Global Journal of Educational Thoughts
GJET vol.3, no.1, June 2026

Submitted: 30 April 2026
Reviewed (1st Round): 7 May 2026
Revision: 21 May 2026
Reviewed (2nd Round): 3 June 2026
Accepted: 4 June 2026

ARTIFICIAL INTELLIGENCE USAGE AND AGE: AN EXPLORATORY STUDY ACROSS KEY STAGES IN A MALAYSIAN INTERNATIONAL SCHOOL

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ABSTRACT

This study investigates the relationship between student age, Key Stage, and Artificial Intelligence (AI) usage frequency among students in a Malaysian international school, spanning Key Stage 2 (Years 3 to 6, ages 7 to 12) and Key Stages 3 and 4 (Years 7 to 10, ages 11 to 16). Using a structured paper-based survey administered to 276 students, the study examines exposure patterns, tool preferences, self-reported learning impact, responsible use guidance received, and attitudinal differences across age groups. Findings reveal near-universal AI adoption across all year groups, including among students as young as seven, with ChatGPT and Google Gemini as the dominant tools. A Spearman rank-order correlation revealed no statistically significant relationship between year group and usage frequency (rho = 0.051, p = 0.402), indicating that AI engagement is uniformly embedded across all Key Stages regardless of age. Purposeful engagement and self-reported learning benefit, however, increased with age. Academic integrity breaches involving the submission of AI-generated work as one's own were reported across all Key Stages at high rates (81.5% overall). Critically, risk awareness does not translate into ethical behaviour: 100% of KS3 students reported knowing AI risks, yet 99.3% admitted to submitting AI-generated work. The study highlights the urgent need for age-appropriate AI literacy frameworks and enforceable academic integrity policies in international schools.

Keywords: *AI literacy, academic integrity, Key Stage, K-12 education, Malaysia.*

INTRODUCTION

The rapid proliferation of Artificial Intelligence (AI) tools in everyday life has fundamentally altered how students access information, complete assignments, and engage with learning. Platforms such as ChatGPT, Google Gemini, and Microsoft Copilot have become increasingly accessible to school-age children. This raises important questions about the appropriate age for AI exposure and the potential academic and developmental implications of early or unguided use.

While global literature on AI in education is expanding (Holmes & Porayska-Pomsta, 2023; Mintz et al., 2023), school-level empirical studies grounded in specific national or institutional contexts remain limited (Holmes et al., 2019). This is especially true in Southeast

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Asia, where international schools serve diverse, technology-exposed student populations that may differ significantly from Western counterparts in their AI literacy and usage patterns (Homer et al., 2025).

This study is conducted within Regent International School, Klang, Malaysia, operating under the Global Schools Group (GSG) framework. The school serves students in K-12 education, providing a unique opportunity to examine AI usage across a broad developmental spectrum from late primary (Key Stage 2, Years 3 to 6, ages 7 to 12) through early secondary (Key Stages 3 and 4, Years 7 to 10, ages 11 to 16). The central premise of this study is that maturity and cognitive development are critical variables in determining readiness for AI exposure, and that age-related differences in usage patterns, attitudes, and awareness will be empirically observable within a single school population.

The study addresses the following primary research question: Is there a statistically significant relationship between student year group, Key Stage, and AI usage frequency in a Malaysian international school context? Secondary questions examine differences in tool awareness, self-reported learning impact, responsible use guidance received, and academic integrity concerns across Key Stages.

The findings are intended to inform school policy on AI integration, support the development of age-appropriate AI literacy curricula, and contribute an institutional case study to the broader international literature on AI in K-12 education.

LITERATURE REVIEW

AI in Education: An Overview

The integration of AI in educational settings has accelerated significantly since the public release of large language models in 2022 to 2023 (Baidoo-Anu & Ansah, 2023). Researchers have documented both the transformative potential of AI including personalised learning, adaptive feedback, and enhanced accessibility and its associated risks, including over-reliance, academic dishonesty, and exposure to inaccurate information (Kasneci et al., 2023; Singhal, 2024).

In primary and secondary education specifically, studies have found that students use AI tools predominantly for homework assistance and information retrieval, often without adequate understanding of the limitations or ethical implications of such tools (Zawacki-Richter et al., 2019). Teachers and school administrators report feeling underprepared to guide students in responsible AI use, underscoring the urgency of institutional frameworks (Kim, 2025).

Age, Maturity, and Technology Readiness

Developmental psychology provides a foundational lens through which to examine age-appropriate technology exposure. Piaget's stages of cognitive development suggest that abstract reasoning, which is necessary for critically evaluating AI-generated content, does not

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fully emerge until the formal operational stage (approximately ages 11 to 12) (Pakpahan & Saragih, 2022; Piaget, 1952). Younger learners in the concrete operational stage may accept AI outputs uncritically, increasing the risk of misinformation uptake and reduced independent thinking.

