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THE USE OF ARTIFICIAL INTELLIGENCE IN LEARNING AMONG HIGH SCHOOL STUDENTS: A SURVEY AT TRANG DINH HIGH SCHOOL, LANG SON PROVINCE

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Abstract

Generative artificial intelligence is increasingly used by secondary students for a range of learning tasks, yet empirical evidence from mountainous provinces in northern Vietnam remains limited. This study describes the use of artificial intelligence in learning among 161 students at Trang Dinh High School, Lang Son province, Vietnam. Data were collected through an online questionnaire of 15 items organised into three groups, namely frequency of use, perceived impact and perceived difficulties, each measured on a four-point Likert scale. Cronbach's alpha values for the three groups were 0.823, 0.814 and 0.882 respectively. Frequency of use reached a mean of 3.21 (SD = 0.48) and was concentrated on information searching and content explanation; perceived impact reached 2.98 (SD = 0.56); perceived difficulties reached 2.47 (SD = 0.73), with verifying information provided by artificial intelligence rated highest within that group. Differences by grade level and by gender were not statistically significant at the .05 level. Frequency of use correlated positively with perceived impact ($r = .548$, $p < .001$). The findings provide reference data for designing school-based guidance on the use of artificial intelligence in learning.

Keywords:

Artificial intelligence, high school students, current use, digital competence, Lang Son.

1. Introduction

The spread of generative artificial intelligence tools since late 2022 has changed the way learners access information sources and organise self-study activities. Systematic reviews of artificial intelligence in education report that research has concentrated on personalised learning, assessment support and enhanced interaction, and that most studies have been conducted in higher education and in developed countries (Chiu et al., 2023; Zawacki-Richter et al., 2019). At the classroom level, several empirical studies indicate that learning systems supported by artificial intelligence can produce outcomes comparable to or higher than certain forms of in-class active learning (Kestin et al., 2025), or improve the quality of argumentation in written work through automated feedback (Zhang, 2025). Analyses of the effects of artificial intelligence on learners' academic development also identify consequences that require monitoring, including a possible reduction in cognitive engagement when learners transfer too many tasks to the tool (Vieriu & Petrea, 2025).

A second line of research addresses the conditions under which the use of artificial intelligence becomes appropriate. Walter (2024) argues that artificial intelligence literacy, prompt engineering skills and critical thinking are three components that should be incorporated into educational programmes once generative tools become an everyday learning resource. At the level of policy and ethics, Karran et al. (2025) show that the acceptability of artificial intelligence in education depends on how stakeholders assess the transparency and accountability of the system, while Mochizuki et al. (2025) analyse international policy guidance and caution against treating technology as a single solution to educational problems. Teachers' competence in integrating artificial intelligence into instruction has also been identified as a substantial mediating factor (Hava & Babayiğit, 2025).

In Vietnam, studies of current practice have been conducted mainly with university students. Bui Trong Tai and Nguyen Minh Tuan (2024) describe the effects of artificial intelligence on students' learning activities; Bui Trong Tai et al. (2024) survey the perceptions of students at a university in the northern mountainous region; Bui Trong Tai and Trinh Thi Phuong Dung (2025) synthesise application trends and research gaps in higher education. At the general education level, Nguyen Thi Ngoc Xuan et al. (2025) analyse the potential and the challenges of integrating artificial intelligence into teaching, with an emphasis on limitations in infrastructure, awareness and teacher competence. A recent field study by Nguyen Van Ninh et al. (2026), conducted with teachers and students in high schools, indicates that classroom application of artificial intelligence remains limited while students' express interest in learning activities supported by this technology. In terms of administration, the Ministry of Education and Training (2025) has issued a framework for the pilot content of artificial intelligence education for general education students, which creates a requirement for local empirical data to support appropriate implementation.

The gap identified from this review concerns data on high school students in mountainous localities, where device availability, internet connectivity and professional support differ from urban areas. Trang Dinh High School, located in Trang Dinh district of Lang Son province, is one such setting. The present study was conducted to answer three questions: (1) For which learning activities, and at what frequency, do students use artificial intelligence? (2) How do students perceive the impact of artificial intelligence on their learning, and what difficulties do they encounter when using it? (3) Are there differences across the three item groups by grade level and gender, and how are the three groups related to one another?

