

Preparing Future Educators for AI-Driven Consumerism: Examining AI Literacy and Ethical Consumerism Among Initial Teacher Education Students

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Preparing Future Educators for AI-Driven Consumerism

Exploring AI Literacy and Ethical Consumerism in Initial Teacher Education

- **Background:** AI is reshaping how consumers make decisions through tools like personalised advertising, algorithmic pricing, and automated financial services, often invisibly.
- **Purpose:** Investigate how Initial Teacher Education (ITE) students in Ireland understand AI-driven consumerism and their preparedness to teach AI literacy (AIL) and ethical consumerism.
- **Method:** Cross-sectional survey (N = 93), assessing five areas: awareness, ethical concerns, teaching confidence, curriculum exposure, and views on education's role.
- **Key Findings:**
 - Moderate awareness of AI in consumer contexts
 - Limited confidence in teaching due to minimal curriculum exposure
 - Ethical concerns (e.g. data privacy, manipulation) noted but not well connected to teaching practice
- **Conclusion:** Highlights the need for integrating AI literacy and ethics in teacher education through an interdisciplinary curriculum and targeted professional development.

Digitalisation and the Changing Consumer Landscape

Digital Shift

- Daily life and commerce are increasingly digital, with AI and big data driving interactions in virtual spaces (Vitezić & Perić, 2024).

Evolution of AI

- From Turing's early theories to today's predictive algorithms, AI has advanced significantly, reshaping consumer experiences (Holmes et al., 2019; OECD, 2019).

AI Integration in Consumer Contexts

- Targeted Marketing & Online Recommendations
- Dynamic Pricing & Automated Financial Services (Ayub et al., 2019)

Digitalisation and the Changing Consumer Landscape

Data-Driven Personalisation

- AI uses big data and machine learning to identify patterns and predict consumer preferences (Cheng & Wang, 2018; Rabassa et al., 2021; Fayyad et al., 1996).

Deep Neural Networks (DNNs)

- These systems learn psychological and behavioural traits to personalise product recommendations (Li et al., 2022).

AI Influence

- **Personalised Ads** based on browsing history (Qadri et al., 2025)
- **Dynamic Pricing** tailored to user behaviour and location (André et al., 2017; Grewal et al., 2021)
- **Convenience Features:** Smart assistants and recommendation systems enhance ease in shopping, media use, and financial planning

The Role of AI in Contemporary Consumerism

Empowering Yet Risk-Laden

- While AI enhances convenience and efficiency in consumer decision-making, it also introduces significant risks, bias, privacy invasion, loss of control, and lack of accountability (Grewal et al., 2021; Akter et al., 2021; Vallis et al., 2024).

Ethical Implications

- The ‘dark side’ of AI highlights challenges around transparency, data misuse, and ethical governance in digital marketplaces (André et al., 2018; Ma et al., 2024).

Influence on Youth

- AI shapes how young people perceive value and make choices in digital environments, influencing identity, autonomy, and consumption behaviours (Ameem et al., 2023; Lim, 2023; Roozen et al., 2025).

Conclusion

AI is not just a technological tool, it is a cultural and ethical force that redefines consumer experiences and demands critical educational responses.

The Gap in Teacher Education Programmes

What is AI Literacy (AIL)?

- AIL goes beyond technical skills, it includes critical understanding, ethical awareness, and civic responsibility (UNESCO, 2021; Long & Magerko, 2020).

Key Competencies

- Evaluating how AI collects and uses data
- Understanding AI-driven decision-making
- Recognising and addressing systemic bias (Akter et al., 2021; Li et al., 2022; Ning et al., 2025)

Why It Matters

- AI now shapes how young people access information, make choices, and form values. Educators must be equipped to foster students' agency and resilience in AI-influenced environments (Chiu et al., 2022; Schüller, 2022; Karataş et al., 2025).

Current Challenge

- Many teacher education programmes lack structured AIL training, leaving future educators underprepared to guide students in ethical and informed digital citizenship.

Study Rationale and Educational Relevance

AI's Growing Role

AI technologies, such as personalised ads, algorithmic pricing, and data-driven recommendations, are reshaping consumer behaviour (Akter et al., 2021; Qadri et al., 2025).

Policy Push

- The EU's 2020 White Paper calls for AIL across all education levels, yet most AIL efforts remain STEM-focused and fragmented (Abbasi et al., 2025; Yim, 2024).

Gap in Teacher Education

- AIL is underexplored in ITE programmes, especially in terms of practical classroom integration and ethical decision-making (Sperling et al., 2024; Kohnke et al., 2025).

