study’s hypotheses and methodology. The next section details the results and discusses the findings, recommendations, further research, and conclusion.
the abilities and knowledge required to access digital media, understand, and create digital content (Park, 2012). Conversely, new media literacy is a broader term that extends beyond the skills associated with digital media literacy. According to Celik, Muukkonen, and Dogan (2021), and Tran-Duong, (2023), the concept encompasses critical engagement with all forms of digital media. Furthermore, based on Chen, Wu, and Wang’s (2011) research, new media literacy can be understood through two distinct continua: consuming and functional to critical literacy. Consuming media literacy encompasses a range of essential technical skills required to access and consume media content (Lin et al., 2013). While prosuming media literacy refers to the technical skills necessary for producing and creating media content by utilizing preexisting technology tools (Chen et al., 2011; Koc & Barut, 2016; Lin et al., 2013). Additionally, media literacy extends beyond technical abilities. Functional media literacy, as conceptualized by Chen, Wu, and Wang (2011) and Koc and Barut, (2016), encompasses the using media tools within a particular social and cultural context to access, generate, and interpret media content at the textual level. On the other hand, critical media literacy entails examining, assessing, and comprehending media messages across various contextual dimensions. The critical dimension is based on the functional aspect, as it requires individuals to know new media’s technical or operational qualities to comprehend its sociocultural context (Tran-Duong, 2023; Zafer Can Ugurhan et al., 2021).

Using the consumer-prosumer and functional-critical media literacy continuums, we can identify four categories of new media literacy:

1. A functional consumer of new media can access and comprehend media content.
2. A critical media consumer analyses media content within its social, economic, political, and cultural context, aiming to comprehend the sociocultural aspects of media, such as its formation, social values and concepts, and purpose.
3. A functional prosumer creates new content and participates in various new media environments.
4. A critical prosumer understands their participation in media production, publication, and consumption.

They can effectively integrate their social values into their media production and make productive use of media messages (Chen et al., 2011; Koc & Barut, 2016; Tran-Duong, 2023).

A functional consumption in online learning

Functional consumption literacy focuses on developing technical skills that enable consumers to engage in activities such as efficiently accessing, gathering information, and utilizing diverse media resources (Zafer Can Ugurhan et al., 2021) and comprehending media messages (Lee et al., 2015). Being a functional consumer in online learning means you can navigate digital platforms, obtain access to online course materials, easily retrieve these materials, and assimilate information offered in multiple formats, such as text, audio, video, and interactive content. Access to technology increases the quality and quantity of information available to students (e.g., supplementary course content, video or audio files, peer-to-peer information exchange, etc.) (Johnson et al., 2008).

A fundamental principle of most learning theories is that the efficacy of learning is enhanced when students can interact effectively with course content, their peers, and their instructor; in an online learning environment, these interactions can be challenging because they are mediated by information technology (Johnson et al., 2008). To effectively learn, students must be able to utilize technology to facilitate these peer connections. According to Eom et al., (2006), university students’ easy access to and use of online course websites positively impacts learning outcomes. Students’ proficiency with digital devices (e.g., computers, laptops) allows them to navigate the course environment successfully, leverage the communication tools to their advantage, maximize the quality of communication and learning, and be more satisfied with their experiences (Johnson et al., 2008). Besides the impact of internet availability on student performance, there is a significant positive correlation between internet access, connection quality, speed, and student satisfaction (Basuony et al., 2021).

Additionally, students’ easy access to media is a critical predictor of satisfaction (Al-Rahmi et al., 2022); moreover, in a study conducted by (Butt et al., 2023), it was found that students who utilize online education technology exhibit higher levels of satisfaction with the services provided by the technology, perceiving it as an optimal means of fulfilling their educational requirements. Therefore, it can be hypothesized that: **H1**: Functional consumption skills significantly impact university students’ satisfaction with online learning.
Critical media consumption in online learning

Critical consuming literacy refers to media consumers’ ability to analyze and comprehend media content’s social, economic, political, and cultural contexts (Lee et al., 2015). Critical media individuals can proficiently evaluate information from various sources by considering the information’s authorship, purpose, and perspective (Zafer Can Ugurhan et al., 2021). Additionally, they can determine the underlying objectives and perspectives that shape the information and assess the sources’ credibility and reliability (Hobbs, 2010; Hobbs & Moore, 2013; Zafer Can Ugurhan et al., 2021), and the message’s usefulness (Lee et al., 2015). Critique stereotypes, ideologies, and values engage with media thoughtfully and discerningly, analyze and evaluate media content, and explore media’s impacts and applications (Kellner & Share, 2005).

