
Generative AI Acceptance among Moroccan Secondary School Students: A Technology Acceptance Model Approach

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Abstract

Generative artificial intelligence (GenAI) is increasingly integrated into students' learning, but evidence regarding its acceptance among secondary-school learners remains limited, particularly in North Africa. This study examined factors influencing Moroccan students' intention to use GenAI through the core Technology Acceptance Model and exploratory open-ended questions. An Arabic online questionnaire was completed by 234 students attending urban secondary schools in Salé, Morocco, during April and May 2026. The model included perceived ease of use, perceived usefulness, attitude, and behavioral intention and was analyzed using partial least squares structural equation modeling. Reliability and convergent validity were satisfactory. All hypothesized relationships were significant. Perceived ease of use predicted perceived usefulness ($\beta=.479$) and attitude ($\beta=.169$); perceived usefulness predicted attitude ($\beta=.597$) and behavioral intention ($\beta=.207$); and attitude predicted behavioral intention ($\beta=.449$). The model explained 37.0% of the variance in behavioral intention. Open-ended responses highlighted explanation, idea generation, and time saving as benefits, alongside concerns about overdependence and inaccurate information. Perceived usefulness emerged as the main driver of favorable attitudes, which subsequently supported usage intention. Schools should combine purposeful integration with verification practices, ethical guidance, and age-appropriate artificial intelligence literacy.

Keywords: GenAI, technology acceptance model, secondary education, PLS-SEM, behavioral intention, Morocco

1. Introduction

The rapid development of generative artificial intelligence (GenAI) has begun to transform educational practices by providing learners with tools capable of producing text, explanations, summaries, translations, images, and other forms of content in response to natural-language prompts. Since the public release of ChatGPT in November 2022, GenAI applications have become increasingly accessible to students, who can use them to clarify difficult concepts, generate ideas, improve written work, save time, and prepare for academic tasks. Unlike a lot of previous educational technologies, GenAI provides immediate and personalized responses, which allow students to interact with digital systems in ways that may directly affect the way they search for information, complete assignments, and engage with learning (Chiu, 2024; Xiaoyu et al., 2025).

Empirical evidence indicates that the adoption of GenAI among students has been particularly rapid. Contractor & Reyes (2025) documented academic AI use among more than 80% of students at a selective American college within two years of ChatGPT's release. Similarly, the Digital Education Council's Global AI Student Survey found that 86% of respondents used AI in their studies, with more than half reporting weekly use (Digital Education Council, 2024). In Saudi Arabia, Almassaad et al. (2024) found that 78.7% of 859 university students frequently used GenAI tools, with ChatGPT being the most widely used application. These findings suggest that GenAI is no longer a peripheral educational technology but is progressively becoming part of students' regular academic practices.

The rapid adoption of GenAI has encouraged researchers to examine the factors that influence students' acceptance of these technologies. Existing studies generally report favorable attitudes toward GenAI and emphasize its perceived functional value for learning (Daher & Hussein, 2024; Ursavaş et al., 2025). Aksoy & Akyel (2026), for example, identified a high level of acceptance among Turkish higher education students, while more than half of the participants reported using at least one GenAI tool. Almassaad et al. (2024) similarly showed that students valued GenAI for clarifying concepts, translating information, summarizing academic content, and generating ideas. Research conducted among Portuguese university students also identified performance expectancy and habit as important determinants of GenAI adoption, indicating that students are particularly likely to accept these tools when they perceive them as useful for completing academic activities efficiently (Pedro et al., 2026).

These results can be interpreted through established technology-acceptance frameworks. The Technology Acceptance Model (TAM) proposes that perceived usefulness and perceived ease

of use are central cognitive beliefs shaping users' attitudes and intentions toward a technology (Davis, 1989). Perceived usefulness refers to the extent to which students believe that GenAI can enhance their learning or academic performance, whereas perceived ease of use concerns the extent to which they consider these tools understandable, accessible, and effortless to operate. These beliefs are expected to influence students' overall attitudes toward GenAI and, subsequently, their behavioral intention to continue using it. Recent GenAI-specific evidence supports this pathway, showing that attitude and perceived usefulness significantly predict students' behavioral intention to use GenAI (Ursavaş et al., 2025). The Unified Theory of Acceptance and Use of Technology further highlights the importance of previous experience and facilitating conditions, including access to technological devices, internet connectivity, and the skills needed to use digital tools effectively (Venkatesh et al., 2003).

