



The Roles of Artificial Intelligence Ethics and Media Literacy in Improving Responsible Digital Citizenship

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ABSTRACT

This research addresses the roles of AI ethics and media literacy (ML) in enhancing responsible digital citizenship (RDC). This study is limited to the Universities in the higher education sector in Jordan. Article report both direct and indirect effects and moderation was performed by ML. The sampling technique that was used in this study was purposive sampling. The study was conducted with 408 respondents, namely active digital learning and online communication university students and academic staff. Data analysis was done with the technique of structural equation modeling (SEM) to show the direct and indirect effects in the research model. The research results show that there is a direct and positive impact of AI ethics and ML on RDC. Additionally, there is a positive indirect effect of AI ethics on RDC via ML. To sum up, this research confirms the results of the earlier studies, which suggested direct and indirect implications in relation to responsible digital behavior in the digital environments. To foster ethical online engagement, critical information appraisal, and responsible technology use, AI ethics and media literacy are crucial. All of this has a profound impact on sustainable digital engagement and wellbeing. The novelty of this research is its research object. The higher education sector in Jordan was chosen as the focus for the study, as it is likely to be impacted by RDCs in the context of AI ethics and ML. RDC is very important to establish ethical, knowledgeable and sustainable digital societies.

Keywords: AI Ethics, Media Literacy, Responsible Digital Citizenship, Digital Awareness, Sustainable Digital Society

JEL Classifications: L82

1. INTRODUCTION

Artificial Intelligence technologies and digital media platforms have made a tremendous impact on communication systems, education, and social relations in today's society, especially in developing nations like Jordan (Culcasi, 2025). The use of AI in education, through its systems, digital communication, and automated learning platforms, is becoming more and more common in universities to enhance educational quality, institutional competitiveness, and student engagement (Winkel, 2025). Yet, alongside the digital technologies' growth have come the accompanying ethical issues of misinformation, fake news, algorithmic bias, privacy concerns, cyber manipulation, and irresponsible online activity (Anurogo et al., 2023). The challenges

have made RDC (Ethical, safe, informed and socially responsible use of digital technologies and online platforms in society) even more relevant. Even with the increasing digitalization, there is a lack of ethical awareness and low critical evaluation skills among university students in relation to information on the internet and AI-generated content (Hussain, 2025). This means that the challenge for higher education institutions is to foster ethical digital cultures that enable sustainable development of societies and responsible use of technology (Risteska, 2023).

AI ethics was chosen for this study as it embodies the principles of fairness, transparency, accountability, and responsible technological decision-making that govern AI-driven systems and digital environments (Valenzuela, 2025). The principles

of ethical use of AI are critical for minimizing negative online habits, safeguarding user rights, fostering trust among institutions, and ensuring responsible technology utilization (Tuneva, 2025). The reason why ML was chosen is that it helps people to critically interpret, analyze and verify digital information, which helps minimize their susceptibility to misinformation, digital propaganda, and manipulable online information (Maidee, 2025). The use of ML also enhances users' critical thinking skills and increases smart involvement in digital societies (Luttrell, 2020). Previous studies have explored aspects of AI ethics, ML, digital behaviour and online communication in isolation, but there are few integrated studies on the links between AI ethics and ML to RDC (Sumalapao and Millendez, 2025; Porlezza, 2023).

Ethical and societal implications of responsible online behavior have been overlooked in previous studies focused primarily on the adoption of technology, learning efficiencies in digital environments, and the use of AI (Risteska, 2023; Luttrell, 2020). A few studies investigated ML as a solution to misinformation, but did not incorporate the application of AI ethical considerations related to digital responsibility (Hidayatulloh et al., 2026). Likewise, while some research in the field of AI ethics addresses behavioural impacts on the university population, much more work tends to be directed towards organizational governance, algorithmic transparency, and technological accountability (Milenkova and Lendzhova, 2021; Trattner et al., 2022). Some scholars engaged in conceptual analysis of the concept of digital citizenship, but they hadn't performed empirical research into the direct impact of AI ethics and ML in developing countries contexts (Biagini, 2025; Huda and Hashim, 2026). In addition, there is little empirical evidence in the Middle East countries despite the swift digitalization and reliance on AI-integrated educational systems in the region (Luttrell, 2020). These restrictions expose significant theoretical, contextual and methodological gaps that need to be explored through an interdisciplinary approach.