Research on digital literacy similarly indicates that older adolescents are better equipped to evaluate source credibility and recognise the boundaries of automated tools (Livingstone & Helsper, 2010). This developmental gradient suggests that AI usage in younger Key Stages requires more scaffolding, parental oversight, and teacher mediation than in secondary years.

Theoretical Frameworks

Three theoretical frameworks inform the analytical lens of this study. First, Davis's Technology Acceptance Model (TAM) suggests that perceived usefulness and perceived ease of use are the primary determinants of technology adoption (Davis, 2025; Davis et al., 1989). Applied to the present context, TAM offers an explanation for the near-universal AI uptake observed across all Key Stages: students perceive AI tools as both useful and accessible, irrespective of their developmental stage. The uniformity of adoption documented here with no statistically significant age-frequency relationship (Spearman rho = 0.051, p = 0.402) is consistent with TAM's prediction that utility perception, rather than user maturity, drives adoption behaviour.

Second, Zimmerman's Self-Regulated Learning (SRL) theory (Nilson & Zimmerman, 2023; Zimmerman, 2002) provides a framework for understanding qualitative differences in AI engagement across Key Stages. SRL describes the capacity of learners to plan, monitor, and evaluate their own cognitive processes. The finding that older students report significantly higher learning benefit from AI use is consistent with SRL theory: secondary-age learners possess more developed metacognitive skills that enable purposeful rather than exploratory AI engagement. KS2 students, by contrast, exhibit patterns consistent with lower self-regulatory capacity, including higher rates of daily but less structured use.

Third, Kohlberg's theory of moral development (Kohlberg, 1994; Sabeen, 2024) offers a critical lens for interpreting the awareness-behaviour gap identified in this study. Kohlberg's framework proposes that moral reasoning develops progressively from rule-based, consequence-oriented thinking in younger children toward principled, self-directed ethical judgement in late adolescence. The finding that 100% of KS3 students reported high risk awareness yet 99.3% admitted to submitting AI generated work as their own suggests that students at this stage may understand the rules without having the ethical principles that would encourage compliance. This is consistent with Kohlberg's conventional stage of moral development, where behaviour is governed by perceived group norms rather than independent ethical reasoning. A pattern with direct implications for how academic integrity education should be designed.

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The Malaysian and International School Context

Malaysia's national education system has increasingly emphasised digital skills, and international schools within the country operate within a dual framework, adhering to international curricula while navigating local regulatory and cultural expectations. Studies on technology use in Malaysian schools highlight strong device access among urban, international school students alongside variable digital literacy levels (Bhan et al., 2025; Kamarudin et al., 2025; Razak et al., 2018). By investigating AI usage frequency specifically across different Key Stages in a Malaysian international school, this study fills a crucial gap in regional literature, offering contextually grounded insights.

Academic Integrity and AI

Academic integrity in the age of AI is an emerging and contested area, with studies indicating that a substantial proportion of secondary students use AI-generated content in assessed work without disclosure (Cotton et al., 2024). This trend suggests that younger students may not fully grasp the ethical dimensions of their actions, highlighting a critical need for explicit instruction on AI ethics across all Key Stages.

Research further indicates that knowledge of risk alone is insufficient to drive ethical behaviour; structural and normative interventions are required to close the gap between awareness and conduct (Livingstone & Helsper, 2010). As such, academic integrity in AI-rich environments must be addressed through enforceable institutional policy and redesigned assessments, not solely through awareness campaigns (Cotton et al., 2024; Ng et al., 2025).

METHODOLOGY

Research Design

This study adopts a cross-sectional, exploratory survey design. A quantitative-dominant, mixed approach was employed: a structured questionnaire provided primarily numerical data for frequency and correlation analysis, supplemented by two open-ended items to capture qualitative student perspectives. The mixed approach was selected to enable triangulation, allowing quantitative patterns in usage and attitudes to be contextualised by students' own expressed views on AI benefits and risks. This design is consistent with short-form empirical studies in educational technology research (Hirose & Creswell, 2023).

Participants

Participants were from Regent International School, Klang, a Malaysian international school affiliated with the Global Schools Group (GSG). Participants were stratified by Key Stage, targeting Years 3 to 10 (ages 7 to 16). Key Stage 1 (Years 1 to 2) was excluded due to self-report limitations of students under age 7. A total of 276 students participated, comprising 105 KS2 students (Years 3 to 6), 134 KS3 students (Years 7 to 9), and 37 KS4 students (Year 10).

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It is noted that the KS4 cohort (n = 37) comprises a single year group (Year 10), which limits the robustness of KS4 level comparisons relative to the larger KS2 and KS3 samples.

Instrument

A 15-item structured questionnaire was developed for this study, comprising five sections: (A) demographic and device access data; (B) AI usage frequency, tools, and context; (C) AI and learning behaviours, including fact-checking habits and responsible use guidance received; (D) a 7-item Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) measuring attitudes toward AI in education; and (E) two open-ended reflective questions on perceived benefits and risks of AI. The instrument was reviewed by two subject-matter experts prior to administration and adapted for age-appropriateness across Key Stages.