Study Focus and Approach

Theoretical Lens

The study examines AIL through three dimensions:

- Episteme (theoretical knowledge)
- Techne (practical application)
- Phronesis (ethical judgment)

Study Objectives

- Assess AI familiarity and perceived consumer impact
- Explore ethical concerns (privacy, bias, manipulation)
- Evaluate confidence in teaching AIL and consumer ethics
- Identify curricular exposure and barriers/supports

Methodology

- Cross-sectional survey (N = 93) with Irish ITE students
- Informed by the AILST framework (Ning et al., 2025)

Methodology

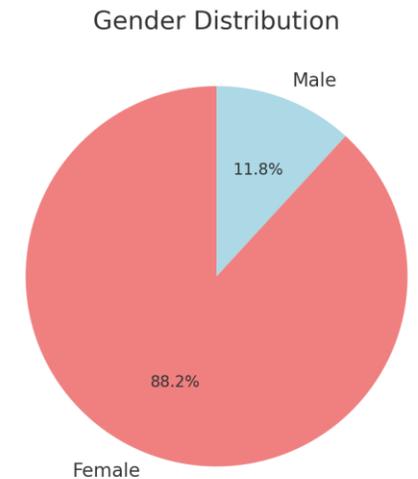
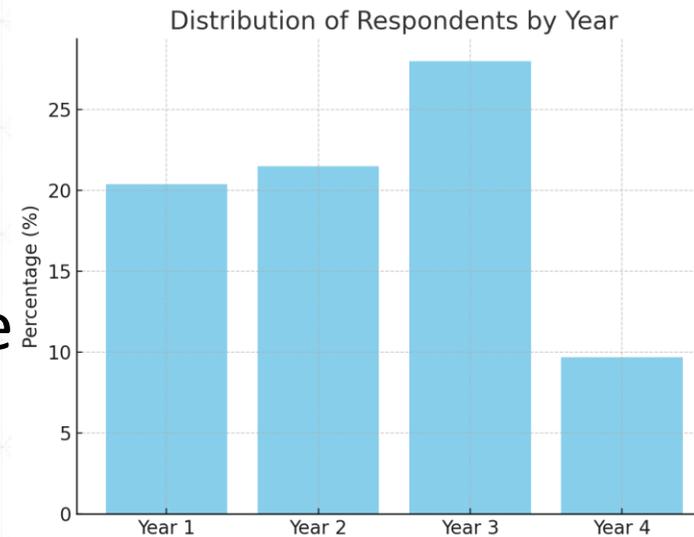
Research Design

- Cross-sectional quantitative study
- Ethical approval granted (MICREC JFREC2025-012)

Focus

- ITE students' awareness, confidence and perceptions of Alland ethical consumerism

Participants



Survey Instrument & Procedure

Instrument

- Based on ALLST (Ning et al., 2025) + original items
- Topics: AI knowledge, ethics, consumer awareness, teaching confidence, curriculum exposure
- Likert-scale, multiple-choice, ranking, and open-ended items
- High reliability across subscales ($\alpha > .75$)

Procedure

- Administered via Qualtrics
- Distributed by institutional gatekeepers
- Anonymous, voluntary participation