The Jordanian Higher education context is deemed appropriate because the country has one of the highest internet penetration rates in the Middle East, and after the COVID-19 pandemic, significant investments in AI-based educational technologies have been made in the sector (Chiu et al., 2024). Universities play an important role in the country's development strategies, youth empowerment, and knowledge economy in Jordan (Salleh et al., 2023); hence they are among the most critical institutions that impact the preparation of future digital citizens and the ethical use of technological tools. However, the growing exposure to cyber risk, unethical use of AI, misinformation and irresponsible social media use by students has raised significant issues in society and education (Anurogo et al., 2023). Thus, universities were chosen as strategic settings in which the digital competencies, and ethical values and responsible communication behaviours are continuously cultivated and practiced.

The goal of this research is to look at the direct impact of AI ethics and ML on RDC and to assess the role of ethical technological practices and critical information evaluation in building sustainable digital societies. The importance of this study is that it brings together in a unique interdisciplinary perspective

digital citizenship theory and the intersection of AI ethics and media literacy. This study is unique because it is a non-separable integration of technological ethics, communication competency and social responsibility in the context of Jordanian higher education institutions that have not been addressed in previous studies. Moreover, this research provides theoretical enrichment, contextual expansion, and practical implications that can enhance the development of ethical online behavior, digital participation, and sustainable technological development in universities, policy makers and digital governance institutions.

2. THEORETICAL BACKGROUND

The theoretical foundation for this study is based on two theories, namely uses and gratifications theory (UGT) and ethical decision-making theory (EDM) that can describe the interaction between people and digital technology, interpretation of media content and the formation of responsible behaviour in the context of AI technology. According to UGT, people "use" media and technological systems because they choose them to satisfy their cognitive, social, informational, and psychological needs, not because they are being used by them (Katz et al., 1973). In the modern context of university settings, students are regularly being tasked with interacting with AI-empowered applications, social media sites, and algorithmic information systems for the purpose of attaining educational efficiency, social connectivity, and information accessibility (Culcasi, 2025). At the same time, the growing reliance on AI-generated information and digital media has also led to a heightened risk of misinformation, manipulated content, algorithmic manipulation and persuasion, and unethical communication practices (Chiu et al., 2024). Thus, UGT was chosen as it explains why students intentionally engage with digital media as well as how student interaction affects responsible digital citizenship outcomes. The theory also corroborates the importance of ML as people with higher levels of critical interpretation also exhibit more selective media consumption, verification behavior, and resistance to misleading digital content (Hristovska, 2023).

Previous research showed that ML boosts users' capacity to assess information credibility, detect narratives that are manipulated, and responsibly participate in online communities, all of which compliment the conceptual framework of this study (Winkel, 2025; Risteska, 2023). Moreover, scholars asserted that individuals with higher levels of ML demonstrated more ethical communication actions and awareness of digital responsibility, as they process information more critically, leading to better communication behavior online (Sumalapao and Millendez, 2025; Huda and Hashim, 2026). Likewise, AI ethics is closely connected to UGT as ethical technology systems can affect users' trust, satisfaction, and confidence in the processes of digital engagement (Tuneva, 2025). Improved engagement with AI systems that operate transparently, fairly, and with accountability and user interests at heart benefit individuals (Valenzuela, 2025).

Existing studies consistently found that positive experiences of user's perceptions of technological environments positively influenced the perceptions of credibility, online responsibility and quality of digital participation (Luttrell, 2020). Furthermore, EDM

offers a compelling theoretical basis for the current research since the theory addresses moral consequences and ethics in making moral evaluations before taking behavioral actions (Luttrell, 2020). The core elements of RDC involve ethical decision-making, ethical use of technology, and responsible action in digital contexts (Biagini, 2025). Hence, EDM was chosen as it elucidates the interaction between AI ethics and ML, in the context of ethical online decisions and responsible communication. AI ethics plays a crucial role in advancing ethical decision-making processes, fostering fairness, transparency, and accountability in digital interactions, and enhancing individual moral reasoning in technology usage (Chiu et al., 2024). At the same time, ML enhances ethical assessment by granting users with a critical consciousness more skills to identify harmful content, understand the potential dangers of misinformation, and prevent engaging in unethical online activities (Culcasi, 2025).

A number of previous studies found that these factors, i.e., ethical awareness and critical media interpretation, were found to significantly affect the digital responsibility, online participation quality and ethical communication behavior of university students (Trattner et al., 2022; Damanik et al., 2025). Other scholars also found that students who receive digital education with ethical values have higher accountability, safer communication practices, and more commitment to responsible use of technology (Murthy et al., 2026; Salleh et al., 2023). The combined use of the UGT and EDM theory is very suitable as both theories can be used to explain motivational media usage behavior and ethical evaluation processes that impact RDC. While UGT illuminates the factors behind active involvement in AI technologies and digital media, EDM sheds light on the ethical considerations that influence responsible behaviors in these contexts (Katz et al., 1973; Porlezza, 2023). Previously, these theories have not been studied in tandem in the context of AI ethics and ML in higher education settings in developing economies (Anurogo et al., 2023; Culcasi, 2025). Hence, the amalgamation of these theories greatly enhances the conceptual originality, interdisciplinary nature and explanatory power of this study, and forms a solid basis for studying the role of AI ethics and ML in responsible digital citizenship amongst university students in Jordan.