Furthermore, the integration of the Internet and media has resulted in a plethora of educational resources, offering individuals numerous avenues for learning. Nevertheless, consumers must be more critical when assessing online content (Silvhiany et al., 2021). According to Namjaidee and Dhammapissamai, (2022), the abundance of internet sources can be overwhelming and requires users to be more cautious when analyzing online information. Online content evaluation requires rigorous source investigation, context awareness, digital abilities, and a complete understanding of the Internet and the digital world (Polizzi, 2020).

On the one hand, most university students are highly proficient in utilizing major social media platforms, showcasing their technological prowess. In contrast, concerning understanding the functioning of the internet as an information system, students tend to use search engines uncritically (Wittebols, 2020).

Students who are media literate can make educated judgments, comprehensively understand the many attributes of different content and services, effectively utilize the wide range of opportunities offered by evolving communication technologies, and make reasoned decisions using technology (Kay & Greenhill, 2010). Therefore, students need critical online information literacies to navigate and utilize information in the digital age (Leeder, 2019) (McDowell & Vetter, 2020).

Additionally, Critical consumption positively affects students’ perceived learning outcomes (Tran-Duong, 2023). Moreover, critical consumption empowers students to assess course structure and design, ultimately improving academic achievement and overall student satisfaction (Kauffman, 2015). Hence, it is hypothesized that: H2: Critical consumption skills significantly impact university students’ satisfaction with online learning.

A functional prosumption in online learning

Functional prosumption literacy entails several technical competencies related to the dual production and consumption processes. Practical prosumption skills refer to the technical knowledge required to produce and distribute media content and replicate and reproduce various media forms, such as text, image, audio, and video (Lin et al., 2013). Functional prosumption skills include signing up for a social media platform, sharing and disseminating messages created by others on multiple platforms, and creating media content (Lee et al., 2015; Zafer Can Ugurhan et al., 2021).

According to Ramirez-Velarde et al., (2014), the active participation of students in creating their learning materials enhances the learning process by fostering greater engagement, motivation, and interaction among students. Furthermore, McGarr, (2009) stated that students tend to acquire more knowledge and skills by creating educational podcasts, not just consuming them. This is because it encourages them to learn more about the topic, enhances their digital skills, facilitates learning, and makes the classroom a positive environment. Therefore, it is deduced that: H3: Functional prosumption skills significantly impact university students’ satisfaction with online learning.

A critical prosumption in online learning

Critical prosumption literacy entails the comprehension of media content and participation in media activities actively and thoughtfully. This includes interactive involvement in new media and producing material with a critical mindset (Lee et al., 2015; Zafer Can Ugurhan et al., 2021). Hence, the findings by Zafer Can Ugurhan and colleagues (2021) suggested that students are more proficient in consuming media messages than their prosuming abilities. Specifically, they demonstrated the highest level of skill in consuming media messages, while their skills in critically prosuming such messages were found to be less developed. Additionally, many students had difficulty evaluating the YouTube videos as part of their homework and encountered difficulties comprehending the material in a lengthy movie (Silvhiany et al., 2021).
However, today’s university students are millennials or Generation Z and have grown up with technology; we may believe that our online students have a higher level of digital literacy and technological savvy that surpasses our own. However, they may lack the media literacy skills necessary for success in online courses (Crosby, 2019). Moreover, when students could write, audio or video record their assignments, they only opted for written responses. Consequently, they missed out on an opportunity to enhance their competency in media literacy (Crosby, 2019). According to Wiley et al., (2017), students who produce educational resources, such as generating images and sharing them on social networking platforms to elucidate course topics and creating tutorial videos for specific assignments, have demonstrated enhanced academic performance. And this is a critical predictor for students’ satisfaction (Butt et al., 2023). Hence, it is proposed that: H4: Critical prosumption skills significantly impact university students’ satisfaction with online learning.