Data Analysis Approach

Tools & Preparation

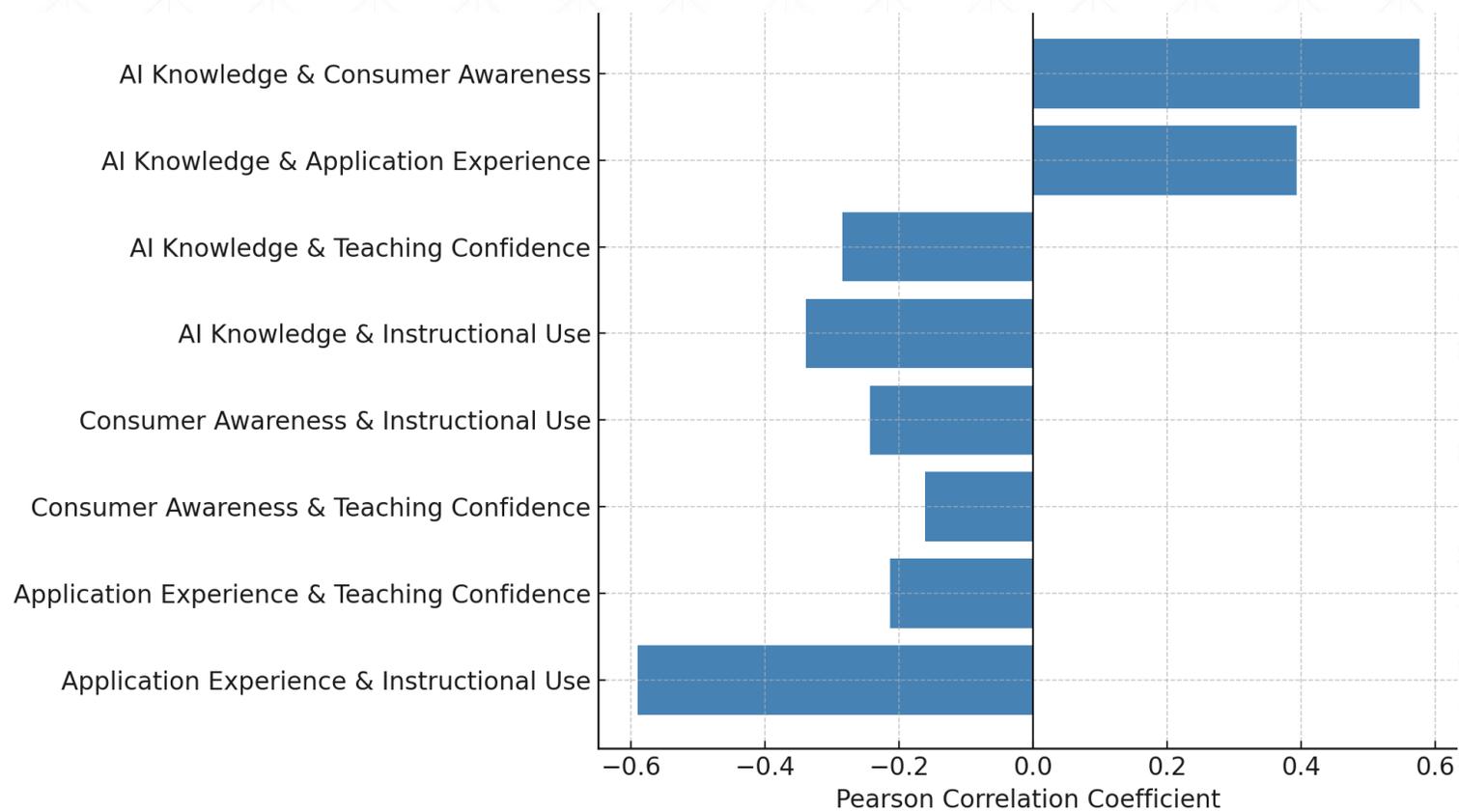
- Data analysed using SPSS v29

Checked for normality (histograms, Q–Q plots); log transformations applied where needed

Statistical Tests

- Descriptive stats (means, SDs, frequencies)
- Cronbach's α : internal consistency
- Pearson correlation: relationships between ALL constructs
- t-tests: gender & curriculum exposure comparisons
- One-way ANOVA: differences by year group
- Multiple & hierarchical regression: predictors of teaching confidence
- Chi-square tests (χ^2): categorical associations (e.g. curriculum exposure \times confidence)

Results- Correlations among key variables



Awareness of AI in Consumer Contexts

Key Findings

AI awareness (8-item scale)

- Mean = 3.50 | SD = 0.94 | $\alpha = 0.842$
- Students show mixed familiarity with AI-driven marketing and algorithmic influence

Self-assessed AI knowledge (10-item scale)

- Mean = 2.91 | SD = 1.02 | $\alpha = 0.834$
- Wide variation in confidence and understanding

ANOVA Result

- No significant difference across years ($p = 0.673$)
- Indicates limited scaffolding of AI topics across programme stages

Correlation & Regression Insights

Key Correlations

Strong

- AI Knowledge \leftrightarrow Consumer Awareness ($r = 0.576, p < .001$)

Negative

- AI Knowledge \leftrightarrow Teaching Confidence ($r = -0.284$)
- Application Experience \leftrightarrow Instructional Use ($r = -0.590$)