2.1. AI ethics and Responsible Digital Citizenship

The use of AI in higher education institutions has introduced new ethical challenges, such as the creation of algorithms that influence student learning and performance and the employment of artificial intelligence tools to evaluate student work, which are the basis of this study (Huda and Hashim, 2026). The four pillars of ethical AI discussed - transparency, fairness, accountability, and responsible governance of technologies – all affect the perception of and interaction with digital platforms by individuals (Sumalapao and Millendez, 2025). The ethical aspects of this are expected to enhance students' responsible use of the internet, as they exposed to less biased information, misinformation, and manipulated digital structures within the university environment (Chiu et al., 2024). Digital information access, analysis, evaluation, and creation is seen as a critical competency in which individuals can access, analyze, evaluate, and create digital information in an informed and responsible way (Hidayatulloh et al., 2026). It improves

cognitive processing of information online, as well as decreasing vulnerabilities to misinformation and digital manipulation (Winkel, 2025). In previous studies, the positive relationship between higher levels of ML and a more informed approach to digital communication environments, along with a more critical and ethical evaluation of media have been consistently found (Risteska, 2023; Tuneva, 2025). Therefore, RDC is understood as the result of ethical technological environments and high interpretative media skills in making safe, informed, and socially responsible digital behaviors (Maidee, 2025). Furthermore, empirical research indicates that the combination of ethical awareness and robust ML competencies contributes to a more responsible digital approach, trust in online systems, and positive social interactions within digital environments (Salleh et al., 2023; Valenzuela, 2025).

- H_1 : AI ethics positively affects RDC.

2.2. AI Ethics and Media Literacy

AI ethics is becoming a key construct that shapes behavioral orientations in digitally mediated environments, especially in higher education systems, where students engage with algorithmic platforms and communication tools that rely on AI with regularity (Luttrell, 2020). Technological legitimacy is influenced by ethical considerations like “transparency,” “accountability,” “fairness,” and “explainability,” and users' acceptance of digital systems is affected by these (Pangrazio and Sefton, 2021). If people believe the AI systems are ethical, and responsibly managed, they more likely to engage in trust-based patterns and positive digital interactions (Valenzuela, 2025). In school settings, these moral understandings are further encouraged by the adoption of moral policies and sound practices for integrating technology, which encourage equity and user security (Trattner et al., 2022). In addition, ML plays a crucial role in influencing users' ability to critically analyze digital content, assess its validity, and recognize misinformation in multifaceted online environments (Damanik et al., 2025). It enhances cognitive filter systems and empowers informed judgement in assessing digital narratives and AI-generated outputs (Huda and Hashim, 2026). Empirical evidence shows that people who have greater ML competencies are more likely to have analytical thinking abilities, share information responsibly, and be less vulnerable to deception (Luttrell, 2020; Murthy et al., 2026). The synergy between ethical AI systems and media literacy shapes a digital space conducive to fostering responsible behavioral tendencies and reinforcing the users' commitment to engaging safely and responsibly in the digital realm (Porlezza, 2023).

- H_2 : AI ethics positively affects ML.

2.3. Media Literacy and Responsible Digital Citizenship

However, in the modern digital world, where people are constantly bombarded with data from an ever-expanding array of digital platforms and social networks, and where AI plays a key role in the digital landscape, the cognitive and behavioural ability to manage one's own information has become a very important skill (Luttrell, 2020). It helps users access, interpret, evaluate, and critically

analyze digital content, which can enhance their skills of discerning credible information from misinformation and algorithmically manipulated narratives (Pangrazio and Sefton, 2021). ML serves as a protective factor to foster analytical thinking and critical judgment in online communication in contexts where information is abundant and artificial content is created (Chiu et al., 2024). Better evaluative skills, content verification behavior, and digital manipulation strategies awareness were found among individuals who have higher levels of ML (Sumalapao and Millendez, 2025). This competency is especially significant in educational settings where learners are often exposed to digital learning platforms, online forums, and AI-generated teaching content, where they must critically evaluate the trustworthiness and ethics of information sources (Biagini, 2025). Empirical studies show that ML can have a significant positive impact on responsible online behaviors, decreasing impulsive sharing and elevating ethical communication practices in the online world (Hussain, 2025). Moreover, it helps to foster reflective thinking habits that prompt users to reflect on the social implications of digital interactions before engaging in them, thereby promoting a sense of responsibility and ethical awareness (Tuneva, 2025). Thus, ML has been identified as a key enabling factor influencing the responsible use of digital media, supporting the cognitive evaluation process and encouraging the use of digital interactions that are socially responsible, ethical and informed (Salleh et al., 2023).