Despite the growing body of research on GenAI acceptance, most available studies have been conducted among university students (Chiu, 2024; Xiaoyu et al., 2025). This limits the extent to which their findings can be generalized to secondary-school learners. High-school students operate within a different educational and developmental context characterized by compulsory schooling, closer teacher and parental supervision, less autonomy in completing academic tasks, differentiated academic tracks, and preparation for high-stakes examinations. Their access to digital resources, level of digital competence, prior experience with AI, and understanding of appropriate GenAI use may also vary considerably. Consequently, secondary-school students may evaluate the usefulness and ease of use of GenAI differently from university students.

Evidence concerning younger users nevertheless indicates that GenAI has already entered secondary-school students' everyday experiences. Common Sense Media et al. (2024) reported that 70% of surveyed American adolescents aged 13 to 18 had used at least one type of GenAI tool. The study also revealed substantial differences in the ways young people used these technologies and, in the guidance they received from adults and schools. Such findings demonstrate the need to examine adolescents directly rather than assuming that conclusions drawn from higher education accurately represent their experiences.

Research on secondary-school students' acceptance of GenAI remains particularly limited in underexamined educational contexts such as Morocco. A recent qualitative study of 18 Moroccan public high-school students provides valuable initial evidence that learners perceive ChatGPT as useful for instant explanations, personalized learning, and language or writing support; however, its small qualitative sample and focus on a single tool do not establish how broader student populations evaluate the core acceptance dimensions of usefulness, ease of use,

attitude, and behavioral intention (Farhane, 2025). Existing international evidence does not fully account for differences in school systems, digital accessibility, language practices, or students' prior exposure to emerging technologies. Understanding Moroccan high-school students' perceptions is therefore important for determining whether they consider GenAI useful and easy to use, whether they hold favorable attitudes toward it, and whether they intend to use it in their future learning. Examining demographic, educational, and digital-background characteristics may also reveal whether acceptance varies according to age, gender, school level, digital skills, access to technology, or previous experience with AI tools.

Against this background, the present study investigates Moroccan high-school students' acceptance and perceptions of generative artificial intelligence. The study is primarily grounded in the Technology Acceptance Model and focuses on four central constructs: perceived ease of use, perceived usefulness, attitude toward GenAI, and behavioral intention to use it. Demographic and educational variables (age, gender and school level) are used to characterize the sample and support subgroup comparisons. Students' digital and AI backgrounds, including their access to devices and the internet, self-reported digital skills, and previous use of AI or GenAI, are examined as contextual factors that may shape their acceptance of these technologies.

The quantitative component is complemented by three open-ended questions that allow students to express their perceptions in their own words. These questions provide exploratory insights that may not be fully captured by the standardized TAM measures and can help contextualize the quantitative findings. This design therefore combines the explanatory structure of technology-acceptance theory with a limited qualitative component that captures students' experiences and perspectives within the Moroccan secondary-school context.

Accordingly, the study addresses the following research questions:

- **RQ1.** To what extent do perceived ease of use and perceived usefulness predict Moroccan secondary-school students' attitudes toward GenAI?
- **RQ2.** To what extent do perceived usefulness and attitudes toward GenAI predict students' behavioral intention to use it?

2. Theoretical Background and Hypothesis Development

The present study is primarily grounded in the Technology Acceptance Model (TAM), which explains technology adoption through users' perceptions of usefulness and ease of use, their attitudes toward the technology, and their intention to use it (Davis, 1989). TAM has been extensively applied to educational technologies and has recently been used to investigate

students' acceptance of generative artificial intelligence (GenAI) tools (Freeman, 2025; Marengo et al., 2025; Rispler et al., 2025).

The Unified Theory of Acceptance and Use of Technology (UTAUT) provides additional support for considering students' digital access, digital competence, facilitating conditions, and previous experience with AI technologies (Venkatesh et al., 2003). In the present study, these elements are treated as contextual and descriptive variables rather than latent constructs within the structural model.

The proposed model therefore focuses on four central constructs: perceived ease of use (PEOU), perceived usefulness (PU), attitude toward GenAI (ATT), and behavioral intention (BI). Students' demographic, educational, digital, and AI backgrounds are examined to characterize the sample and determine whether acceptance differs across student groups. Three open-ended questions complement the quantitative measures by allowing students to express perceived benefits, concerns, and additional views in their own words.

2.1. Perceived Ease of Use

Perceived ease of use refers to the degree to which students believe that using GenAI requires little effort (Davis, 1989). GenAI tools generally rely on conversational interfaces and natural-language prompts, making them accessible even to users without advanced technical skills. When students find GenAI easy to learn and operate, they may be more likely to recognize its educational usefulness and develop favorable attitudes toward it.