The proposed theoretical model

The self-proposed model explains the proposed relationship between university students’ new media literacy and their satisfaction with online learning (Fig. 1). The study’s model also suggests a significant relationship between students’ new media literacy dimensions (Functional Consumption, Critical Consumption, Functional Prosumption, and Critical Prosumption) and students’ online learning satisfaction (H1 to H4).

![Figure 1. The conceptual framework of new media literacy impact on satisfaction with online learning](image)

Conducting the relevant study under the proposed model is significant in Egypt for four reasons. First, Egypt is currently experiencing a growing interest in online learning, but it is still in its early stages, especially compared to Western nations (El-Sayad et al., 2021). Second, the quality of Higher Education in Egypt is decreasing, leading to crowded classes, and the decrease in resources has highlighted the need for online learning adoption (El Gamal & Abd El Aziz, 2012). Thirdly, youths are highly engaged with digital media, such as social media, blogging, video games, and smartphones (Kahne et al., 2012). Fourth, in educational settings, media literacy is considered a tool for empowerment. It underlines that young people should be intelligent, adaptable, and dynamic as media consumers and creative producers (Nasr, 2020). Therefore, university students’ media literacy level affects their online learning satisfaction. The assumption is that university students’ satisfaction with online learning increases according to their proficiency with new media.

METHODS

Methodology and sample scope

From March to May 2023, an online survey was conducted and distributed to university students via multiple social media groups (including WhatsApp, Facebook, and Telegram). The sample was then expanded using the snowball sampling procedure, in which previously identified participants were asked to refer to other suitable participants. The online form was completed by 640 undergraduate students enrolled in various academic programs and degree levels, ranging from first-year to final-year students from four public and private universities across several Egyptian regions; the study aimed to capture a comprehensive representative sample of Egyptian university students with varying socio-economic backgrounds and educational experiences by targeting this diverse range of institutions.

The respondents were informed of the purpose of the study before their participation and were encouraged to participate voluntarily with the assurance of confidentiality (Nijhawan et al., 2013). Moreover, participants knew they could withdraw at any point before submitting the questionnaire. They consented to participate without further repercussions by completing and submitting the questionnaire. Table 1 provides a summary of the characteristics of the sample.

Questionnaire and measures

The questionnaire was structured into three sections: The first section focused on gathering demographic information, as presented in Table 1. The second section consisted of a 15-questions to measure students’ satisfaction. The researcher wrote these questions based on the works of Bolliger and Halupa, (2012), and Elshami et al., (2021). The alpha value for students’
satisfaction with the online learning scale is 0.866. The
sample item is “Students’ Interactions in online courses
are greater than lectures on campus” (see Appendix).
Lastly, the third section encompassed the constructs of
the new media literacy scale, which were based on the
work of Koc and Barut, (2016); this scale includes four
factors (Functional Consumption, Critical
Consumption, Functional Prosumption, and Critical
Prosumption) with 35 items. The alpha values for new
media literacy dimensions were (0.765, 0.945, 0.885,
and 0.938) respectively. The sample item is “I can use
search engines to find relevant information” (see
Appendix). A 5-point Likert scale was used for this
study, ranging from 5 (strongly agree) to 1 (strongly
disagree).

Table 1. Demographic statistics of participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Item</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>325</td>
<td>50.8</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>315</td>
<td>49.2</td>
</tr>
<tr>
<td>Type of online courses</td>
<td>Video</td>
<td>325</td>
<td>46.4</td>
</tr>
<tr>
<td></td>
<td>Audio</td>
<td>156</td>
<td>22.3</td>
</tr>
<tr>
<td></td>
<td>Text</td>
<td>178</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>Live meetings</td>
<td>41</td>
<td>5.9</td>
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<td>University</td>
<td>Minia</td>
<td>310</td>
<td>48.5</td>
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<td></td>
<td>Beni Suef</td>
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<td>17.5</td>
</tr>
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<td></td>
<td>Sohag</td>
<td>123</td>
<td>19.2</td>
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<td>Nahda</td>
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<td>Type of university</td>
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<td>85.2</td>
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<tr>
<td></td>
<td>Private</td>
<td>95</td>
<td>14.8</td>
</tr>
</tbody>
</table>