- H₃: ML positively affects RDC.

2.4. Mediating Role of Media Literacy

AI Ethics in digital ecosystems provides a framework for responsible technological interaction, ensures principles of fairness, accountability, transparency and human-centred governance are embedded in algorithmic and platform-based systems (Luttrell, 2020). The construction of user perceptions of legitimacy and trust in digital environments is guided by these ethical design principles, which in turn affect user reactions towards the technology-mediated communication, information exchange, and exchanges as a whole (Damanik et al., 2025). Reflective and socially responsible digital behaviour is more likely thanks to increased trust and system integrity in case of ethical governance of AI systems (Hristovska, 2023). As a complementary cognitive ability, ML improves citizens' ability to critically assess, interpret and evaluate digital content, thereby supporting them to make informed choices in online worlds where algorithmic curation and information distortion are prevalent (Winkel, 2025). This competency help users improve their capacity to detect misinformation, minimize cognitive bias, and make more deliberate information sharing decisions (Anurogo et al., 2023). This synergy is a positive reinforcement of digital behaviors, as the combination of ethically driven AI systems and robust ML capabilities promotes a harmonious integration of technology and critical evaluation skills among users (Valenzuela, 2025). Empirical studies indicate that this alignment can drive greater responsible interactions, lesser vulnerability to digital manipulation, and better ethical judgment in digital environments (Damanik et al., 2025). In this integrated context, ethical AI plays a role in regulating the behaviour of the system, whereas ML influences the individual cognitive reactions, and together supports

the outcomes of RDC (Risteska, 2023). Conceptual model used in the study is presented in Figure 1.

- H₄: AI ethics has an indirect positive effect on RDC, mediated through ML.

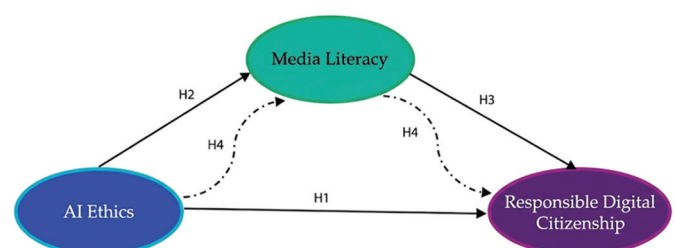
3. METHODS AND DATA

The method used for this study was exploratory and analyzed the implications and interaction between variables (Risteska, 2023). AI ethics and ML were treated as exogenous variables and RDC as endogenous variable. The conceptual relationship between the variables in the digital behavior frameworks was also explored. The research model was designed to explain the relationship between ethical technological principles and critical media evaluation skills with responsible online behavior among university students. The magnitude of relationships between constructs represented by the indicators was evaluated in the research process. This study was carried out in several universities in Jordan where digital transformation and AI-based learning systems have been high priority in academic and administrative processes. These institutions are highly dependent on digital platforms and are suitable settings to explore the behavioral outcomes of their ethical aspects and media. A Google Form was used for data collection to make it accessible and efficient. The study was structured using the existing conceptual models in literature and the theoretical components were incorporated via literature review (Salleh et al., 2023). Empirical interpretation and analysis is based on differences in findings, which may stem from contextual differences, differences in characteristics of the respondents and differences in digital maturity of the institutions.

3.1. Sampling

This study adopted purposive sampling method. Purposive sampling is a sampling method that involves selecting samples based on specific criteria that correspond to a specific research objective (Hidayatulloh et al., 2026). The sample size included students from a university who used digital learning environments as part of their activities. Eligibility criteria comprised at least 1.5 years university study experience, undergraduate and/or postgraduate university enrollment and regular use of digital learning platforms. A total of 520 respondents were found. Before final analysis, however, a screening process was carried out to ensure that data are accurate and that the data quality is good in terms of the quality of the response. Incomplete and inconsistent responses were filtered and 408 valid responses remained for final analysis. This process ensured reliability, validity and representativeness of the data set. The final sample was large

Figure 1: Conceptual model



enough to be used for SEM and hypothesis testing, and it yielded strong empirical evidence to support digital behavioral analysis.