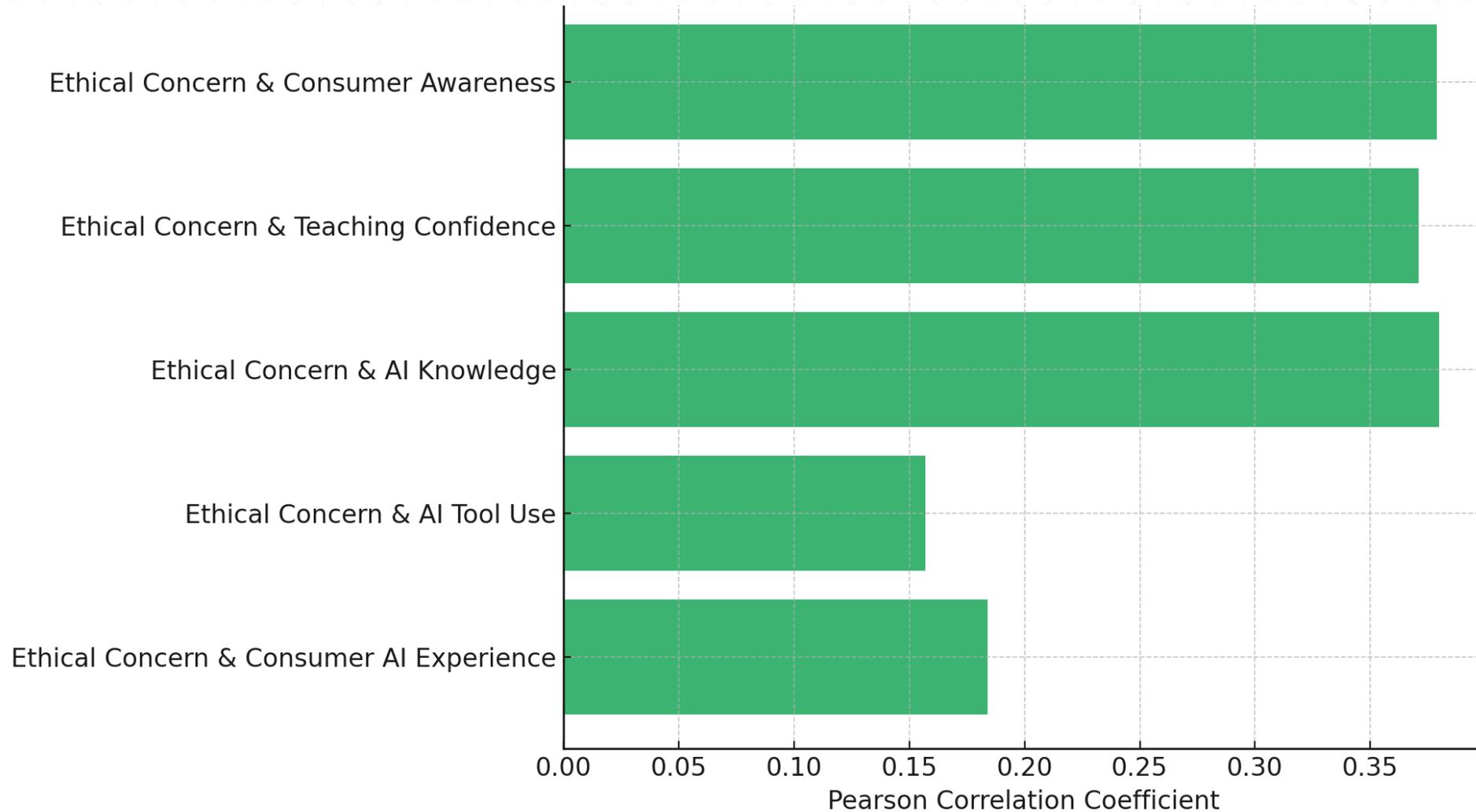
Regression Model

- Significant predictor of consumer awareness
AI Knowledge ($\beta = .573, p < .001$)
- Not significant
Ethical concern, gender, curriculum exposure

Conclusion

- Conceptual AI knowledge is key to understanding AI in consumer life
- Ethics and exposure alone are insufficient without technical grounding

Correlations Involving Ethical Concerns



Ethical Awareness – Key Findings

Scale Overview

- 7-item scale, excellent reliability ($\alpha = 0.952$)
- Mean = 3.23 (SD = 1.42)
- Measured concerns about privacy, bias, fairness, and legal responsibility

Correlations

- Ethical concern \leftrightarrow AI Knowledge ($r = 0.380, p < .001$)
- Ethical concern \leftrightarrow Consumer Awareness ($r = 0.379, p = .005$)
- Ethical concern \leftrightarrow Teaching Confidence ($r = 0.371, p < .001$)
- Not significantly linked to AI tool use or consumer experience

Key Insight

- Ethical awareness aligns with critical understanding and teaching confidence, but not with hands-on AI use alone

Regression Insights on Ethical Concern

Teaching Confidence (Model 1)

- Ethical concern = only significant predictor ($\beta = 0.350, p < .001$)
- AI knowledge & consumer awareness = non-significant

Teaching Confidence (Model 2, n=53)

- AI knowledge strongest predictor ($\beta = 0.626$)
- Ethical concern not significant alone, but supports deeper confidence when paired with knowledge

Instructional Use of AI

- Ethical concern = significant predictor ($\beta = 0.432, p < .001$)
- AI knowledge = not significant