DATA ANALYSIS AND RESULTS

Table 2. Descriptive analysis

<table>
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<tr>
<th>Construct</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>SD</th>
<th>Kurtosis</th>
<th>Skewness</th>
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<td>SOE</td>
<td>3.178</td>
<td>3.100</td>
<td>2.400</td>
<td>3.800</td>
<td>0.349</td>
<td>-0.471</td>
<td>0.221</td>
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<td>FC</td>
<td>4.304</td>
<td>4.290</td>
<td>3.290</td>
<td>5.00</td>
<td>0.438</td>
<td>-0.258</td>
<td>-0.452</td>
</tr>
<tr>
<td>CC</td>
<td>4.145</td>
<td>4.360</td>
<td>2.090</td>
<td>5.00</td>
<td>0.726</td>
<td>0.895</td>
<td>-1.115</td>
</tr>
<tr>
<td>FP</td>
<td>4.562</td>
<td>4.710</td>
<td>3.000</td>
<td>5.00</td>
<td>0.501</td>
<td>0.879</td>
<td>-1.224</td>
</tr>
<tr>
<td>CP</td>
<td>4.112</td>
<td>4.300</td>
<td>2.950</td>
<td>5.00</td>
<td>0.572</td>
<td>-0.981</td>
<td>-0.413</td>
</tr>
</tbody>
</table>

Prosumption

The model measurement assessment

To examine the study’s model measurement, Kaiser-
Meyer-Olkin and Bartlett’s tests were run to check the
model’s suitability for factor analysis. The KMO value
was 0.730, and Bartlett’s test of sphericity [(1902.375),
(p < 0.000)] was significant, indicating that the factor
analysis was acceptable. The study also ran the Cronbach’s alpha (CA) test and composite reliability
(CR) techniques to determine the data reliability.

SPSS software and partial least squares-structural
equation modeling (PLS-SEM) were used to analyze
and test the hypotheses; PLS-SEM is a component-
based estimation method that allows us to estimate
complex cause-effect relationship models with latent
variables (Hair et al., 2019). The following sections
describe the applied analyses and methods.

Descriptive analysis

The measurements acquired to conduct a descriptive
analysis of the model’s variables are presented in Table
2. It shows that FC (Functional Consumption) had a
mean value of 4.304 and a standard deviation value of
0.438; for CC (Critical Consumption), 4.145 was
obtained as the mean, and 0.726 was the standard
deviation value. Moreover, for FP (Functional
Prosumption), the mean value was 4.562; for standard
deviation, the value was 0.501. CP (Critical
Prosumption) was seen to have a mean value of 4.112
and a standard deviation value of 0.572. The mean value
computed for SOL (Satisfaction with Online Learning)
was 3.178, and the standard deviation computed was
0.349. It means that the coefficient of variation (CV =
Mean/Std Dev) is not too high, and the data are not very
scattered, which indicates the authenticity of the
responses. Furthermore, the calculated skewness values
suggest the data followed a normal distribution. The
curtosis values obtained were below 10, while the
skewness values ranged from -3.0 to +3.0. Indicating
significant ranges for determining normality.
Table 3. The reliability and convergent validity results

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Loading</th>
<th>CA</th>
<th>CR</th>
<th>AVE</th>
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<tbody>
<tr>
<td>Functional Consumption (FC)</td>
<td>FC01</td>
<td>0.761</td>
<td>0.765</td>
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<td>FC02</td>
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<td>FC03</td>
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<td>FC04</td>
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<td></td>
<td>FC07</td>
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<td>Critical Consumption (CC)</td>
<td>CC01</td>
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<td>0.945</td>
<td>0.950</td>
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</tr>
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<td>CC02</td>
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<td>CC03</td>
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<td>CC05</td>
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<td>CC11</td>
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<td></td>
<td>CP05</td>
<td>0.893</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP06</td>
<td>0.828</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP07</td>
<td>0.853</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP10</td>
<td>0.729</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction of Online Learning</td>
<td>SOL01</td>
<td>0.629</td>
<td>0.866</td>
<td>0.896</td>
<td>0.521</td>
</tr>
<tr>
<td>(SOL)</td>
<td>SOL02</td>
<td>0.731</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOL03</td>
<td>0.621</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOL05</td>
<td>0.670</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOL07</td>
<td>0.747</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOL08</td>
<td>0.812</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOL10</td>
<td>0.878</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOL13</td>
<td>0.658</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Loadings: Factor loadings; AVE: Average variance extracted