As formal pilot testing was not conducted, the absence of a validated pilot is acknowledged as a limitation. Internal consistency of the 7-item Likert scale (Section D) was assessed using Cronbach's alpha; $\alpha = 0.387$, $n = 230$ (Cronbach, 1951). Of the 276 participants, 230 provided complete responses across all seven Likert items and were included in this analysis. Missing responses were concentrated in KS2, consistent with the developmental limitations noted in Section 5. This value falls below the conventional threshold of 0.70 (Nunnally, 1978), which is consistent with the heterogeneous, multi-dimensional nature of the items: the scale spans distinct attitudinal constructs including perceived utility, worry about over-reliance, confidence, and policy orientation, rather than a single latent trait (Norman, 2010). Accordingly, Likert items were treated as independent attitudinal indicators rather than a composite measure, and no summative scale score was computed. This limitation will be addressed through instrument refinement in the planned follow-up study. Likert scale items were treated as interval data for the purpose of mean score calculation, a practice supported in educational research contexts involving five-point scales (Gavião et al., 2023; Norman, 2010).

Data Collection

The survey was administered in paper format during school hours under teacher supervision in April 2026. Students completed the questionnaire simultaneously within their classrooms to maintain a standardised environment and prevent peer influence or external distractions. To ensure absolute anonymity, the survey excluded all identifying markers, such as names or specific class details. This study was conducted as an internal school-based research initiative.

All responses were collected anonymously and were not linked to individual student records. As this study was conducted as an internal school improvement initiative within the researcher's own institution, formal external ethical review was not required. Ethical safeguards were nonetheless observed throughout: participation was voluntary, all responses were fully anonymous, no identifying data were collected or retained, and the survey was administered under teacher supervision within regular school hours. Given that participants included minors (ages 7 to 16), the study design prioritised age-appropriate language, anonymity, and the absence of any risk of harm to participants. Institutional approval was granted by the school principal prior to data collection.

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Data Analysis

Quantitative data were analysed using descriptive statistics (frequencies, percentages, means) and cross-tabulation by Key Stage. A Spearman rank-order correlation (Bhan et al., 2025; Zumitzavan, 2026) was computed to assess the relationship between year group (ordinal) and AI usage frequency (ordinal), as both variables were measured on ordered categorical scales. Likert scale items were treated as interval data and mean scores calculated (South et al., 2022) per Key Stage for comparative analysis. Qualitative responses from Section E were analysed thematically. All analysis was conducted using Microsoft Excel and Python (SciPy library) (Gommers et al., 2024).

RESULTS

Sample Profile

A total of 276 students participated across Years 3 to 10, representing Key Stage 2 (KS2: n = 105), Key Stage 3 (KS3: n = 134), and Key Stage 4 (KS4: n = 37). The distribution by year group is presented in Table 1.

Table 1: Sample Distribution by Year Group and Key Stage

Key Stage	Year Group	n	Age Range	% of Total
KS2	Year 3	22	7 to 8	8.0
KS2	Year 4	32	9 to 10	11.6
KS2	Year 5	27	9 to 11	9.8
KS2	Year 6	24	11 to 12	8.7
KS2 Total	**Y3 to Y6**	**105**	**7 to 12**	**38.0**
KS3	Year 7	38	11 to 13	13.8
KS3	Year 8	66	13 to 14	23.9
KS3	Year 9	30	13 to 14	10.9
KS3 Total	**Y7 to Y9**	**134**	**11 to 14**	**48.6**
KS4	Year 10	37	14 to 16	13.4
KS4 Total	**Y10**	**37**	**14 to 16**	**13.4**
GRAND TOTAL	**Y3 to Y10**	**276**	**7 to 16**	**100**

AI Exposure and Usage Frequency

The vast majority of students reported having used AI tools. As shown in Table 2, 85.1% of the total sample identified as regular AI users, with a further 14.1% having tried AI tools at least once. Only two students, both in KS2, reported no usage or awareness of AI tools. One reporting they had heard of AI but never used it, and one reporting no awareness at all. This indicates near-universal AI exposure across the school population.

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Table 2: AI Exposure (Q4)

Response	KS2	KS3	KS4	Total
Yes, I use it regularly	77 (73.3%)	124 (92.5%)	34 (91.9%)	235 (85.1%)
Yes, I have tried it a few times	26 (24.8%)	10 (7.5%)	3 (8.1%)	39 (14.1%)
Heard of it but never used it	1 (1.0%)	0	0	1 (0.4%)
No, I have never heard of it	1 (1.0%)	0	0	1 (0.4%)
TOTAL	**105**	**134**	**37**	**276**

Usage frequency varied by Key Stage (Table 3). KS2 students demonstrated the highest rate of daily use (45.7%), driven largely by KS2. However, KS2 also recorded the highest rates of infrequent use, with 21.9% using AI once a month or less. By contrast, KS3 students showed a pattern of habitual use at a few times a week (67.2%), with KS4 similarly concentrated at 70.3%.