2.2. Perceived Usefulness

Perceived usefulness refers to students' beliefs that GenAI can improve their learning and academic performance. In the present study, it concerns GenAI's capacity to facilitate the understanding of difficult topics, save time, and improve the quality of homework and assignments.

Previous studies indicate that students value GenAI for explaining concepts, summarizing information, generating ideas, and supporting academic tasks (Freeman, 2025; Ventura, 2024). When students perceive these tools as beneficial to their learning, they are more likely to develop positive attitudes and intend to continue using them.

2.3. Attitude Toward Generative AI

Attitude refers to students' overall positive or negative evaluation of GenAI. It includes their level of engagement, enthusiasm, and general appreciation of the opportunities offered by these

technologies. GenAI-acceptance research suggests that favorable evaluations of the technology are associated with stronger intentions to use it (Marengo et al., 2025; Rispler et al., 2025).

2.4. Behavioral Intention

Behavioral intention represents students' willingness to use GenAI in the future. It includes their intention to increase their use and their beliefs regarding the importance of GenAI for future studies and careers. In TAM and UTAUT, behavioral intention is commonly regarded as the most immediate indicator of technology acceptance (Davis, 1989; Venkatesh et al., 2003).

In the proposed model, behavioral intention is directly explained by perceived usefulness and attitude, while perceived ease of use contributes indirectly through its influence on these constructs.

The resulting structural model can therefore be represented as follows (Figure 1):

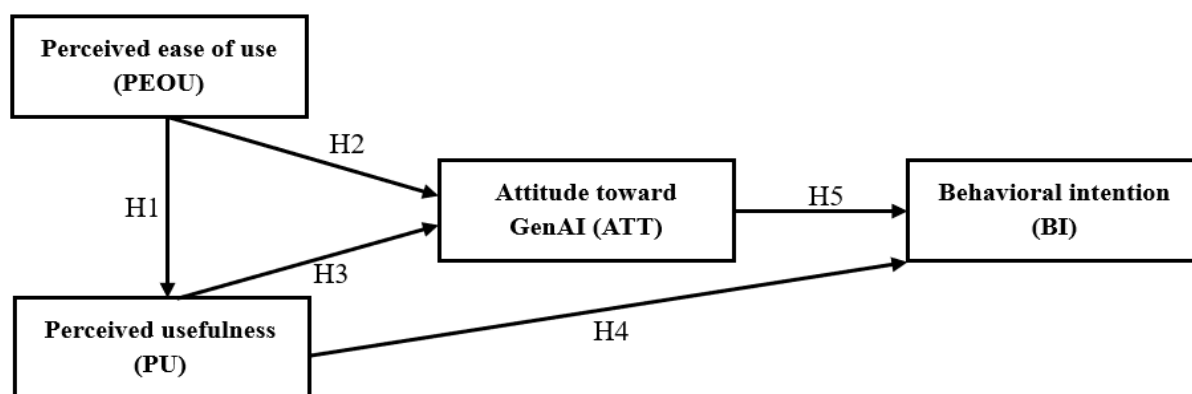


Figure 1. Conceptual model of GenAI acceptance and hypothesized relationships

Accordingly, the following hypotheses are proposed:

- **H1.** Perceived ease of use positively influences students' perceived usefulness of GenAI.
- **H2.** Perceived ease of use positively influences students' attitudes toward GenAI.
- **H3.** Perceived usefulness positively influences students' attitudes toward GenAI.
- **H4.** Perceived usefulness positively influences students' behavioral intention to use GenAI.
- **H5.** A positive attitude toward GenAI positively influences students' behavioral intention to use it.

2.5. Contextual Variables and Open-Ended Perceptions

Demographic, educational, digital, and AI-background variables are not included as latent constructs in the proposed structural model. Instead, they are used to describe the participants and investigate possible differences in PEOU, PU, ATT, and BI according to gender, school level, digital skills, internet access, and previous GenAI experience.

The quantitative component is complemented by three open-ended questions addressing the main benefits of GenAI, students' principal concerns, and any additional comments. Their purpose is to identify emerging themes and provide contextual explanations for the statistical results.

3. Materials and Methods

3.1. Research Design

This study adopted a quantitative, cross-sectional, and explanatory design to examine secondary-school students' acceptance of generative artificial intelligence. A structured questionnaire was used to measure the core TAM constructs. Three open-ended questions were also included to provide complementary insights into students' perceived benefits, concerns, and expectations regarding generative AI.