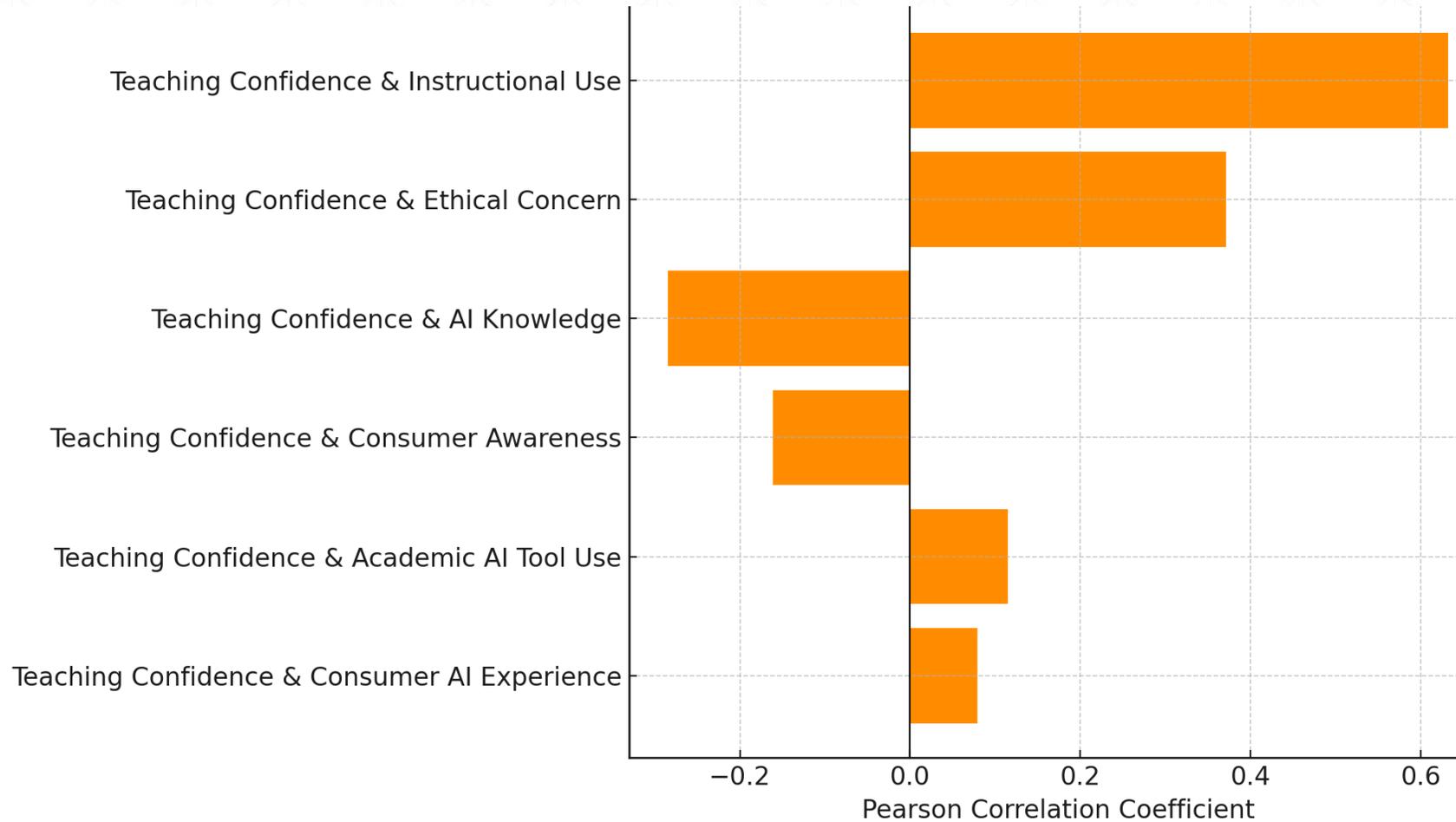
Hierarchical Models (Consumer Awareness)

- In one sample: ethical concern did not add value
- In another: ethical concern, AI knowledge, and tool use all significant

Conclusion

- Ethical reflection matters, but is most impactful when embedded in technical and pedagogical training

Correlations with Teaching Confidence



Teaching Confidence- Key Findings

Scale Overview

- 8-item scale, excellent reliability ($\alpha = 0.927$)
- Mean = 2.69 (SD = 1.45)
- Highest confidence in
 - Instructional design (M = 3.10)
 - Interactive content (M = 2.94)
 - Lesson planning (M = 2.90)
- Lowest in:
 - Feedback (M = 2.37)
 - Assessment (M = 2.33)
 - Personalised learning (M = 2.67)

Key Correlations

- Strongest: Confidence \leftrightarrow Instructional Use ($r = 0.632$)
- Moderate: Confidence \leftrightarrow Ethical Concern ($r = 0.371$)
- Negative: Confidence \leftrightarrow AI Knowledge ($r = -0.284$)
- No link with tool use or consumer experience

Predictors of Teaching Confidence

Model 1

- AI Knowledge = strongest predictor ($\beta = 0.617$, $p < .001$)
- Consumer Awareness also significant ($\beta = 0.299$)
- Ethical Concern, Tool Use = Not significant

Model 2 (Expanded)

- Instructional Use = only significant predictor ($\beta = 0.532$)
- Others not significant

Hierarchical Model

- AI Knowledge & Consumer Awareness explained 73.1% of variance
- Adding Instructional Use added 2% (approaching significance)

Curriculum Exposure t-Test

- Significantly higher Ethical Concern ($d = 3.89$)
- Lower Instructional Use ($d = 1.35$)
- Moderate effects for Teaching Confidence ($d = 0.75$) and AI Knowledge ($d = 0.54$)

Conclusion

- Teaching confidence is shaped by a complex mix of conceptual knowledge, ethical reflection, and perceived instructional ability
- Formal instruction boosts ethics, but may lack applied modelling for classroom use

Curriculum Exposure – What’s Missing?