Table 4. The Heterotrait-Monotrait ratio (HTMT) test

<table>
<thead>
<tr>
<th>Construct</th>
<th>CC</th>
<th>CP</th>
<th>FC</th>
<th>FP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Consumption (CC)</td>
<td>0.484</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical Prosumption (CP)</td>
<td>0.594</td>
<td>0.692</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional Consumption (FC)</td>
<td>0.511</td>
<td>0.699</td>
<td>0.728</td>
<td></td>
</tr>
<tr>
<td>Functional Prosumption (FP)</td>
<td>0.347</td>
<td>0.644</td>
<td>0.792</td>
<td>0.492</td>
</tr>
</tbody>
</table>
The criteria used to measure the factor loading and the reliability stated that each measure should have values of ≥ 0.60; all constructs achieved values ranging between 0.765 and 0.945 for CA – moreover, all constructs achieved values ranging between 0.838 and 0.950 for CR. As a result, the model of this study is consistent and reliable. As shown in Table 3, the analysis confirmed the model’s reliability and showed that the two measures had acceptable values, confirming the convergent validity. According to Hair et al., (2019), convergent and discriminant validities are vital for running validity testing, and the average variance extracted (AVE) should contain values of ≥ 0.50.

Further analysis was conducted to ascertain the validity of the discrimination using the Heterotrait-Monotrait ratio (HTMT) test of correlations. The criterion for assessing the validity of discrimination should yield values of less than 1 (Henseler et al., 2015). Table 4 revealed all admissible HTMT values and confirmed the discriminant validity.

Hypotheses testing

A structural equation model and PLS-SEM with maximum possibility estimates were used to validate the proposed hypotheses and evaluate relationships between the theoretical constructs. The following section presents the discussions based on the research hypotheses mentioned above.

As shown in Table 5 and highlighted in Figure 2, The first hypothesis (H1) examined the proposed relationship between functional consumption (FC) and students’ satisfaction with online learning (SOL). Students with functional consumption skills can seek and obtain course-related information, which improves their understanding and motivation to learn and follow their online courses, thereby enhancing their satisfaction. Thus, the results revealed a positive significant impact of FC on SOL ($\beta = 0.776, p < 0.000$).

The findings of this study align with previous research that has demonstrated a correlation between functional consumption literacy and students’ academic outcomes in online learning environments (Tran-Duong, 2023). The findings of this study align with previous research that has demonstrated a correlation between functional consumption literacy and students’ academic outcomes in online learning environments (Tran-Duong, 2023). This finding is also supported by the work of Al-Rahmi et al., (2022), and Basuony et al., (2021), who found that students’ proficiency in accessing the Internet and utilizing digital devices positively influences their satisfaction with online learning.

Furthermore, the study proposed a significant positive impact of critical consumption (CC) on students’ satisfaction with online learning (SOL) (H2). The findings revealed the positive significance of CC on SOL ($\beta = 0.073, p < 0.005$). This result remained consistent with the findings reported by Tran-Duong, (2023), which indicated that critical consumption competency had significant positive effects on perceived learning outcomes; consequently, this effect ultimately resulted in increased levels of student satisfaction, as previously seen by Hadavi and Wakefield, (2021).

The third hypothesis (H3) proposed a positive impact of functional prosumption (FP) on (SOL). The results validated this proposed hypothesis as we found (FP) is positively associated with (SOL) ($\beta = 0.263, p < 0.000$), which is also consistent with the results highlighted by early research, indicating that functional prosumption positively impacts learning outcomes (Tran-Duong, 2023). According to McGarr, (2009), students who create educational podcasts enhance their digital skills and facilitate learning. Moreover, Ramirez-Velarde et al., (2014) discovered that students’ participation in creating educational materials enhances their interaction and motivation, resulting in greater satisfaction with online learning.