Table 3: AI Usage Frequency (Q5)

Frequency	KS2	KS3	KS4	Total
Every day	48 (45.7%)	29 (21.6%)	9 (24.3%)	86 (31.2%)
A few times a week	23 (21.9%)	90 (67.2%)	26 (70.3%)	139 (50.4%)
Once a week	8 (7.6%)	12 (9.0%)	2 (5.4%)	22 (8.0%)
Once a month or less	23 (21.9%)	3 (2.2%)	0 (0.0%)	26 (9.4%)
Never	3 (2.9%)	0 (0.0%)	0 (0.0%)	3 (1.1%)
TOTAL	**105**	**134**	**37**	**276**

Correlation Analysis: Year Group and Usage Frequency

A Spearman rank-order correlation was conducted to examine the relationship between student year group (Year 3 to Year 10) and AI usage frequency (ordinal: Never to Every day). The analysis returned a non-significant result (rho = 0.051, p = 0.402, n = 276). This indicates that AI usage frequency does not increase systematically with year group and is effectively uniform across all Key Stages. This finding reinforces the descriptive data: AI is deeply embedded in students' academic lives from Year 3 upward, and the absence of a significant age-frequency relationship underscores that AI tool adoption is not an age-dependent phenomenon in this school population. The primary research question is therefore answered in the negative: no statistically significant correlation between year group and usage frequency was observed.

Supplementary Statistical Analysis

To examine whether Key Stage differences existed in qualitative engagement variables beyond usage frequency, a series of Kruskal-Wallis H tests (Kruskal & Wallis, 1952) and Chi-square tests of independence (Hirose & Creswell, 2023) were conducted. These analyses complement the Spearman correlation reported in Section 4.3 and address the distributional patterns observable in the cross-tabulations.

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A Kruskal-Wallis test on usage frequency across Key Stages returned a non-significant result ($H = 0.425$, $p = 0.808$), confirming the Spearman correlation finding: median usage frequency did not differ significantly across KS2, KS3, and KS4. However, a Chi-square test of independence on usage pattern distribution (categorised as high frequency: daily or a few times a week, versus low frequency: once a week or less) revealed a significant association with Key Stage ($\chi^2(2) = 27.560$, $p < 0.001$). This indicates that while overall frequency medians are comparable, the distributional shape of usage differs significantly: KS2 students are proportionally more likely to exhibit low-frequency or irregular patterns, whereas KS3 and KS4 students cluster predominantly in the high-frequency category.

Kruskal-Wallis tests on self-reported learning benefit (Q9) and risk awareness (Q12) both returned significant results (Q9: $H = 68.947$, $p < 0.001$; Q12: $H = 43.051$, $p < 0.001$). Post-hoc pairwise Mann-Whitney U tests (Mann & Whitney, 1947) with Bonferroni correction (Merga & Mat Roni, 2018) (adjusted $\alpha = 0.017$) revealed that for learning benefit, all three Key Stage pairs differed significantly (KS2 vs KS3: $p < 0.001$; KS2 vs KS4: $p < 0.001$; KS3 vs KS4: $p = 0.011$). For risk awareness, KS2 differed significantly from both KS3 ($p < 0.001$) and KS4 ($p < 0.001$), but KS3 and KS4 did not differ significantly from each other ($p = 0.031$, non-significant after Bonferroni correction), indicating that risk awareness reaches a maximum by KS3.

A Kruskal-Wallis test on academic integrity behaviour (Q13, ordinal) was also significant ($H = 41.978$, $p < 0.001$). Post-hoc analysis revealed significant differences between KS2 and KS3 ($p < 0.001$) and between KS3 and KS4 ($p < 0.001$), but not between KS2 and KS4 ($p = 0.549$, non-significant). This indicates that KS3 is the statistical outlier for academic integrity breaches, with breach rates significantly higher than both KS2 and KS4. A Chi-square test of independence confirmed the overall association between Key Stage and breach behaviour ($\chi^2(2) = 25.701$, $p < 0.001$).

Context of AI Use

Home-based academic use was overwhelmingly dominant, as shown in Table 4: 98.9% of all students reported using AI at home for schoolwork. In-school use increased with age, with 47.6% of KS2, 78.4% of KS3, and 83.8% of KS4 using AI during school lessons. Personal entertainment use was limited to KS2 (13.3%) and KS3 (13.4%), with no KS4 students reporting this pattern.

Table 4: Context of AI Use (Q6)

Context of Use	KS2	KS3	KS4	Total
At home for schoolwork / homework	104 (99.0%)	132 (98.5%)	37 (100.0%)	273 (98.9%)
At school during lessons	50 (47.6%)	105 (78.4%)	31 (83.8%)	186 (67.4%)
At home for personal use / fun	14 (13.3%)	18 (13.4%)	0 (0.0%)	32 (11.6%)
I don't use AI tools	3 (2.9%)	0 (0.0%)	0 (0.0%)	3 (1.1%)

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AI Tool Awareness and Preferences

ChatGPT was the dominant AI tool across all Key Stages (Table 5), used by 252 students (91.3%). Its adoption increased with age: 77.1% of KS2, 100% of KS3, and 100% of KS4. Google Gemini was the second most commonly used tool (n = 186; 67.4%), rising from 33.3% in KS2 to 91.0% in KS3. Siri/Alexa/Google Assistant was more prevalent in KS2 (15.2%), likely reflecting voice-assistant use among younger learners.