2. Research method

The study used a cross-sectional descriptive design with data collected through an online questionnaire. The participants were students at Trang Dinh High School, Lang Son province. The questionnaire was created on the Google Forms platform and distributed to students through homeroom teachers during a survey conducted in … … . Convenience sampling was used, and 161 valid responses were obtained. By grade level, Grade 10 students accounted for 24.2% (n = 39), Grade 11 for 41.6% (n = 67) and Grade 12 for 34.2% (n = 55). By gender, female students accounted for 56.5% (n = 91), male students for 42.9% (n = 69), and 0.6% (n = 1) selected the option of not stating gender; this case was retained in the overall descriptive analyses and excluded from the comparison by gender.

The instrument comprised three parts. The introductory part presented the purpose of the study, the working definition of artificial intelligence tools (applications that generate or process language and images in response to user requests, for example ChatGPT, Gemini,

Copilot, Claude, DeepSeek and translation applications with integrated artificial intelligence), and the principles of anonymity and voluntary participation. The participant information part contained two questions on grade level and gender. The main part comprised 15 items in three groups: Group A measured the frequency of artificial intelligence use across six learning activities (frequency scale: 1 = never, 2 = rarely, 3 = sometimes, 4 = often); Group B measured the perceived impact of artificial intelligence on learning through four statements; and Group C measured perceived difficulties through five statements (agreement scale: 1 = disagree, 2 = undecided, 3 = agree, 4 = strongly agree). Items within each group were worded in the same direction, so reverse coding was not required. Item content was developed from the artificial intelligence supported learning activities described in Chiu et al. (2023) and Walter (2024), with adjustments for the Vietnamese school context.

For a four-point scale, the interval for each level was calculated as $(4 - 1)/4 = 0.75$, giving the following ranges: 1.00 to 1.75 as low; 1.76 to 2.50 as moderately low; 2.51 to 3.25 as moderately high; and 3.26 to 4.00 as high. Internal consistency reliability was examined using Cronbach's alpha, yielding values of 0.823 for Group A, 0.814 for Group B, 0.882 for Group C and 0.870 for the full set of 15 items.

Data were processed with statistical software using the following techniques: descriptive statistics (frequencies, percentages, means and standard deviations); independent samples t tests with the Welch correction for comparisons by gender; one-way analysis of variance for comparisons by grade level; and Pearson correlation coefficients to examine relationships among the three item groups. The significance level was set at .05. Throughout the paper, M denotes the mean and SD the standard deviation.

With regard to research ethics, the questionnaire did not collect names, specific class identifiers or any other identifying information. Students confirmed their consent to participate before responding and could stop at any point. Data were analysed and reported only in aggregate form.

3. Results and discussion

Descriptive statistics for the 15 items are presented in Table 1. The final column reports the proportion of students selecting level 3 or level 4, corresponding to a higher frequency of use or agreement with the statement.

Table 1. Descriptive statistics for the survey items (n = 161)

Code	Item content	M	SD	Levels 3 and 4 (%)
A1	Searching for and synthesising information for lessons	3.33	0.58	95.7
A2	Explaining lesson content that is not yet understood	3.42	0.59	95.0
A3	Suggesting solution paths and checking answers to exercises	3.20	0.62	92.5
A4	Supporting the writing and editing of essays, reports, presentations	3.02	0.69	78.3
A5	Practising foreign languages	3.14	0.78	82.0

Code	Item content	M	SD	Levels 3 and 4 (%)
A6	Building study plans, outlines and revision questions	3.18	0.68	87.0
B1	AI helps me understand lesson content faster than studying alone	3.06	0.66	83.9
B2	AI makes me more active in searching for and extending knowledge	3.12	0.61	88.2
B3	Using AI increases my interest in learning	2.82	0.76	68.3
B4	AI supports self-assessment and adjustment of my learning outcomes	2.93	0.76	75.8
C1	Difficulty formulating questions so that AI responds appropriately	2.55	0.86	59.0
C2	Difficulty verifying the accuracy of information provided by AI	2.76	0.79	68.9
C3	Difficulty selecting AI tools suited to each school subject	2.55	0.81	58.4
C4	Device and internet conditions limit my use of AI	2.24	0.98	45.3
C5	I receive little guidance on the appropriate use of AI in learning	2.26	0.98	45.3