3.2. Research Instrument

A structured questionnaire as the main data collection instrument was used in this study which contains 19 items (Table 1). The dimensions of Transparency, Accountability, Fairness, and Responsible AI Usage were used to measure the AI ethics (Porlezza, 2023, Luttrell, 2020). Content evaluation, information verification, critical interpretation, and digital awareness skills were used to evaluate ML (Chiu et al., 2024; Biagini, 2025). Ethical online behavior, safe digital interaction, information responsibility, and socially accountable participation (Winkel, 2025; Risteska, 2023) were used to measure RDC. There were 6 items each for AI ethics and Mlincluded, and 6 for RDC. The perceptions of the respondents were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The items were sent electronically using Google Forms for data collection and analysis to be efficient.

3.3. Data Analysis

The study was based on the SEM technique that was used to analyze the direct and indirect effects between the variables. This study employs variance-based SEM, a method that can be used to test the predicting effect of each variable. Variance-based SEM is a method to test the predictive relationship between constructs by seeing whether there is a relationship or influence between constructs (Luttrell, 2020). SEM is a regression model or path analysis approach that uses measurement models and structural models to analyze direct or indirect relationships of research variables (Porlezza, 2023). When the indirect effect of AI ethics on RDC was enhanced, ML was taken as the mediating variable. This is the first step of investigating outer loading research indicators, with a value of ≥ 0.6 or 0.7 (Biagini, 2025). The second step validates and reliability aspects measured through Cronbach's Alpha, Rho-a, and Composite reliability values of 0.7 or higher (Valenzuela, 2025). The third stage is checking the discriminant validity and cross-loading on the Fornell-Larcker criterion, also known as the average variance extracted (AVE)

value, which should be at least 0.5 greater than the cross-loading value (Anurogo et al., 2023). If indicators are valid, reliable and suitable to be indicators then the analysis moves to consideration of implications from the research model. The fourth step is the analysis of the coefficient of determination (R square) which is a maximum absolute value of 100%, to understand the variance of variance explained by the model (Damanik et al., 2025). Thus there is a strong correlation between the variables. The first stage of hypothesis testing in the fifth stage showed that the hypotheses could be accepted because P-values were below 5% and T-statistics were higher than the T-table, which indicated that the influences that were expected in the research formulation (Tuneva, 2025) were present.

4. RESULTS

4.1. Respondent Profile

The respondents of this study were 408. The respondents in this study are university students and their RDC behavior is explored from both the perspective of AI ethics and ML implications. The profiles of the respondents are given in the following Table 2. The respondents were divided into different clusters according to the year of study, academic level, educational background, age, sex and intensity of use of the Internet as shown in Table 2. The majority of the year of study is broken down as follows: 1st-2nd year (30%), 3rd-4th year (28%), 5th year and over (22%), and postgraduate (20%). The majority of the academic level are undergraduates (55%) and then post-graduates (45%). Most respondents have backgrounds in humanities and social sciences (39%) and business studies (33%), information technology (18%) and other (10%). In terms of age distribution, the dominant groups are 18-22 years (34%), 23-26 years (29%), 27-30 years (21%), and above 30 years (16%). As far as gender is concerned, male respondents make up 54% of the sample while female respondents make up 46% of the sample. Distribution of internet usage intensity is high (62%), moderate (25%) and low (13%). Data are representative of the research community and serve as a basis for analysis based on the model of variables as presented in Table 1. The following

Table 1: Research instrument with items

Variable	Indicators (Dimensions)	Sample questionnaire items	No. of items	Key references
AI Ethics	Transparency, Accountability, Fairness, Responsible AI Usage	(1) AI systems used in my learning environment operate transparently. (2) AI-based tools provide accountable decisions in academic tasks. (3) AI technologies are designed fairly without bias. (4) Ethical guidelines are followed in AI applications at my university. (5) I trust AI systems when they are used responsibly in education. (6) AI usage in my institution respects ethical standards.	6	
ML	Content evaluation, Information verification, Critical interpretation, Digital skills	(1) I critically evaluate online information before accepting it. (2) I verify digital content before sharing it on social media. (3) I can identify misleading or fake information online. (4) I understand how digital media influences opinions. (5) I compare multiple sources before trusting information. (6) I have strong skills in analyzing online content credibility. (7) I am aware of manipulation techniques used in digital media.	7	
RDC	Ethical online behavior, Safe interaction, Information responsibility, Digital accountability	(1) I behave ethically when using digital platforms. (2) I avoid spreading unverified information online. (3) I respect others' privacy in digital communication. (4) I use digital platforms responsibly for academic purposes. (5) I consider consequences before posting online content. (6) I follow ethical guidelines when interacting online.	6	

step is the interpretation of the results of the research based on the statistical data.