3.2. Participants and Sampling Procedure

The final sample comprised 234 secondary-school students enrolled in the Common Core, first year of the Baccalaureate, or second year of the Baccalaureate in schools located in the urban area of Salé, Morocco. Participants were recruited using a non-probability convenience sampling technique, based on their accessibility and voluntary participation. Data were collected between April and May 2026 through an online questionnaire distributed to eligible students.

3.3. Ethical Considerations

Participation in the study was voluntary. Before accessing the questionnaire, students received clear information about the purpose of the research, the confidential treatment of their responses, and their right to discontinue participation before submitting the questionnaire. No names, email addresses, or other directly identifying information were collected, and the results were analyzed and reported in aggregate form. The data were securely stored and used exclusively for research purposes.

3.4. Research Instrument

The questionnaire was grounded in the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), measuring perceived usefulness, perceived ease of use, attitudes, and behavioral intention toward generative AI tools (Davis, 1989; Venkatesh et al., 2003). The final analytical model retained four constructs: perceived ease of use (PEOU), perceived usefulness (PU), attitude toward generative AI use (ATT), and behavioral intention (BI). PU items assessed the contribution

of GenAI to learning, time saving, and the quality of academic work; PEOU items measured the perceived ease of learning and regularly using GenAI; ATT items captured students' interest, comfort, and positive evaluation of these tools; and BI items assessed their willingness to use GenAI in future studies and learning activities (Freeman, 2025; Marengo et al., 2025; Rispler et al., 2025).

Additional questions examined demographic and educational characteristics, digital access, facilitating conditions, and previous experience with AI, but these variables were treated as descriptive or contextual factors rather than latent constructs in the structural model (Venkatesh et al., 2012). Three open-ended questions were included to explore students' perceived benefits, concerns, and experiences beyond the standardized measures (Türk et al., 2025). All variables were coded using alphanumeric labels and measured through appropriate nominal, ordinal, or five-point Likert scales to facilitate quantitative analysis.

The questionnaire was pilot-tested with 20 students to ensure the clarity and comprehensibility of its items. The final questionnaire structure and its theoretical foundations are summarized in Table 1.

Table 1. Theoretical constructs and their role in the study

Section	Content focus	Theoretical basis	Role in the study
A. Demographic & educational background	Age, gender, school level.	Descriptive and control variables commonly used in technology acceptance research.	Characterizes the sample and enables subgroup analyses of generative AI acceptance.
B. Digital & AI background	Access to devices, internet, digital skills, prior AI/GenAI use.	UTAUT constructs of facilitating conditions and experience (Venkatesh et al., 2003).	Captures contextual enablers and prior exposure that may influence beliefs, attitudes, and intentions toward GenAI.
C. Perceived usefulness & ease of use	Usefulness for learning, time saving, quality of work, ease of learning/using GenAI.	Core TAM beliefs: perceived usefulness and perceived ease of use (Davis, 1989).	Central cognitive predictors expected to shape attitudes and intentions to use GenAI in learning.
D. Attitudes & behavioral intention	Overall evaluation of GenAI and future use intentions.	Outcome constructs in TAM and UTAUT (attitude, behavioral intention).	Main dependent variables indicating students' acceptance of GenAI tools.
E. Open-ended perceptions	Perceived benefits and main concerns in students' own words.	Exploratory qualitative component complementing TAM/UTAUT.	Provides contextualized insights and emerging themes to interpret and refine the quantitative results.

3.5. Data Analysis Strategy

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated using IBM SPSS Statistics to characterize participants' demographic, educational,

and digital profiles. The hypothesized model was assessed using partial least squares structural equation modelling (PLS-SEM) in SmartPLS 4 (Ringle et al., 2024).

The analysis followed a two-stage procedure. First, the reflective measurement model was evaluated using indicator loadings, Cronbach's alpha, rho_A, composite reliability, average variance extracted (AVE), and the heterotrait–monotrait ratio (HTMT). Second, the structural model was assessed based on variance inflation factors (VIF), path coefficients, coefficients of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2). The statistical significance of the hypothesized relationships was examined through a two-tailed bootstrapping procedure with 5,000 subsamples, using a significance level of $p < .05$.

Finally, responses to the three open-ended questions were analyzed thematically by identifying recurring ideas, coding similar responses, and grouping them into broader themes.

4. Results

4.1. Participant profile and GenAI experience

4.1.1. Participant Characteristics

Table 2 presents the demographic and educational characteristics of the sample. The sample included 133 female students (56.8%) and 101 male students (43.2%). The mean age was 16.1 years ($SD = 1.06$) among female participants and 16.4 years ($SD = 1.21$) among male participants; the overall age range was 14–21 years. Regarding school level, 67 students (28.6%) were enrolled in the Common Core, 91 (38.9%) in the first year of the Baccalaureate, and 76 (32.5%) in the second year.