3.1. Frequency of artificial intelligence use in learning activities

The overall mean of Group A was 3.21 (SD = 0.48), which falls in the moderately high range of the classification described above. The proportion of students with a Group A mean of 3.00 or higher was 79.5%, and 93.8% of students did not select the never option for any of the six activities. Use of artificial intelligence has therefore become a common feature of students' learning in the surveyed setting.

At the item level, the two activities with the highest frequency were explaining lesson content that is not yet understood (A2: M = 3.42, SD = 0.59) and searching for and synthesising information for lessons (A1: M = 3.33, SD = 0.58), with 95.0% and 95.7% of students respectively selecting sometimes or often. The activity with the lowest frequency was supporting the writing and editing of essays, reports and presentations (A4: M = 3.02, SD = 0.69), for which 21.1% of students selected rarely. The item on foreign language practice (A5) had the largest standard deviation within the group (SD = 0.78), indicating greater dispersion among students for this activity than for the others.

This pattern indicates that students approach artificial intelligence mainly through its information provision and explanation functions, that is, through tasks at a lower cognitive level than those requiring the production of an artefact. The result is consistent with the observation of Chiu et al. (2023) that learners commonly use artificial intelligence as a reference source

before applying it to more complex tasks, and with the finding of Nguyen Van Ninh et al. (2026) regarding high school students' interest in learning activities supported by this technology.

3.2. Students' perceptions of the impact of artificial intelligence on learning

The overall mean of Group B was 2.98 (SD = 0.56), lower than Group A and still within the moderately high range. The two items with the highest agreement were that artificial intelligence makes students more active in searching for and extending knowledge (B2: M = 3.12, SD = 0.61; 88.2% agreed or strongly agreed) and that it helps them understand lesson content faster than studying alone (B1: M = 3.06, SD = 0.66; 83.9%). The remaining two items had lower means: artificial intelligence supports self-assessment and adjustment of learning outcomes (B4: M = 2.93, SD = 0.76) and using artificial intelligence increases interest in learning (B3: M = 2.82, SD = 0.76), with 28.0% of students selecting the undecided option for B3.

The gap between B1 and B2 on one side and B3 and B4 on the other suggests that students recognise the instrumental value of artificial intelligence for accessing and processing information more clearly than its value for learning motivation and self-regulation. This is consistent with the argument of Walter (2024) that the benefits of artificial intelligence for self-regulation depend on learners being equipped with prompting skills and skills for evaluating responses, rather than arising automatically from the availability of a tool. The result should also be read alongside the caution raised by Vieriu and Petrea (2025) concerning reduced cognitive engagement when learners use such tools as a substitute rather than a support.

3.3. Difficulties students encounter when using artificial intelligence

The overall mean of Group C was 2.47 (SD = 0.73), which falls in the moderately low range and is the lowest of the three groups. This group also showed the greatest dispersion, indicating that the experience of difficulty varies considerably across students. The item with the highest agreement was difficulty verifying the accuracy of information provided by artificial intelligence (C2: M = 2.76, SD = 0.79; 68.9% agreed or strongly agreed). The next two items were difficulty formulating questions so that the tool responds appropriately to the learning task (C1: M = 2.55, SD = 0.86) and difficulty selecting tools suited to each school subject (C3: M = 2.55, SD = 0.81).

The two items relating to external conditions had lower means: limitations of devices and internet connectivity (C4: M = 2.24, SD = 0.98) and receiving little guidance on the use of artificial intelligence in learning (C5: M = 2.26, SD = 0.98). Even so, the agreement rate for both items reached 45.3%, and 52.2% of students agreed or strongly agreed with at least one of the two. The standard deviation of 0.98 for both C4 and C5 reflects differentiation in access to technology and in the level of support received across student subgroups, a feature noted by Nguyen Thi Ngoc Xuan et al. (2025) in their analysis of infrastructure and implementation capacity in general schools.