4.2. Statistical Results

The first step is the analysis of the research indicators on the outer loading values. This process involves examining the viability of indicators for each of the variables in the research model. Table 3 illustrates the outer loading: From Table 3, it is seen that all the loading of the outer correlates as a basis of information for the research model are considered suitable. All the indicators have an outer loading higher than 0.7. This outcome lead to all indicators being able to represent their respective variables in the analysis of research implications. Table 3 shows that all variables have appropriate values of Cronbach's Alpha, rho-a, composite reliability, and AVE value, meaning that all variables have reached the criteria of validity and reliability. This can be seen from Cronbach's Alpha, rho-a and composite reliability values, which

are all >0.8. The explanation for the determination effect between the mediating variable and endogenous variable is given in Table 3. As the mediating variable, ML can account for the relationship between AI ethics and RDC at the same time, accounting for a 52.3% variance. AI ethics and ML can collectively account for 52.3% of the variance to explain RDC. All entering construct variables affect both determination coefficients, both of which are in the moderate range. Therefore, there is still enough space to add other variables other than the research model.

In addition, the average variance extracted (AVE) values are greater than the threshold value of 0.5. Successful in the sense of AVE is that the AVE values are compared with the cross-loading values in the Fornell Criterion. The discriminant validity value is shown in the following Table 4: The Fornell cross-loading values are more meaningful than the AVE (average variance extracted) values (Table 4). This suggests that the data of study variables have met the criterion of discriminant validity. The research data, which is the basis of information, has been developed according to requirements in terms of valid and reliable. All the research indicators can continue with the proceeding process of hypothesis testing. The last step was to test the hypotheses, whose results are presented in Table 5.

As shown in Table 5 and Figure 2, all the variables are hypothesized as positively influencing the study. All the hypotheses (H_1 , H_2 , H_3) are accepted, and there is a positive relationship between the variables. The P-values are <0.05 while the T-statistic is higher than the T-table value, confirming the positive effect of AI ethics on RDC with the H_1 accepted. Accepted, suggesting that AI ethics positively impacts ML, with strong statistically significant results. The third hypothesis is accepted as the T-result obtained ($T = 9.642$) was higher than the T-table value ($T = 1.98$). The indirect relationship is also meaningful, with a T Statistic of 8.957 and $P < 0.05$, which means that the relationship between them was mediated by ML. The results validate the direct and indirect influence of RDC through AI ethics and AI interactions with ML,

Table 2: Respondent profile

Variable	Category	Percentage
Gender	Male	54
	Female	46
Age	18-22	34
	23-26	29
	27-30	21
	30+	16
	Humanities and Social Sciences	39
	Business	33
Academic level	Information Technology	18
	Others	10
	Undergraduate	55
	Postgraduate	45
	1 st -2 nd year	30
	3 rd -4 th year	28
Year of study	Final year	22
	Above final year	20
	Internet usage	62
Internet usage	High	62
	Moderate	25
	Low	13

Table 3: Measurement research model

Variables	Indicator	Outer loading	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted	R-square
Media literacy	ML1	0.721	0.822	0.835	0.871	0.576	0.523
	ML2	0.815					
	ML3	0.728					
	ML4	0.781					
	ML5	0.772					
	ML6	0.894					
AI ethics	AIE1	0.882	0.931	0.934	0.945	0.738	-
	AIE2	0.896					
	AIE3	0.823					
	AIE4	0.842					
	AIE5	0.891					
	AIE6	0.835					
	AIE7	0.876					
Responsible digital citizenship	RDC1	0.868	0.958	0.959	0.964	0.759	0.512
	RDC2	0.879					
	RDC3	0.871					
	RDC4	0.889					
	RDC5	0.792					
	RDC6	0.873					

respectively, underlining the significance of ethical technological settings and robust information assessment competencies on digital behavior results.

5. DISCUSSION AND IMPLICATIONS

Results of this study indicate that there is strong empirical evidence that AI ethics and ML are important factors affecting RDC among Jordanian university students. The first large scale finding validates the ethics aspect of AI having a positive impact on RDC. This is aligned with the arguments of Chiu et al. (2024) and (Risteska, 2023) that ethical governance of AI systems helps to build transparency, accountability, and trust in digital environments. Likewise, Luttrell 2020 and Tuneva 2025 stated that ethical AI systems help diminish negative digital activities and encourage accountable digital interactions. This finding also corroborates (Sumalapao and Millendez, 2025), who emphasized that ethical practices in AI enhance trust and responsibility of users in digital environments. This discovery is a bit counterintuitive to (Biagini, 2025), who reported that increasing awareness of ethical AI does not necessarily lead to behavioral change, and that the effects are context-specific depending on how much literacy skills are required, indicating differences in results. The second important finding is that AI ethics greatly improves the ML at the university level. This finding aligns with the findings of Hidayatulloh et al. (2026) and Culcasi (2025) that stated critical evaluation and interpretation of information is fostered in an ethical digital environment. It is also congruent with the findings of Huda and Hashim (2026) and (Anurogo et al., 2023) which revealed that structured digital ethics exposure enhances online content analysis and verification among users.