Table 2. Demographic and educational characteristics of the sample

Characteristic	Category	n	%
Gender	Female	133	56.8
	Male	101	43.2
School level	Common Core	67	28.6
	1st year of Baccalaureate	91	38.9
	2nd year of Baccalaureate	76	32.5

4.1.2. Digital and AI Background

Access was strongly mobile: 91.9% reported a smartphone, whereas 32.9% reported a laptop or desktop computer. Stable home internet was reported by 82.1%, but 18.0% had unstable or no access. Use was typically occasional: 47.9% selected 'sometimes', while 30.8% selected 'often' or 'always' (Table 3).

Table 3. Digital access, skills and use of generative AI

Indicator	Category	n	%
Device access ^a	Smartphone	215	91.9
	Laptop/desktop computer	77	32.9
	Tablet	14	6.0
	School computer only	2	0.9
	No personal device	6	2.6
Home internet	Stable	192	82.1
	Unstable	29	12.4
	None	13	5.6
Use frequency	Never	13	5.6
	Rarely	37	15.8
	Sometimes	112	47.9
	Often	51	21.8
	Always	21	9.0
Uses in last 30 days	0	18	7.7
	1–5	94	40.2
	6–10	60	25.6
	>10	62	26.5
Self-reported digital skills	From 1 to 5	M = 3.21	SD = 1.02

Note. ^amultiple responses were permitted for digital devices; therefore, percentages do not sum to 100%.

4.1.3. Purpose of GenAI use:

Students used GenAI for a broad mixture of formal learning and personal exploration. The most frequently selected purposes were understanding lessons (53.8%), generating ideas or supporting creativity (53.4%), health, fitness, or sport questions (45.7%), summarizing content (44.9%), and homework (43.2%). Because respondents could select several purposes, Table 4 reports percentages of cases.

Table 4. Reported purposes for using generative AI

Purpose	n	% of cases
Understand lessons	126	53.8
Generate ideas or support creativity	125	53.4
Health, fitness, or sport questions	107	45.7
Summarize content	105	44.9
Complete or support homework	101	43.2
Prepare for examinations	72	30.8
Entertainment or chat	52	22.2
Other	15	6.4

Note. Multiple responses were allowed; percentages use $N = 234$ as the denominator and do not sum to 100%.

4.2. Measurement Model Assessment

The measurement model was evaluated using indicator loadings, internal consistency reliability, convergent validity, and discriminant validity. As shown in Table 5, all indicator loadings were statistically significant and ranged from 0.801 to 0.903, exceeding the recommended threshold of 0.70.

Composite reliability values ranged from 0.854 to 0.897, while average variance extracted values ranged from 0.673 to 0.745. These findings indicate satisfactory internal consistency and convergent validity.

Table 5. Reliability and convergent validity assessment

Construct	Items	M	SD	Loading range	Cronbach's α	ρ_A	CR	AVE
PEOU	2	3.52	1.03	0.821–0.903	0.663	0.700	0.854	0.745
PU	3	3.38	1.06	0.814–0.876	0.802	0.807	0.883	0.716
ATT	3	3.53	.98	0.801–0.840	0.757	0.759	0.861	0.673
BI	3	3.47	1.10	0.846–0.876	0.828	0.829	0.897	0.744

Note. **PEOU** = perceived ease of use; **PU** = perceived usefulness; **ATT** = attitude; **BI** = behavioral intention; **CR** = composite reliability; **AVE** = average variance extracted.

Although Cronbach's alpha for PEOU was slightly below 0.70, the construct was retained because its indicators showed strong loadings, while its ρ_A , composite reliability, and AVE reached satisfactory levels. The lower alpha may also be partly attributed to the construct being measured with only two indicators.

Discriminant validity was assessed using the heterotrait–monotrait ratio. Most HTMT values were below 0.85. The highest value was observed between PU and ATT at 0.862. Although this value slightly exceeded the conservative threshold of 0.85, it remained below 0.90, and its bootstrapped confidence interval did not include 1. Discriminant validity was therefore considered acceptable, although PU and ATT appeared to be closely related constructs.

Overall, the results supported the reliability and validity of the measurement model.

4.3. Structural Model and Hypothesis Testing

Before testing the hypotheses, collinearity was examined. Inner VIF values ranged from 1.000 to 1.851, indicating that multicollinearity was not a concern.