That C2 ranks highest within the difficulty group is notable when read alongside the results in Section 3.1: students use artificial intelligence most frequently for looking up and explaining content, while also reporting limitations in verifying the information obtained. This is a point to be addressed in school-based guidance, since responses generated by language models may contain inaccurate information that learners find difficult to detect without criteria for cross-checking (Walter, 2024; Karran et al., 2025).

The means of all 15 items are displayed in Figure 1, which allows the three groups to be compared on a single scale. The dashed line marks the midpoint of the scale (2.50).

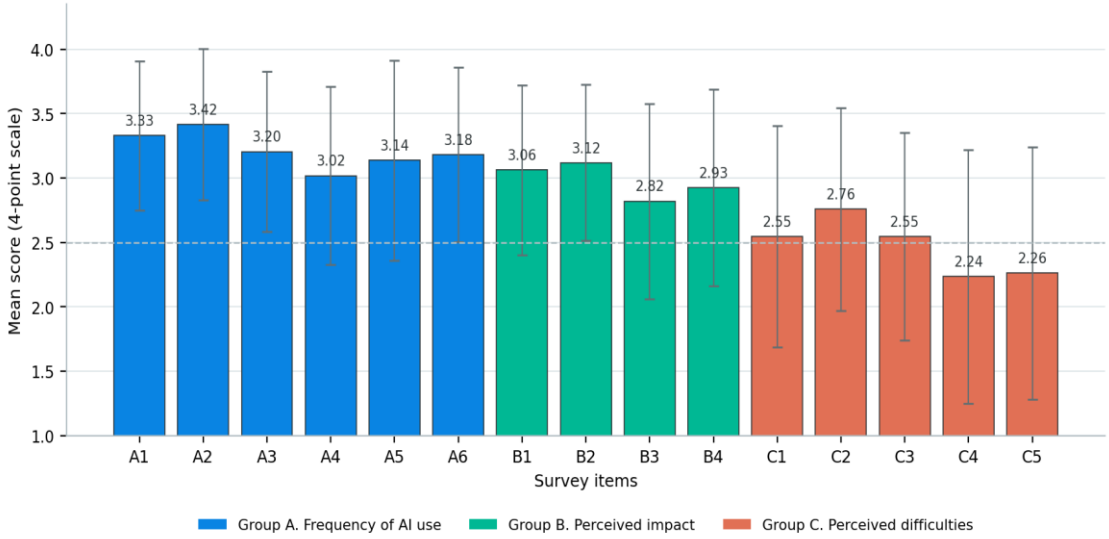

Figure 1. Means and standard deviations of the 15 survey items (n = 161)

3.4. Differences by grade level and gender, and relationships among the item groups

The means of the three item groups by grade level and gender are presented in Table 2, with standard deviations in parentheses.

Table 2. Means of the three item groups by grade level and gender

Student group	n	Group A	Group B	Group C
Grade 10	39	3.12 (0.47)	2.92 (0.61)	2.38 (0.68)
Grade 11	67	3.32 (0.48)	3.09 (0.54)	2.52 (0.80)
Grade 12	55	3.15 (0.47)	2.90 (0.54)	2.47 (0.68)
Male	69	3.22 (0.50)	3.06 (0.64)	2.48 (0.80)
Female	91	3.20 (0.46)	2.92 (0.49)	2.47 (0.68)
Whole sample	**161**	**3.21 (0.48)**	**2.98 (0.56)**	**2.47 (0.73)**

One-way analysis of variance did not detect statistically significant differences among the three grade levels for any of the item groups: Group A, $F(2, 158) = 2.79$, $p = .064$, $\eta^2 = .034$; Group B, $F(2, 158) = 2.19$, $p = .115$; Group C, $F(2, 158) = 0.47$, $p = .628$. Grade 11 students had higher means for Group A (3.32) and Group B (3.09) than the other two grades, but the differences did not reach the .05 level and the η^2 values indicate that the proportion of variance explained by grade level is small.