Key Findings

- Few students ($n = 8$) reported formal instruction on AI
- **Higher ethical concern** ($d = 3.89$), but **lower instructional use** ($d = 1.35$)
- No significant improvement in:
 - Teaching confidence
 - AI knowledge
 - Consumer awareness (Moderate-to-large effect sizes still observed)

Student Experience with AI Tools

- **Low average use:**
 - Academic tools: $M = 1.65$
 - Consumer tools: $M = 1.60$
- **High variability** suggests lack of structured exposure

Practical Gaps and Pedagogical Readiness

Pedagogical Confidence Scale

- 6-item scale ($\alpha = 0.763$), Mean = 3.24 (SD = 0.93)
- Wide range of responses (0.8 to 5.0)

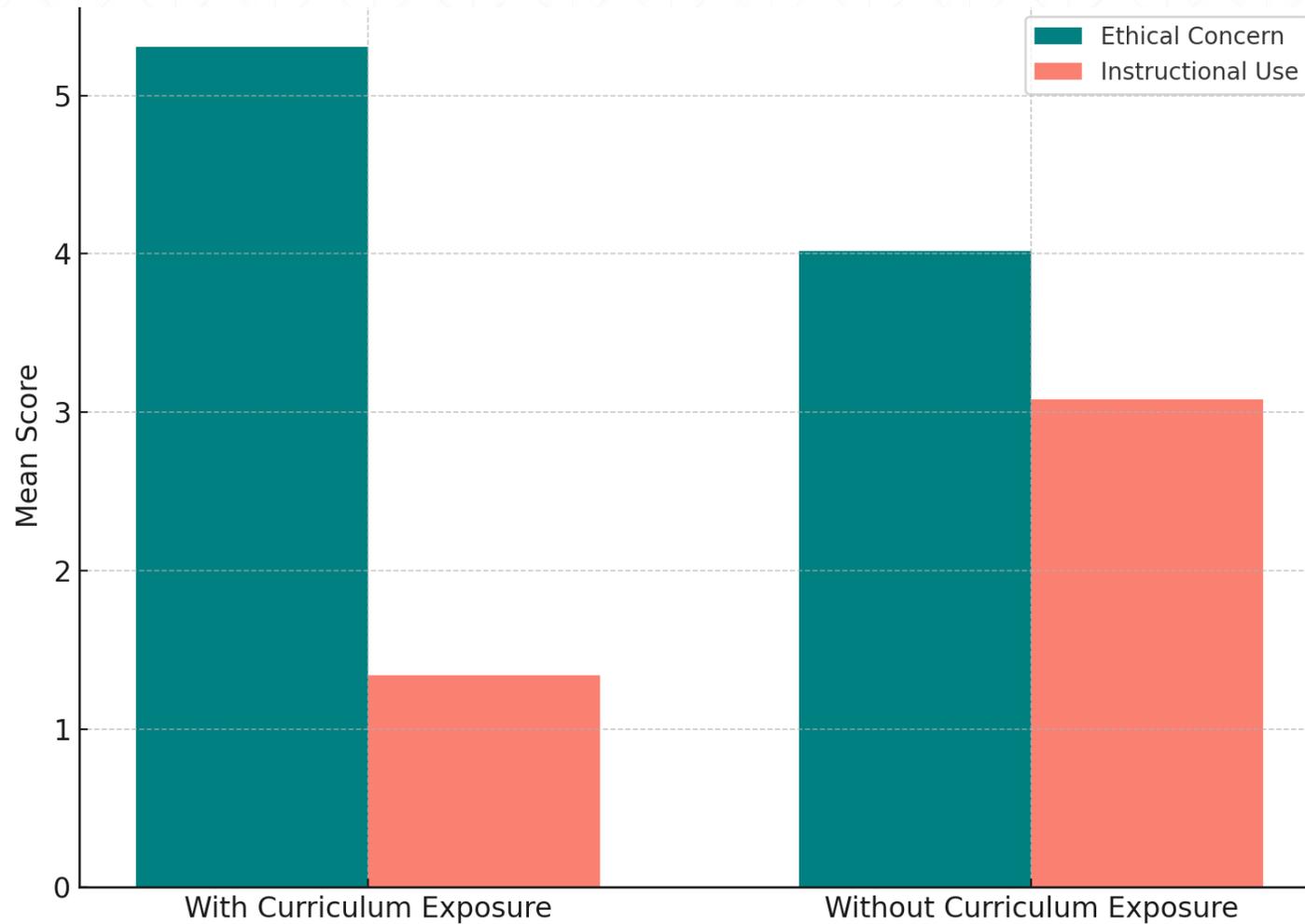
Correlations & Predictors

- Instructional use of AI \leftrightarrow Teaching confidence ($r = 0.632, p < .001$)
- Curriculum exposure did **not** predict consumer awareness in regression models
- **AI knowledge** remained the strongest predictor ($\beta = 0.761$)