The model explained 23.0% of the variance in perceived usefulness, 48.2% of the variance in attitude, and 37.0% of the variance in behavioral intention. The explanatory power of the model was therefore particularly notable for attitude and behavioral intention.

Table 6 presents the results of hypothesis testing. All five hypothesized relationships were positive and statistically significant, with PU exerting the strongest influence on ATT ($\beta = 0.597$, $p < .001$), followed by ATT's substantial direct effect on BI ($\beta = 0.449$, $p < .001$).

Table 6. Structural model results

Hypothesis	Relationship	β	t-value	p-value	f ²	Decision
H1	PEOU $\rightarrow$ PU	0.479	7.517	< 0.001	0.298	Supported
H2	PEOU $\rightarrow$ ATT	0.169	2.941	0.003	0.042	Supported
H3	PU $\rightarrow$ ATT	0.597	12.275	< 0.001	0.530	Supported
H4	PU $\rightarrow$ BI	0.207	2.886	0.004	0.037	Supported
H5	ATT $\rightarrow$ BI	0.449	6.974	< 0.001	0.173	Supported

All five hypothesized relationships were positive and statistically significant. PEOU positively influenced PU, supporting H1. It also had a weaker but significant direct effect on ATT, supporting H2.

PU was the strongest predictor of ATT, with a path coefficient of 0.597 and a large effect size. H3 was therefore supported. PU also had a significant direct effect on BI, although the corresponding effect size was relatively small, supporting H4.

ATT exerted a substantial positive influence on BI and was the strongest direct predictor of students' intention to use generative AI. H5 was consequently supported.

Taken together, the findings indicate that students' attitudes toward generative AI are primarily shaped by its perceived usefulness, while behavioral intention is mainly determined by a favorable attitude toward its use.

4.4. Indirect Effects

The analysis also revealed several significant indirect relationships:

- ✓ PEOU indirectly influenced ATT through PU ($\beta=0.286$, $p<0.001$)
- ✓ PU also indirectly influenced BI through ATT ($\beta=0.268$, $p<0.001$)
- ✓ Furthermore, PEOU had a significant total indirect effect on BI ($\beta=0.303$, $p<0.001$).

This effect occurred through PU, ATT, and the sequential pathway involving both constructs. These results suggest that ease of use contributes to behavioral intention mainly by strengthening students' perceptions of usefulness and promoting a positive attitude toward generative AI.

In sum, the measurement model demonstrated satisfactory reliability, convergent validity, and acceptable discriminant validity. The structural model supported all five hypotheses and explained 37.0% of the variance in behavioral intention.

Perceived usefulness emerged as the main determinant of attitude, whereas attitude was the strongest direct predictor of behavioral intention. The findings therefore confirm the central assumptions of the Technology Acceptance Model and underline the importance of both perceived usefulness and favorable attitudes in explaining students' intention to use generative AI.

4.5. Exploratory open-response findings

Benefit responses were provided by 198 students (84.6%), concern responses by 196 (83.8%), and additional comments by 168 (71.8%). The largest benefit categories concerned understanding, explanation, and summarization (79 mentions), followed by access to information, ideas, and creativity (71) and speed or convenience (55). The most frequent concern was overdependence or reduced independent thinking (65 mentions), followed by inaccurate or misleading information (37). These themes complement the TAM results: students valued concrete utility, yet many framed useful adoption as conditional on verification and self-regulation.

Table 7 summarizes the main themes identified in students' open-ended responses.

Table 7. *Exploratory themes in students' open responses*

Domain	Theme	Mentions	Illustrative summary or translated excerpt
Benefit	Understanding, explanation, or summarization	79	<i>'It explains lessons in a simple way, adapts to each student's level, and provides support at any time.'</i>
	Information, ideas, or creativity	71	<i>Students described quick access to ideas and examples for learning tasks.</i>
	Speed, convenience, or time saving	55	<i>Students valued faster searching, drafting, and task completion.</i>
	Support for homework or academic tasks	36	<i>Responses referred to exercises, assignments, and revision.</i>
Concern	Overdependence or reduced thinking/creativity	65	<i>'Overreliance can reduce analytical skills and make self-directed learning more difficult.'</i>
	Inaccurate or misleading information	37	<i>'I am afraid it may send me incorrect answers, so I check the information using other tools.'</i>
	Human replacement, jobs, or loss of control	17	<i>Some respondents worried about future social and occupational effects.</i>
	Privacy or security	13	<i>Responses mentioned personal information, misuse, and data safety.</i>
	Cheating, misuse, or academic integrity	10	<i>Students called for responsible use and clearer school rules.</i>

Note. Counts are non-exclusive because one response could receive multiple codes. Excerpts were translated from Arabic and lightly edited for readability without changing meaning.