Table 5: AI Tools Used (Q7)

Tool	KS2	KS3	KS4	Total
ChatGPT	81 (77.1%)	134 (100.0%)	37 (100.0%)	252 (91.3%)
Google Gemini	35 (33.3%)	122 (91.0%)	29 (78.4%)	186 (67.4%)
Microsoft Copilot	3 (2.9%)	4 (3.0%)	0 (0.0%)	7 (2.5%)
Siri / Alexa / Google Assistant	16 (15.2%)	10 (7.5%)	1 (2.7%)	27 (9.8%)

Self-Reported Learning Impact (Q9)

KS3 and KS4 students reported substantially higher confidence in AI's learning benefit. Among KS3 respondents, 113 students (84.6%) and KS4 respondents, 31 students (83.8%) stated that AI definitely helps them learn, compared to 36 students (34.3%) in KS2. KS2 students were more likely to respond 'Sometimes' (42.9%) or express uncertainty, consistent with younger learners' less purposeful engagement with the tools.

Responsible Use Guidance (Q11)

School-based guidance was the primary source of AI literacy: 55.2% of KS2 (n = 58), 90.3% of KS3 (n = 121), and 75.6% of KS4 (n = 28) reported receiving guidance at school. Only 5 students across the entire sample reported figuring out AI independently, all in KS2.

Risk Awareness (Q12)

Risk awareness showed a clear progression with age. In KS3 and KS4, 100% and 95.5% of students respectively reported knowing a lot about AI risks. In KS2, only 69.5% reported high risk awareness, with 9.5% reporting no awareness at all, despite high usage rates.

Academic Integrity (Q13)

Academic integrity findings are among the most striking results of this study. As shown in Table 6, 81.5% of all students (n = 225) reported submitting AI-generated work as their own often. Among KS3 students, 99.3% (n = 133) reported doing so. Even in KS2, 63.8% (n = 67)

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reported frequent submission. Only 33 students across the entire sample (12.0%) reported never having submitted AI-generated work.

Table 6: Submitted AI-Generated Work as Own (Q13)

Response	KS2	KS3	KS4	Total
Yes, often	67 (63.8%)	133 (99.3%)	25 (67.6%)	225 (81.5%)
Yes, once or twice	11 (10.5%)	0 (0.0%)	6 (16.2%)	17 (6.2%)
No, never	26 (24.8%)	1 (0.7%)	6 (16.2%)	33 (12.0%)
I did not know that was an issue	1 (1.0%)	0 (0.0%)	0 (0.0%)	1 (0.4%)

Attitudinal Findings: Likert Scale (Section D)

Table 7 presents mean (M) Likert scores (1 = Strongly Disagree; 5 = Strongly Agree) by Key Stage. The highest-scoring item was 'AI helps me when I am stuck on a problem' (M = 3.89), rising from 3.50 in KS2 to 4.18 in KS4. Worry about laziness scored above the midpoint across all Key Stages (M = 3.13). Confidence in safe AI use increased progressively (KS2: 2.84; KS4: 3.24). 'AI should be taught in school' scored below the midpoint across all groups (M = 2.53).

Table 7: Mean Likert Scores by Key Stage (1 = Strongly Disagree; 5 = Strongly Agree)

Statement	KS2	KS3	KS4	M Overall
AI makes learning more interesting	2.78	2.81	2.87	2.81
I worry that using AI makes me lazy	3.00	3.25	3.10	3.13
I feel confident using AI tools safely	2.84	3.03	3.24	3.02
AI should be taught in school as a subject	2.61	2.66	2.27	2.53
Students my age are ready to use AI	3.09	3.16	3.57	3.25
I would use AI less with stricter rules	2.84	2.90	2.28	2.71
AI helps me when I am stuck on a problem	3.50	4.05	4.18	3.89

Student Voices: Open Reflections (Q14 to Q15)

Thematic analysis of open responses revealed consistent patterns. The most frequently cited advantage was AI's role in supporting homework and explaining concepts:

"AI helps me when I am stuck with a problem" (KS2, Year 3)
"Saves time efficiently for research" (KS3, Year 8)
"Helps us understand difficult topics" (KS4, Year 10)

The most commonly cited risks were over-dependence and privacy concerns, with academic integrity raised spontaneously across all Key Stages:

"Allow them to cheat in exams" (KS2, Year 3)
"AI might give wrong information and get caught by teacher" (KS3, Year 8)

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"Getting lazy, not doing things on your own" (KS4, Year 10)

DISCUSSION

Age and Usage: Near-Universal Engagement Across All Key Stages

The central finding of this study is that AI usage is near-universal across all Key Stages, including among students as young as seven, and that usage frequency does not increase significantly with age (Spearman rho = 0.051, p = 0.402). This challenges assumptions about age-gated technology adoption and confirms that the presence of AI in students' academic lives is not a secondary school phenomenon. While daily use was highest in KS2 at 45.7%, this reflects irregular engagement patterns rather than higher overall frequency; KS3 and KS4 students showed more consolidated, habitual use. The pattern is consistent with the rapid normalisation of large language models since 2022 (Baidoo-Anu & Ansah, 2023; Bhan et al., 2025; Yau et al., 2023), and the extent of primary-age engagement documented here extends the empirical base significantly.