Conclusion

- Current curriculum may increase ethical awareness, but not instructional capability
- Hands-on integration is key: ITE programs must embed AIL across practical and subject-specific modules

Effect of Curriculum Exposure on Ethical Concerns and Instructional Use



Impact of Formal Instruction

Curriculum Exposure Effects

Students with formal AI instruction (n = 8) showed:

- **Higher ethical concern** (M = 5.31 vs. 4.02, d = 0.90)
- **Lower instructional use** (M = 1.34 vs. 3.08, d = 1.29)
- **Higher AI knowledge** (d = 1.00)
- **Teaching confidence effect** (d = 0.93, not statistically significant)

Key Insight

- Formal instruction builds awareness and knowledge
- Lacks consistent effect on practical teaching confidence

Broader Role of Education

Regression Findings – Consumer Awareness

- Model explained 59% variance (adj. $R^2 = 0.548$)
- AI knowledge = only significant predictor ($\beta = 0.761$)

Regression Findings – Teaching Confidence

- Explained 74.2% variance (adj. $R^2 = 0.726$)
- AI knowledge ($\beta = 0.626$) and consumer awareness ($\beta = 0.266$) significant
- Ethical concern = not significant

Student Attitudes Toward AI

- 10-item scale ($\alpha = 0.846$), Mean = 3.91
- Strong agreement on AI's usefulness in teaching and learning

Conclusion

- ITE programmes must move beyond theory
- Embed practice-based, scaffolded AIL to develop educators who are both informed and equipped

Discussion: AI Awareness in Consumer Contexts

- **No progression** in AI awareness across ITE year groups
Suggests lack of scaffolded curriculum integration (Gouseti et al., 2025; Sperling et al., 2024)
- **Moderate awareness** overall (M = 3.50)
But wide variation reflects inconsistent understanding of AI-driven marketing and algorithmic decisions

Conceptual vs Practical Gaps

- Students' AI knowledge strongly predicts consumer awareness- Reinforces the need to move beyond functional use to deeper conceptual understanding (Long & Magerko, 2020)
- Disparities in tool familiarity highlight inequities in exposure (Ng et al., 2021; Medina-Gual et al., 2022)

Implications for Teacher Education

Curricular Shortcomings

- No significant year-on-year growth in AI literacy
 - Missed opportunity to build cumulative AIL throughout the programme
- Informal AI interactions are not being pedagogically leveraged

Research Alignment

- Confirms international concerns that ITE is lagging behind AI's societal role (Kohnke et al., 2025; Hur, 2025)
- Lack of structured reflection and pedagogical modelling for AI in education

Call to Action

- Embed structured, progressive AI literacy from Year 1
- Ensure balance of technical knowledge, ethical reflection, and instructional application
 - In line with UNESCO (2024), Ning et al. (2025), and Ng et al. (2023)

Discussion – Ethical Concerns in AI-Driven Consumerism

- **Moderate ethical concern** among pre-service teachers
- Strongly correlated with AI knowledge, consumer awareness, and teaching confidence
 - But not linked to AI tool use or consumer experience
- Indicates that ethical reflection does not emerge from exposure alone
 - Requires explicit instruction and guided engagement (Gouseti et al., 2024; Kočková et al., 2024)

Predictive Role

- Ethical concern was the only significant predictor of teaching confidence in one model
 - Suggests moral reasoning may be more impactful than technical understanding when scaffolding is weak

Implications and International Context

Nuanced Understanding

- In a secondary model, AI knowledge > ethical concern
 - Ethical literacy requires technical and contextual foundations to be effective (Sperling et al., 2024)

Practice Does Not Equal Ethics

- Hands-on use alone does not foster ethical concern
 - Challenges assumption that practical exposure leads to reflection

Global Perspectives

- Du et al. (2024): Ethical concern can shape attitudes and intentions but lacks direct influence without self-efficacy and application

Conclusion

- Ethical concern is vital, but insufficient on its own
- ITE must integrate structured, practice-based ethics instruction to support AI literacy and responsible teaching
 - Prevents uncritical adoption and reinforces equity and fairness in digital education