5. Discussion

This study examined GenAI acceptance among Moroccan secondary-school students through the core TAM and found support for all five hypothesized relationships. The model explained

37.0% of the variance in behavioral intention, a meaningful proportion for a focused model containing only usefulness and attitude as direct predictors. The results show a coherent sequence: ease strengthens perceived usefulness; usefulness strongly shapes attitude; and attitude is the most substantial direct predictor of future intention.

The descriptive profile shows that GenAI was already familiar to this sample. Nearly nine in ten respondents had used it, most commonly on an occasional basis. Students reported uses that extended beyond homework to lesson understanding, idea generation, summarization, examination preparation, and personal-interest questions. These patterns are consistent with international student research showing that GenAI adoption is multifunctional rather than confined to a single academic task (Almassaad et al., 2024; Chan & Hu, 2023).

PEOU predicted PU with a medium effect. This supports the original TAM mechanism: when interaction requires less effort, users are better able to perceive performance benefits (Davis, 1989). For secondary-school students, ease may be especially important at the entry stage because successful prompting and output evaluation are not automatic skills. However, the smaller direct PEOU $\rightarrow$ ATT effect suggests that a simple interface alone is insufficient to create a strongly favorable evaluation. Students appear to ask what the tool can do for learning, not merely whether it is convenient to operate.

PU was the strongest predictor of ATT and produced the largest effect size in the model. This finding aligns with recent GenAI acceptance studies in which performance-related beliefs are central to adoption (Pedro et al., 2026; Ursavaş et al., 2025). The students' open responses help specify what "useful" meant in practice: simplified explanations, access to ideas, summarization, and time saving. These themes closely correspond to the three PU items and support the substantive interpretation of the latent construct.

Both PU and ATT predicted BI, but ATT had the stronger direct effect. This pattern indicates that instrumental value matters while a broader positive orientation adds distinct explanatory power. Retaining attitude in the model was therefore productive for this age group. PU also influenced BI indirectly through ATT, and PEOU reached BI through the model's mediated pathways. The results support a staged interpretation in which ease enables usefulness, usefulness builds positive evaluation, and evaluation consolidates intention.

The open responses prevent a favorable average attitude from being read as uncritical enthusiasm. The most common concern was overdependence or reduced independent thinking, and many respondents also questioned factual accuracy. Similar tensions appear in other student

studies, where the attraction of speed and support coexists with concern about unreliable output, plagiarism, and autonomy (Almassaad et al., 2024; Farinosi & Melchior, 2025). The present findings therefore suggest conditional acceptance: students recognize educational value but also expect boundaries, verification, and guidance.

This distinction matters theoretically. Concerns were not forced into a risk construct that had not been retained in the final model. Instead, qualitative evidence identifies candidate variables such as trust, perceived accuracy, self-regulation, and institutional guidance, that future studies can develop and validate. This preserves the parsimony of TAM while making the interpretation more responsive to students' actual experiences.

The study extends core TAM evidence to a relatively under-researched population: secondary-school students in a North African context. It confirms that the canonical sequence among ease, usefulness, attitude, and intention remains informative even when GenAI tools are widely accessible outside formal school platforms. The strong PU → ATT pathway and the significant mediated effects also show why reporting only direct predictors of intention would provide an incomplete account.

At the same time, the findings define the limits of a parsimonious model. Core TAM explains a substantial but incomplete share of intention. Contextual constructs highlighted by UTAUT, facilitating conditions and social influence, as well as trust, perceived accuracy, teacher support, and self-regulation may explain additional variance. These should be added selectively and validated rather than combined into an excessively broad model.

For schools, usefulness should be demonstrated through purposeful tasks: comparing explanations, generating practice questions, receiving formative feedback, and revising drafts. Such activities should make learning gains visible while keeping students responsible for the final reasoning. Ease of access should be accompanied by prompt literacy, source checking, and explicit discussion of when GenAI use is or is not appropriate.

Teacher professional development is equally important. Teachers need shared language for disclosing AI assistance, protecting personal data, identifying unreliable output, and designing assessments that preserve genuine learning. Because access in this sample was predominantly mobile and not universally stable, implementation should also avoid assuming continuous broadband or computer ownership. Clear school-level guidance is preferable to either unrestricted use or an undifferentiated ban, a position consistent with students' calls for responsible use and wider governance evidence (Farinosi & Melchior, 2025; UNESCO, 2023).