Table 5. Structural model assessment

<table>
<thead>
<tr>
<th>H</th>
<th>Path</th>
<th>$\beta$</th>
<th>T-Value</th>
<th>P-Value</th>
<th>R$^2$</th>
<th>Q$^2$</th>
<th>$f^2$</th>
<th>CI (LL, UL)</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>FC $\rightarrow$ SOL</td>
<td>0.776</td>
<td>15.757</td>
<td>0.000</td>
<td>0.593</td>
<td>0.291</td>
<td>0.517</td>
<td>0.679, 0.871</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>CC $\rightarrow$ SOL</td>
<td>0.073</td>
<td>2.805</td>
<td>0.005</td>
<td></td>
<td></td>
<td>0.009</td>
<td>0.118, 0.018</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>FP $\rightarrow$ SOL</td>
<td>0.363</td>
<td>6.389</td>
<td>0.000</td>
<td></td>
<td></td>
<td>0.116</td>
<td>0.465, 0.249</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>CP $\rightarrow$ SOL</td>
<td>0.386</td>
<td>8.895</td>
<td>0.000</td>
<td></td>
<td></td>
<td>0.191</td>
<td>0.296, 0.468</td>
<td>Supported</td>
</tr>
</tbody>
</table>
Finally, the study proposed a positive impact of Critical Prosumption (CP) on (SOL) (H4). The findings confirmed the positive relationship proposed here ($\beta = 0.386$, $p < 0.000$). This result consisted of what Tran-Duong, (2023) demonstrated, that critical prosumption was the most powerful and significant influence on student learning outcomes in the online learning environment.

Additionally, it aligns with the findings of Wiley et al., (2017), who indicated that students’ generating images and sharing them on social networking platforms to elucidate course topics and create tutorial videos for specific assignments improved academic performance.

Furthermore, several studies have scrutinized students’ satisfaction with online learning in the Arab world (Alqurashi, 2019; Basuony et al., 2021; Elshami et al., 2021; El-Sayad et al., 2021). Nevertheless, they all contended that online learners should understand the technological tools and platforms utilized in the online learning environment. This inquiry pertains to the adverse effects of technical disabilities on students’ satisfaction levels.

There is a scarcity of research examining the correlation between new media literacy and students’ satisfaction with online learning, particularly in the context of the Arab world, notably Egypt, where online learning has emerged as a novel phenomenon since the outbreak of COVID-19.

**DISCUSSION**

This study aimed to explore the effect of new media literacy on university students’ satisfaction with online learning. Overall, factors of new media literacy (functional consumption, critical consumption, functional prosumption, and critical prosumption) significantly positively affected students’ satisfaction with online learning. The $R^2$ value of 0.593 suggests a modest effect size of new media literacy on online learning satisfaction. Specifically, students with a greater degree of new media literacy are more inclined to experience satisfaction with their online learning endeavors. This result may be attributed to students’ ability to proficiently utilize their abilities to navigate online courses efficiently, critically assess and evaluate information, and engage with peers.

Furthermore, the $Q^2$ value of 0.29 suggests a moderate predictive relevance regarding the influence of
new media literacy on students’ satisfaction with online learning; the model can account for approximately 29% of the variance in online learning satisfaction. This finding indicates that new media literacy significantly predicts satisfaction with online learning. In addition, the findings provide the following implications.

Firstly, functional consumption literacy focuses on developing technical skills that enable consumers to engage in activities such as accessing, gathering information, and utilizing diverse media resources efficiently (Zafer Can Ugurhan et al., 2021), and comprehending media messages (Lee et al., 2015), was found to be the most powerful predictor of students’ satisfaction with online learning. Based on this finding, students with greater abilities to participate, engage, access, assemble information, and utilize diverse devices are predicted to be more satisfied with their online learning. Functional consumption substantially impacts online learning satisfaction ($f^2 = 0.517$); this suggests that online learning platforms should prioritize constructing user-friendly platforms that provide students with the necessary features. This finding is consistent with the study by Wu, Tennyson, and Hsia (2010), which found that computer self-efficacy is a primary predictor of student learning satisfaction; additionally, according to Alqurashi, (2019) findings that proficiency in basic technology skills is required for students to effectively navigate and participate in learning activities within an online environment.

Secondly, the impact of critical consumption on satisfaction with online learning is statistically insignificant ($f^2 = 0.009$). This implies that students’ ability to assess the online learning course content critically does not substantially influence their satisfaction with the learning experience. This phenomenon may arise due to the ineffective utilization of critical thinking skills or the lack of adequately challenging and exciting material and pedagogy in online courses. Thirdly, the $f^2$ value of 0.116 indicates that functional prosomption has a negligible effect on students’ satisfaction with online learning; students who can actively participate in the online learning process by creating content, sharing ideas, and interacting with others are not significantly more likely to be satisfied with their learning experience. This could be because they cannot effectively utilize their prosumptive skills or the online learning platform does not provide sufficient participation opportunities. This finding aligns with the research conducted by Hobbs, (2010), which suggested that students need to understand how knowledge is constructed, represents reality, and expresses a particular perspective to take advantage of online educational opportunities.