The Piagetian framework suggests that KS2 students in the concrete operational stage may lack the abstract reasoning required to critically evaluate AI outputs (Pakpahan & Saragih, 2022; Piaget, 1952). The data lend partial support to this: KS2 students were less likely to report definitive learning benefit, suggesting more exploratory engagement. However, the high rates of academic integrity breaches even in KS2 indicate that lack of sophistication does not equate to lack of misuse.

The Awareness and Behaviour Gap: A Critical Finding

Perhaps the most significant finding is the gap between risk awareness and behaviour. At KS3 and KS4, virtually all students reported knowing a lot about AI risks, yet 99.3% of KS3 and 83.8% of KS4 reported submitting AI-generated work as their own at least once. This contradiction suggests that knowledge alone is insufficient to change behaviour. Analogous findings in digital literacy research indicate that awareness interventions without behavioural scaffolding yield limited impact (Livingstone & Helsper, 2010).

This finding has direct implications for how schools approach AI education. Programmes focusing primarily on teaching students about risks may be missing the more pressing need. Effective AI education must shift from a risk-based model to a norm-based framework that prioritises structured, school-wide standards and enforceable consequences. Rather than treating AI literacy as abstract knowledge, institutions need clear policies that define acceptable use such as distinguishing between brainstorming support and uncritical content generation (Kim, 2025). This approach requires institutional readiness, including redesigned assessments that value human reflection and robust data governance to ensure equity and privacy (Ng et al., 2025).

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Implications for School Policy

The data suggest the need for age-differentiated, school-wide AI frameworks. For KS2 students, the priority should be supervised, purposeful exposure with explicit scaffolding and not prohibition, but guided engagement that builds critical evaluation skills before formal operational reasoning is fully developed. For KS3 and KS4, the findings indicate an urgent need to review academic integrity policy: with near-universal AI submission documented, schools may benefit from moving beyond awareness-based guidance toward clearly communicated, enforceable standards with meaningful consequences.

The finding that school-based guidance is the primary source of AI literacy for the majority of students underscores the pivotal role teachers play and the professional development obligation this creates for school leadership.

Limitations

Several limitations should be noted. This study is conducted within a single Malaysian international school, limiting generalisation. Data are self-reported, and high academic integrity breach rates may reflect social desirability bias or common method bias, with students potentially over-reporting submission behaviour due to anonymity or peer-norming effects. The KS4 cohort comprised only 37 students from a single year group (Year 10), limiting the robustness of KS4 comparisons. The exclusion of KS1 leaves the youngest learners unexamined. The questionnaire was not formally piloted or externally validated prior to administration. The Likert section produced sparse responses in KS2, which is developmentally expected but limits attitudinal analysis precision for younger groups. These limitations will be addressed in a subsequent extended study.

CONCLUSION

This study set out to examine the relationship between student age and AI usage frequency across Key Stages 2 to 4 in a Malaysian international school. A Spearman rank-order correlation found no statistically significant relationship between year group and usage frequency ($rho = 0.051$, $p = 0.402$), confirming that AI is uniformly and deeply embedded in students' academic lives from Year 3 upward, irrespective of age. Purposeful engagement, tool sophistication, and self-reported learning benefit show positive trends with age, but the most urgent finding concerning near-universal submission of AI-generated work across all Key Stages suggests the need for further institutional review and policy consideration regardless of age group.

The study contributes a contextually grounded, school-level dataset to the growing international literature on AI in K-12 education. A critical gap between risk awareness and ethical behaviour is identified, a finding that future research and policy must urgently address. A comprehensive follow-up study incorporating KS1, longitudinal tracking, and teacher and parent perspectives is planned for a subsequent submission. This work aims to support school leaders, curriculum designers, and policymakers in developing evidence-based, age-appropriate frameworks for responsible AI integration in K-12 education.

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Revision: 21 May 2026
Reviewed (2nd Round): 3 June 2026
Accepted: 4 June 2026

REFERENCES

Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, *7*(1), 52–62.

Bhan, N., Kandikatti, S. S., Kulkarni, T. H., Rajesh, A., Ramli, A. C., Faiz, H., & Hazilan, W. F. (2025). What makes us use AI? A study on high school students' intention to use AI tools for learning. *Global Journal of Educational Thoughts*, *2*(1), 104–117.

Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2024). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in education and teaching international*, *61*(2), 228–239.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, *16*(3), 297–334.

Davis, A. C. (2025). *Faculty Perceptions on the Utilization of Technology (AI) at HBCUs Through the Lens of the Technology Acceptance Model (TAM)* Jackson State University].

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management science*, *35*(8), 982–1003.

Gavião, L. O., Sant'Anna, A. P., Lima, G. B. A., & Garcia, P. A. d. A. (2023). Composition of probabilistic preferences in multicriteria problems with variables measured in Likert scales and fitted by empirical distributions. *Standards*, *3*(3), 268–282.

Gommers, R., Virtanen, P., Haberland, M., Burovski, E., Reddy, T., Weckesser, W., Oliphant, T. E., Cournapeau, D., Nelson, A., & Roy, P. (2024). scipy/scipy: SciPy 1.15. 0. *Zenodo*.

Hirose, M., & Creswell, J. W. (2023). Applying core quality criteria of mixed methods research to an empirical study. *Journal of Mixed Methods Research*, *17*(1), 12–28.

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education promises and implications for teaching and learning*. Center for Curriculum Redesign.

Holmes, W., & Porayska-Pomsta, K. (2023). The ethics of artificial intelligence in education. *Lontoo: Routledge*, 621–653.

Homer, S. T., Chuen, P. W., & Chuah, C. (2025). The role of AI in education: a Southeast Asian student perspective through a Unified theory of acceptance and use of technology lens. *Asia Pacific Journal of Education*, 1–28.

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Kamarudin, M. N. A., Ghani, M. Z., Amin, M., Afiq, M. N., Amran, M., Radzuan, M. F., Ismail, A., & Danial, S. C. (2025). Empowering Inclusive Learning: The Role of Technologies, Artificial Intelligence (AI), and Information Technology (IT) in Special Education. *Jurnal Evolusi*, *6*(2), 98–107.

Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., & Hüllermeier, E. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and individual differences*, *103*, 102274.

Kim, J. (2025). Perceptions and preparedness of K-12 educators in adopting generative AI. *Research in Learning Technology*, *33*.

Kohlberg, L. (1994). Stage and sequence: The cognitive-developmental approach to socialization. The first half of the chapter is a revision of a paper prepared for the Social Science Research Council, Committee on Socialization and Social Structure, Conference on Moral Development, Arden House, Nov 1963.,

Kruskal, W. H., & Wallis, W. A. (1952). Use of ranks in one-criterion variance analysis. *Journal of the American statistical Association*, *47*(260), 583–621.

Livingstone, S., & Helsper, E. (2010). Balancing opportunities and risks in teenagers' use of the internet: The role of online skills and internet self-efficacy. *New media & society*, *12*(2), 309–329.

Mann, H. B., & Whitney, D. R. (1947). On a test of whether one of two random variables is stochastically larger than the other. *The annals of mathematical statistics*, 50–60.

Merga, M. K., & Mat Roni, S. (2018). Children's perceptions of the importance and value of reading. *Australian Journal of Education*, *62*(2), 135–153.

Mintz, J., Holmes, W., Liu, L., & Perez-Ortiz, M. (2023). Artificial intelligence and K-12 education: Possibilities, pedagogies and risks. In (Vol. 40, pp. 325–333): Taylor & Francis.

Ng, D. T. K., Chan, E. K. C., & Lo, C. K. (2025). Opportunities, challenges and school strategies for integrating generative AI in education. *Computers and Education: Artificial Intelligence*, *8*, 100373.

Nilson, L. B., & Zimmerman, B. J. (2023). *Creating self-regulated learners: Strategies to strengthen students' self-awareness and learning skills*. Routledge.

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in health sciences education*, *15*(5), 625–632.

Nunnally, J. C. (1978). Psychometric theory. In: McGraw-hill.

Submitted: 30 April 2026
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Pakpahan, F. H., & Saragih, M. (2022). Theory of cognitive development by Jean Piaget. *Journal of Applied Linguistics*, *2*(1), 55–60.

Piaget, J. (1952). The origins of intelligence in children. International Universities Press. *New York (c1952),* 352–354.

Razak, N. A., Jalil, H. A., Krauss, S. E., & Ahmad, N. A. (2018). Successful implementation of information and communication technology integration in Malaysian public schools: An activity systems analysis approach. *Studies in Educational Evaluation*, *58*, 17–29.

Sabeen, H. (2024). Relationship Between Students' Moral Development and their Academic Achievement: An Extension of Kohlberg's Theory. *International Research Journal of Management and Social Sciences*, *5*(1), 685–701.

Singhal, C. (2024). Exploring the pros and cons of integrating technology in education *Global Journal of Educational Thoughts*, *Volume 1*(1), 74–82.