Several limitations qualify the findings. First, the cross-sectional design identifies associations rather than causal change. Second, convenience sampling from urban Salé limit generalization to rural schools, other Moroccan regions, or students in different tracks. Third, the measures were self-reported and assessed intention rather than logged behavior. Social-desirability and common-method effects therefore remain possible.

Fourth, PEOU contained only two items and its alpha was slightly below .70, even though CR, rho_A, loadings, and AVE were satisfactory. Future work should test a broader PEOU item pool and establish measurement invariance across gender, educational level, language, and prior-use groups. Fifth, the open-response analysis was exploratory and keyword-assisted; a dedicated qualitative design with independent coding and richer interviews would provide stronger evidence about concerns and school norms. Finally, the core TAM deliberately excluded the field instrument's concern and ethical-use items. Future studies should validate distinct constructs such as trust, perceived inaccuracy, overdependence, privacy concern, teacher support, and AI literacy before testing an expanded model. Longitudinal or experimental designs could also examine whether guided classroom use changes beliefs and actual behavior over time.

6. Conclusion

This study examined the acceptance of generative artificial intelligence among secondary-school students in Salé, Morocco, using the core Technology Acceptance Model complemented by exploratory open-ended questions. All five hypothesized relationships were supported, and the model explained 37.0% of the variance in behavioral intention. Perceived ease of use strengthened perceived usefulness ($\beta = 0.479$) but exerted a comparatively weaker direct effect on attitude ($\beta = 0.169$). Perceived usefulness was the strongest predictor of attitude ($\beta = 0.597$) and also had a smaller direct effect on behavioral intention ($\beta = 0.207$), whereas attitude emerged as the strongest direct predictor of behavioral intention ($\beta = 0.449$). These findings mean that ease of use may facilitate students' initial engagement with GenAI, but it is the educational value they attribute to these tools that primarily shapes favorable attitudes and, subsequently, their intention to continue using them. By extending the core TAM relationships to secondary-school learners in an underexamined North African context, the study provides evidence of the model's continued relevance among a younger, largely mobile-first population that remains insufficiently represented in GenAI-acceptance research.

The open-ended findings provide a more nuanced interpretation of these relationships. Students valued GenAI mainly for explaining and summarizing lessons, facilitating access to

information and ideas, supporting creativity, and saving time. These perceived benefits closely reflect the functional value captured by the perceived-usefulness construct and help explain its central role in the structural model. Nevertheless, students' generally favorable evaluations should not be interpreted as uncritical endorsement. Overdependence or reduced independent thinking appeared in 65 comments, while inaccurate or misleading information was mentioned 37 times. Acceptance therefore appears to be conditional: students recognize the educational potential of GenAI while remaining aware of the cognitive and informational risks associated with its inappropriate or excessive use.

These findings should be considered in light of several limitations. The cross-sectional design does not permit causal conclusions or an assessment of how students' beliefs may change over time. Moreover, the use of a convenience sample drawn from urban secondary schools in Salé limits generalization to rural areas, other Moroccan regions, and different educational settings. The study also relied on self-reported perceptions and behavioral intentions rather than observed use, while perceived ease of use was measured with only two indicators and the open-ended component remained exploratory. Future research should therefore employ longitudinal or experimental designs, include more diverse and representative samples, examine actual patterns of GenAI use, and consider additional constructs such as trust, perceived accuracy, AI literacy, teacher support, and self-regulation.

Taken together, the findings support guided integration rather than either unrestricted use or a general prohibition of GenAI in Moroccan secondary education. Schools should design purposeful learning activities that make the educational value of GenAI explicit, such as comparing explanations, generating practice questions, providing formative feedback, or supporting the revision of written work. Such activities should be accompanied by age-appropriate AI-literacy education focused on source verification, independent reasoning, privacy, academic integrity, and the transparent disclosure of AI assistance. Teacher professional development and clear school-level guidance are equally important for ensuring consistent and responsible practices. In the end, given students' predominantly mobile access and the uneven stability of home internet connections, implementation strategies should also address inequalities in access to devices and connectivity. Under these conditions, GenAI can serve as a structured learning aid without displacing students' responsibility for verification, reflection, and independent learning.

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Declaration on Generative AI Use

Generative AI tools were used solely for language refinement and editorial assistance. The authors critically reviewed and verified the entire manuscript and assume full responsibility for its content, interpretations, and conclusions.

Disclosure Statement

The authors declare that there is no conflict of interest regarding the publication of this article. No financial, personal, or professional relationships have influenced the research, analysis, or conclusions presented in this work.

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