Discussion – Teaching Confidence in AI

- **Confidence moderate and uneven**
 - Higher in **lesson planning & instructional design**
 - Lower in **feedback, assessment, and personalised learning**
- **Reflects a gap between awareness and practical application** (Guan et al., 2025; Kohnke et al., 2025)

International Context

- Pre-service teachers are comfortable using AI for low-stakes tasks
 - But lack strategies for complex or ethically sensitive uses (Özer-Altınkaya & Yetkin, 2025)
- Confidence grows with guided, experiential training, not passive exposure (Hur, 2025)

The Confidence Paradox and Curriculum Implications

Confidence Paradox

- More technical knowledge = more caution
 - Indicates deeper awareness of AI's risks (Hur, 2025; Guan et al., 2025)

Ethical Concern & Instructional Use

- Ethical concern supports confidence, but only within a pedagogical framework
- Formal instruction builds awareness but not applied classroom skills
 - Students feel informed yet underprepared (Kohnke et al., 2025)

Conclusion & Recommendation

- **Confidence depends on practice-based integration**
- ITE must embed AI literacy across:
 - Teaching methods
 - Ethics modules
 - Subject-specific pedagogies
- To ensure graduates are both ethically informed and instructionally equipped

Discussion – Curricular Gaps in AI Literacy

- **Formal AI instruction** reported by few students; effects inconsistent
 - No reliable gains in confidence, knowledge, or competence
- Ethical concern increased with exposure, but did not improve readiness to teach AI
 - Reflects gap between theory and practice (Ayanwale et al., 2024; Sperling et al., 2024)

Inconsistent Exposure

- Descriptive data showed fragmented experience with AI tools
 - Matches findings from Velandar et al. (2024) on incidental learning
- Curriculum exposure did not predict consumer AI awareness
 - AI knowledge was the strongest predictor

Recommendations for Curriculum Reform

Systemic Issues

- ITE curriculum lacks structured, progressive integration of AIL
 - Leads to uneven preparation and missed opportunities for pedagogical modelling
- Current content favours conceptual over practical instruction (Karataş, 2024)

What's Needed

- Systematic embedding of AIL across:
 - Theory and practice-based modules
 - Subject-specific planning and microteaching
 - Placement and experiential learning
- Adopt "Intelligent TPACK": link ethical, technical, and instructional knowledge (Velandar et al., 2024)

Conclusion

- ITE programmes must shift from incidental exposure to intentional design
 - Prepare educators to critically and practically engage with AI in both classroom and consumer contexts

Education's Role in Developing AI-Literate Consumers

Key Insights

- Structured AI instruction increases ethical concern and knowledge
 - But does not consistently build teaching confidence or practical skills
- Mirrors global findings: theory is valued, but application is lacking (Ayanwale et al., 2024; Kohnke et al., 2025)

Strongest Predictors

- AI knowledge predicted both consumer awareness and teaching confidence
 - More impactful than ethical concern or tool exposure (Guan et al., 2025)

Student Perceptions

- Students view AI as valuable in education
 - Risk: optimism without guidance may lead to shallow, uncritical classroom use

Bridging the Theory-Practice Divide

The Challenge

- Disconnect between conceptual understanding and applied integration
 - Students lack opportunities to model or simulate AI use in teaching
 - Confidence remains moderate and fragmented (Ng et al., 2021; Velandar et al., 2024)

What's Needed

- Treat AIL as a holistic, interdisciplinary strand
 - Combine:
 - Ethics
 - Technical understanding
 - Pedagogical practice
- Aligns with calls to embed AI as a socio-technical competence (Karataş, 2024)

Conclusion

- ITE must move beyond awareness
 - Embed scaffolded, practice-based learning
 - Include: microteaching, peer collaboration, guided tool use
 - To prepare educators who are confident, competent, and critically engaged

Conclusion Key insights

The Challenge

- AI is transforming consumer behaviours, decision-making, and digital citizenship
- ITE programmes must equip future teachers to critically engage with AI in education and consumer contexts

Key Findings

- **AI knowledge** = strongest predictor of teaching confidence and consumer awareness
- **Ethical concern** matters most when paired with technical understanding and contextual application
- **Curricular exposure** improved awareness but didn't consistently enhance instructional readiness

The Gap

- Current AI-related content in ITE is often:
 - Overly theoretical
 - Fragmented
 - Lacking practice-based integration

Call to Action – Embedding AI Literacy in ITE

What's Needed

- Treat ALL as a core, interdisciplinary competence
- Combine:
 - Conceptual knowledge
 - Ethical reflection
 - Pedagogical application

Recommendations

- Embed AI across ITE modules (methods, placement, microteaching)
- Foster collaboration across education, technology, and business faculties
- Provide ongoing CPD for pre- and in-service teachers

Conclusion

- Preparing AI-literate, ethically aware educators is a pedagogical and policy priority
- ITE must empower teachers to guide learners in an AI-rich, ethically complex, and consumer-driven world

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