South, L., Saffo, D., Vitek, O., Dunne, C., & Borkin, M. A. (2022). Effective use of Likert scales in visualization evaluations: A systematic review. Computer graphics forum,

Yau, K. W., Chai, C. S., Chiu, T. K., Meng, H., King, I., & Yam, Y. (2023). A phenomenographic approach on teacher conceptions of teaching Artificial Intelligence (AI) in K-12 schools. *Education and information technologies*, *28*(1), 1041–1064.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? *International journal of educational technology in higher education*, *16*(1), 39.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64–70.

Zumitzavan, V. (2026). Quantitative Method Design and Data Analysis. In *Social Science Methodologies for Management Research: From Philosophy to Practice in the AI Era* (pp. 109–202). Springer.

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APPENDIX A: Survey Instrument

Note. The survey was administered in paper format during April 2026. Language was adapted for age-appropriateness across Key Stages 2 to 4. Section D items were presented with a 1–5 response grid on the physical form.

GLOBAL SCHOOLS RESEARCH CLUB
Student Survey: AI Usage and Age
Researcher: Ramis Rao | Academic Year 2025/26 | CONFIDENTIAL & ANONYMOUS

Thank you for taking part in this survey. There are no right or wrong answers. We want to know about YOUR experience with AI. This survey is completely anonymous. It should take about 10–15 minutes. AI tools include apps like ChatGPT, Google Gemini, Copilot, Siri, Alexa, Snapchat AI, or any tool that answers questions or helps you write.

SECTION A: About You

Q1. What is your current year group?
○ Year 3 ○ Year 4 ○ Year 5 ○ Year 6 ○ Year 7 ○ Year 8 ○ Year 9 ○ Year 10

Q2. How old are you, in years?
○ 7–8 ○ 9–10 ○ 11–12 ○ 13–14 ○ 15–16

Q3. What devices do you use at home? (Tick all applicable options)
○ Smartphone ○ Tablet ○ Laptop / Computer
○ Smart speaker (e.g. Alexa, Google Home) ○ None / I don't have my own device

SECTION B: Your AI Utilisation

Q4. Have you ever used an AI tool (e.g. ChatGPT, Gemini, Copilot)?
○ Yes, I use it regularly ○ Yes, I have tried it a few times
○ I have heard of it but never used it ○ No, I have never heard of it

Q5. How often do you use AI tools?
○ Every day ○ A few times a week ○ Once a week ○ Once a month or less ○ Never

Q6. Where do you usually use AI tools? (Tick all applicable options)
○ At home for schoolwork / homework ○ At school during lessons
○ At home for personal use / fun ○ I don't use AI tools

Q7. Which AI tools have you used? (Tick all applicable options)
○ ChatGPT ○ Google Gemini ○ Microsoft Copilot ○ Siri / Alexa / Google Assistant
○ Snapchat AI / social media AI ○ Other: _____
○ I have not used any AI tools

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Q8. What do you mainly use AI for? (Tick up to 3)
○ Getting help with homework or assignments ○ Explaining things I don't understand
○ Writing essays or stories ○ Generating images or creative content
○ Entertainment / games / chat ○ Searching for information ○ Other: _____

SECTION C: AI and Your Learning

Q9. Do you think AI helps you learn better?
○ Yes, definitely ○ Sometimes ○ Not sure ○ No ○ I don't use AI

Q10. How often do you double-check the facts or information given to you by an AI tool?
○ Always ○ Often ○ Sometimes ○ Never ○ I don't use AI

Q11. Has a teacher or parent ever taught you how to use AI responsibly?
○ Yes, at school ○ Yes, at home ○ Both at school and at home
○ No, I figured it out myself ○ No, I don't use AI

Q12. Do you know the risks of using AI (e.g. wrong information, privacy, over-reliance)?
○ Yes, I know a lot about this ○ I know a little ○ I have heard of it but don't know much
○ No, I don't know about this

Q13. Have you ever submitted AI-generated work as your own to a teacher?
○ Yes, often ○ Yes, once or twice ○ No, never ○ I didn't know that was an issue

SECTION D: Attitudes and Opinions
For each statement below, indicate your degree of agreement by placing a tick (✓):
1 = Strongly Disagree | 5 = Strongly Agree

D1. AI makes learning more interesting for me.	1 □ 2 □ 3 □ 4 □ 5 □
D2. I worry that using AI makes me lazy.	1 □ 2 □ 3 □ 4 □ 5 □
D3. I feel confident using AI tools safely.	1 □ 2 □ 3 □ 4 □ 5 □
D4. AI should be taught in school as a subject.	1 □ 2 □ 3 □ 4 □ 5 □
D5. I think students my age are ready to use AI.	1 □ 2 □ 3 □ 4 □ 5 □
D6. I would use AI less if my school had stricter rules.	1 □ 2 □ 3 □ 4 □ 5 □
D7. AI helps me when I am stuck with a problem.	1 □ 2 □ 3 □ 4 □ 5 □

SECTION E: Open Reflection

Q14. In your own words: What is the greatest advantage of AI for students?

Q15. In your own words: What is the greatest RISK of using AI for a student?

Thank you for completing this survey. Your responses are valuable to our research.