Furthermore, the results of the studies carried out by Valenzuela (2025) and Salleh et al. (2023) showed that ethical awareness

reinforces the cognitive filtering processes in using digital information. This result, however, is partially contradictory to (Damanik et al., 2025) who suggested that the development of ML has more education-based motivations than ethics-based motivations, suggesting a possible role of institutional context. This is shown by the third result that shows that ML positively affects RDC. Murthy et al. (2026) and (Trattner et al., 2022) highlight the importance of ML in fostering critical thinking and informed involvement in digital spaces. Likewise, Porlezza (2023) and Biagini, (2025) found that people with high scores on the ML scale tend to be more resistant to misinformation and behave more responsibly online. Also, Risteska (2023) and Winkel (2025) established the positive effect of ML on evaluative judgment and ethical communication practices. However, Culcasi (2025) proposed that the use of ML alone was not enough to guarantee ethical conduct in full measure unless backed up by an institutional measure, which somewhat defies the present findings. The fourth and most integrated finding showed that there is a strong indirect relationship between AI ethics and RDC via the mediation of ML. This is in line with theoretical explanations by Valenzuela (2025) and Pangrazio and Sefton (2021) that ethical digital systems indirectly affect behavioral outcomes by enhancing cognitive abilities. The same, Risteska (2023) and Damanik et al. (2025) proposed that ethical AI contexts have a positive impact on user learning processes, thereby positively affecting responsible digital behavior. Maidee (2025), and Luttrell (2020) also confirmed that ML is a mediator between ethical exposure and responsible action. Yet, Anurogo et al., (2023) and Winkel (2025) have suggested that the indirect effects can differ based on the digital maturity, implying context-sensitivity in the mechanism of behavioral transformation.

Overall, they are aligned to the previous interdisciplinary research and have also built on the current literature by combining AI ethics and ML in a comprehensive behavioral model. This study is different from previous fragmented research (Luttrell, 2020; Culcasi, 2025) because it illustrates how both ethical technological systems and critical media skills are linked to developing a responsible citizenship in the digital world in a developing country context. This holistic perspective helps to address the gaps in previous studies where ethics and literacy were studied separately, but not their joint behavioral impact (Hussain, 2025; Risteska, 2023). The results support the premise that RDC is not a monomodal phenomenon, but a multi-modal phenomenon that is the result of the interplay between ethical AI governance and ML skills in higher education contexts.

Figure 2: Research model implication value

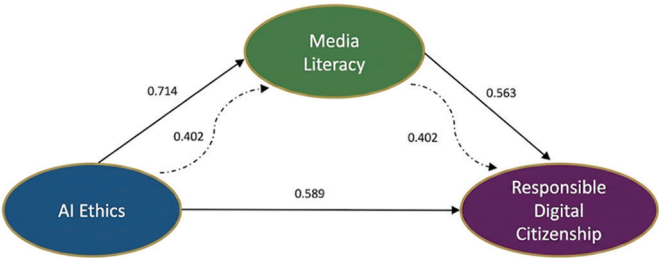


Table 4: Discriminant validity

Variables	RDC	AI Ethics	ML
RDC	0.762		
AI Ethics	0.714	0.861	
ML	0.698	0.589	0.874

Table 5: Hypothesis testing results

Hypothesis path	Relationship type	Beta (O)	T-statistic	P-value	Result
AI Ethics→RDC	Direct effect	0.589	13.084	0.000	Accepted
AI Ethics→ML	Direct effect	0.714	27.118	0.000	Accepted
ML→RDC	Direct effect	0.563	9.642	0.000	Accepted
AI Ethics→ML→RDC	Indirect effect	0.402	8.957	0.000	Accepted

this study, UGT is extended as a model since it is found that in an AI-driven environment, the use of digital platforms is not value neutral but it is active selection and use based on psychological and informational needs. Rather, AI ethics transforms the concept of gratification by incorporating fairness, transparency, and accountability into digital systems, which can impact user interactions with content. Another distinction that EDM makes is that it addresses what people consider moral consequences before they act online, reinforcing the model. This study extends EDM by adding media literacy as a cognitive ethical filter which could enhance ethical judgment within digital environments. Most of the previous studies have used these theories individually (Damanik et al., 2025; Huda and Hashim, 2026), while this study merges these theories into a single behavioral model. It shows that RDC is a result of motivational media use (UGT) and ethical reasoning process (EDM). The integration aims to resolve theoretical fragmentation problems observed in previous research (Sumalapao and Millendez, 2025; Luttrell, 2020), adding a comprehensive perspective on digital behaviour in the context of AI tools.