Independent samples t tests with the Welch correction (n = 160 after excluding the case that did not state gender) likewise showed no statistically significant differences between male and female students: Group A, $t(140.2) = 0.32$, $p = .748$; Group B, $t(123.1) = 1.53$, $p = .130$; Group C, $t(131.9) = 0.11$, $p = .914$. The corresponding Cohen's d values were 0.05, 0.25 and

0.02. This result differs from some studies reporting gender differences in the use of learning technologies, and may be related to the fact that artificial intelligence tools are currently accessed mainly through smartphones, which reduces the technical barriers previously associated with gender differences.

Pearson correlation analysis showed that Group A correlated positively and moderately with Group B ($r = .548$, $p < .001$) and positively but weakly with Group C ($r = .254$, $p = .001$). Group B and Group C correlated positively at a weak to moderate level ($r = .368$, $p < .001$). The coefficient between A and B is consistent with the assumption that students who use the tools more frequently also rate their benefits more highly; the cross-sectional design, however, does not permit conclusions about the direction of influence. The positive correlation between A and C indicates that a higher frequency of use is accompanied by clearer identification of difficulties, which may be explained by direct experience with the limitations of the tools. When the sample was split at the median of Group A, the group with higher use had a Group C mean of 2.58 compared with 2.36 for the remaining students.

3.5. Recommendations

First, schools may give priority to guiding students in verifying information provided by artificial intelligence, since this is the difficulty with the highest mean in Group C and is directly linked to the most frequently used activity in Group A. Such guidance can be embedded in subject lessons as a procedure for cross-checking tool responses against textbooks and reference materials, rather than being organised as a separate thematic session.

Second, given that items B4 and B3 have lower means than the other items in Group B, guidance may focus on using artificial intelligence to support self-assessment and study planning, for example by asking the tool to generate review questions after students have completed a task on their own. This approach preserves the learner's active role in the cognitive process and is consistent with recommendations on preserving cognitive effort when using generative tools (Walter, 2024; Vieriu & Petrea, 2025).

Third, the finding that 45.3% of students agreed with item C5 indicates a demand for formal guidance from the school. Strengthening teachers' capacity to integrate technology is a condition for implementing such guidance (Hava & Babayiğit, 2025) and is consistent with the requirements of the framework for pilot artificial intelligence education content for general education students (Ministry of Education and Training, 2025).

Fourth, with regard to item C4 on device and connectivity conditions, schools may consider scheduling access to computer rooms or designing learning tasks that can be completed under a range of technological conditions, so as to limit disparities in opportunity across student subgroups.

3.6. Limitations

Several limitations should be considered when interpreting the results. The sample was drawn by convenience sampling at a single high school with 161 students, so the findings are not representative of students across Lang Son province or the northern mountainous region. The data are based on student self-report, which is subject to recall and to social desirability in responding, and were not triangulated with behavioural data or teacher reports. The cross-sectional design describes a single point in time and does not permit causal inferences from the reported correlations. The 15-item instrument has met requirements for internal consistency reliability but has not been examined for structure through factor analysis. In addition, the study

did not collect information on the specific tools students use, the amount of time spent using them, or academic achievement, so the relationship between artificial intelligence use and learning outcomes was not examined. Further studies could extend the sample to multiple schools, add in-depth interviews and adopt a longitudinal design to describe change over time.

4. Conclusion

This study described the use of artificial intelligence in learning among 161 students at Trang Dinh High School, Lang Son province, using a 15-item instrument with a four-point Likert scale. The results indicate that artificial intelligence is present in the daily learning activities of most surveyed students, with a mean of 3.21 for frequency of use, concentrated on explaining lesson content and on searching for and synthesising information, while activities supporting the production of written work were used less frequently. Perceived impact reached a mean of 2.98, with the dimensions of access to and extension of knowledge recognised more clearly than the dimensions of learning interest and self-regulation. The difficulty group reached a mean of 2.47, with difficulty verifying the accuracy of information ranking highest and approximately 45% of students reporting limitations in device conditions and in the guidance they receive. Differences by grade level and gender were not statistically significant at the .05 level, while frequency of use correlated positively with perceived impact and with the identification of difficulties. These results provide reference data for designing school-based guidance on the use of artificial intelligence in learning in the surveyed setting, for which the two areas with the clearest empirical basis are skills for verifying information and ways of using the tools to support self-assessment of learning outcomes.

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