Lastly, critical prosomption, exemplified by creation with a critical perspective (Lee et al., 2015), is the second factor influencing student satisfaction; the $f^2$ value of 0.19 indicates that the effect size of critical prosomption on online learning satisfaction is moderate; this finding aligns with what was suggested by Tran-Duong, (2023) that an effective online learning environment requires adequate assistance to enable students to engage critically and actively in new media platforms and generate unique content that effectively conveys their sociocultural values and beliefs actively and critically. In contrast to the findings presented in Crosby’s (2019) research, online learners may exhibit a higher level of technological proficiency than ours. However, they may lack the necessary media literacy skills to succeed in online courses.

To conclude, students who evaluate the course content critically and use their prosomption skills to create new content and share their ideas are more likely to be satisfied with their online learning experience. This may be because they can take a more active role in their learning and acquire knowledge in a more pertinent manner. Based on this result, students with a more remarkable ability to create media content, particularly with a critical understanding of embedded sociocultural values and ideology issues, are predicted to be more satisfied with their online courses. According to Tran-Duong, (2023), educators and educational administrators must enhance and foster students’ functional and critical consumption literacy to improve online learning outcomes.

Regarding limitations and future research, although this paper has discussed the literature on new media literacy (NML) and university students’ satisfaction with online learning (SOL) in Egypt, it is not without limitations, which are primarily related to the sample size, methodological approach, and data-collection period. Consequently, the generalizability of the results is restricted to the study participants. The participants did not represent a variety of disciplines or academic institutions. This suggests that the study’s findings may not apply to students in other disciplines or universities. Future research would benefit from examining the topic in different sectors and populations in addition to the extant findings. Future research could also investigate the relationship between student satisfaction with online learning and academic performance. This study examines the relationship between new media literacy...
and student satisfaction with online learning in Egyptian higher education institutions.

CONCLUSION

This study examined the relationship between students’ new media literacy and their satisfaction with online learning. Evidence of the positive significance of functional consumption, critical consumption, functional prosumption, and critical prosumption on the online learning satisfaction of university students. The current study increased knowledge of the factors that play a significant role in the online learning environment. In addition to its theoretical contributions, this study has considerable implications for formulating strategic plans to improve the efficacy of online courses within the expanding landscape of online programs in higher education. This study also provides valuable insights that can help administrators understand how to enhance the student experience in an online learning environment.

ACKNOWLEDGEMENTS

Data availability. Due to confidentiality concerns, the data supporting the findings of this study are not publicly available but are available from the corresponding author upon reasonable request.

Declarations. The author does not have any relevant financial or non-financial associations to declare.

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Crosby, C. (2019). Understanding online learners’ media literacy for effective training of online instructors. In Handbook of research on virtual training and mentoring of online instructors (pp. 1-19). IGI Global.


APPENDIX

Sample of SOL scale

SOL01: Students’ Interactions in online courses are more significant than lectures on campus.
SOL04: Online teaching leads to losing face-to-face contact with students (Recorded).
SOL06: I can access online courses at any time.
SOL08: I am satisfied with the online course tools and websites.
SOL13: Online teaching allows me to continue my studies during the Corona pandemic.

Sample of NML Scale

FC01: I can use search engines to find relevant information.
FC02: I am aware of media shifts and developments.
FC04: I am aware of explicit and implicit media messages.
CC05: Media messages often include their own opinions.
CC07: Can decide on the accuracy of media content.
CC11: Can avoid the risks and consequences of media content.
FP02: Use programs and applications to edit/edit media content (text, image, video, etc.).
FP05: I can share content and messages online.
FP06: I can comment on what others share online content.
FP07: I can evaluate or review what is posted online based on my interests.
CP01: I can influence the opinions of others through my social media posts.
CP04: I can build an online identity that matches my personal qualities.
CP10: Can develop original messages (videos, photos, etc.).