5.2. Practical Implications

The findings of this study have meaningful implications for higher education institutions, digital platform designers, and policy makers. Higher education institutions can incorporate the study of AI ethics into their courses to ensure that students are aware of the responsible use of AI systems. Digital platform designers have to factor in the ethical implications of AI systems when developing their platforms. Policy makers need to be aware of the ethical implications of AI systems, and make informed decisions on how to regulate and manage their use. More robust training in ML should help students recognize and assess information digitally and minimize misinformation risks. Jordanian universities and other settings in the developing world need to establish structured digital citizenship frameworks that integrate ethical understandings of AI with media evaluation abilities. For students, it is important to foster trust and responsible use of technology through transparency and fairness in AI tools for learning, as well as through workshops and digital literacy campaigns in academic institutions. These results also point to the need to integrate digital ethics into the higher education standards as a key competence of education policymakers. The study offers practical recommendations to enhance responsible digital practices in AI-driven learning contexts overall.

5.3. Social and Policy Implications

The study has social and policy implications in the new digital dependency era. Societally, by improving the ethical use of AI and ML, misinformation, cyber manipulation, and unethical digital practices are minimized, fostering greater trust in online communication systems. Governments should consider creating national digital citizenship policies that include ethical frameworks for AI governance and a requirement for ML education in universities and schools. However, policymakers should also institute regulations on AI systems to promote transparency, accountability, and fairness in public digital platforms. In developing countries such as Jordan, they are essential as a result of the fast digital transition and the growing presence of unregulated online information environments. Moreover, social institutions

should conduct awareness program about responsible approach to youth in digital participation. Fostering digital ethics at the societal level supports informed civic participation, helps lower the digital divide, and supports the enhancement of democratic participation. Thus, the results confirm the importance of a comprehensive policy system that harmonizes technological innovation and ethical and educational growth.

5.4. Teaching and Academia Implications

The results of this study are of significant value for implications in teaching and academic activities because it encourages the inclusion of AI ethics and media literacy in higher education teaching. Teachers should integrate case-based learning methods that enable students to discuss and consider actual ethical issues within the context of AI and digital space. Interdisciplinary courses in communication studies, digital ethics and information evaluation skills should be developed by curriculum developers. Further, blended learning models should be adopted to enable students' critical engagement with AI-generated contents and online materials in universities. Additionally, faculty training programs should be launched to empower teachers with adequate skills to teach digital ethics. Academic institutions should foster environments for active learning and support students' responsible use of digital media through simulations and collaborative digital projects. These practices will help students develop critical thinking, ethical thinking and digital responsibility. In general, the study emphasizes the need to integrate the ethical and literacy-based skills into the educational systems to prepare students for complex digital society.

6. CONCLUSION

The results of this study show that AI ethics and ML are essential factors of RDC in HE contexts. The results show the potential of ethical AI systems for transparency, accountability, and trust, as well as the role of ML in enhancing critical analysis and informed decisions in the digital world. These variables collectively contribute to responsible online behaviors in the university students. The research also shows that ethical technological frameworks and critical media competencies influence digital responsibility together in a society where the role of artificial intelligence becomes more and more prominent. This study combines theory and practice to emphasize the need to cultivate the ethical awareness and ML skills as essential skills for modern digital citizens. The findings highlight the predetermined nature of responsible digital behaviour as a result of ethical education and technological governance, supported by the building of cognitive literacy. Hence, the need to strengthen the ethics of AI and the role of ML in academic institutions to create sustainable, informed, and socially responsible digital societies.

Although this study has made contributions, it has also some limitations: It is cross-sectional, which is the limitation of only establishing correlations between the variables. The study only considers the context of Jordan with university students, and focuses solely on AI ethics and ML, excluding other psychological and technical factors like digital addiction, trust in technology or personality traits. Longitudinal study designs should be used

in future to investigate behaviour changes over time. Studies across different countries and educational systems are also recommended to increase the external validity of the studies. Furthermore, other mediators or moderators like digital trust, technological readiness, and social influence could be added to the theoretical model for future studies. Mixed-method approaches may also offer more qualitative understandings of students' patterns of digital behavior. Further research in the workplace and organizational settings help to improve knowledge of RDC within other populations.

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