Impacts of AI on Education

– A Statistical Analysis –

Team Members

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Introduction to the Topic

Artificial Intelligence (AI) is changing the way we learn, teach, and interact in education. This project explores how AI tools are perceived by students and educators—and whether their use leads to statistically measurable differences in opinions and outcomes.

Questions Driving This Study:

- How do students and educators differ in their views on AI?
- Are AI tools seen as beneficial or overwhelming?
- Can statistical tools help quantify the actual impact?

Data Source

This project is based on primary data collected through a structured Google Form survey. The form was distributed among students, educators, and professionals from various academic and professional backgrounds.

Purpose of the Survey

The goal was to understand real-world perceptions and experiences regarding AI-powered educational tools, their effectiveness, concerns, and usage trends.
To access the actual form click here

AI in Education – Google Form (Responses)

Data overview

Total responses = 150

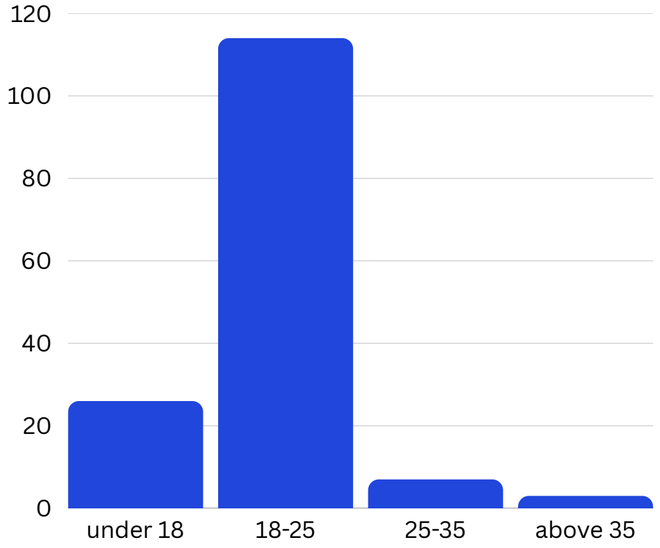
✓ Age Distribution:

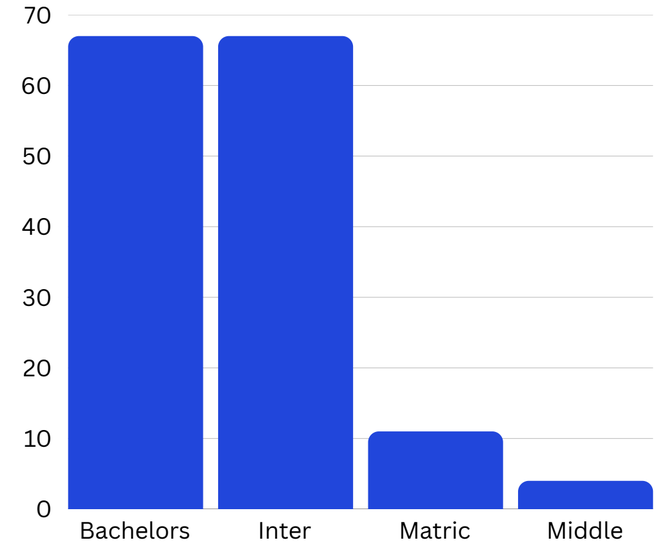
76% respondents aged 18-25 (114/150)
Under 18: 17% (26/150)
→ Dominant youth perspective (93% under 25)

✓ Academic Profile:

45% hold bachelor's degrees (67/150)
60% computer science students (90/150)

Majority: Young (18-25), tech-affiliated undergraduates
Aligns with AI-in-education focus (computer science bias noted)





AI Tool Usage – Extended Sample Insights

AI Tool Adoption Frequency Among Respondents (n = 150)

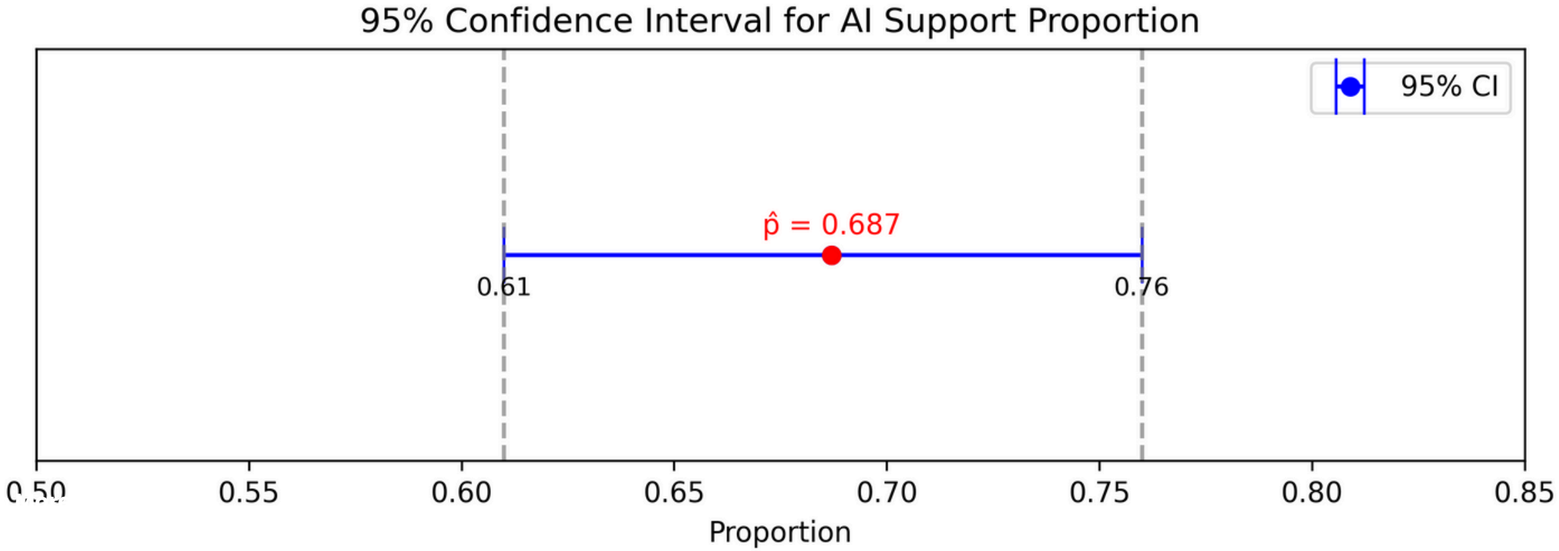
Interpretation:

- Nearly 3 in 4 respondents use AI tools frequently.
- Only 10% reported rare or no usage.
- Usage is heavily skewed toward frequent interaction → strong AI integration in workflow.

Usage Frequency	Count	Percentage
Never	6	4.0%
Rarely	9	6.0%
Occasionally	33	22.00%
Frequently	110	73.3%

Confidence Interval for AI Integration Support

- Estimated Proportion ($\hat{p}$): 68.7%
- Confidence Level: 95%
- Confidence Interval: [61%, 76%]
- (Calculated as: $\hat{p} \pm z \times \sqrt{(\hat{p}(1-\hat{p})/n)}$)



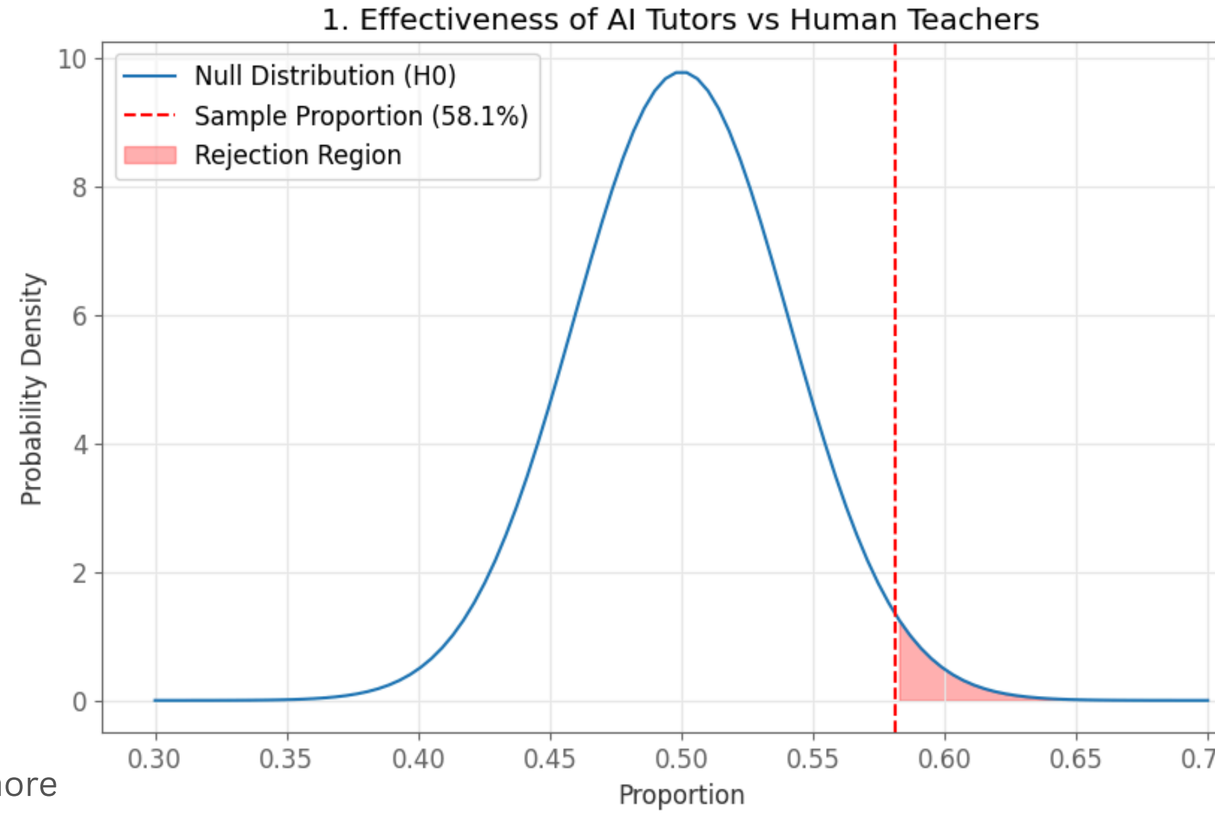
We are 95% confident that the true proportion of students supporting AI integration lies between 61% and 76%.

Effectiveness of AI Tutors vs Human Teachers

H0: μ = 50% (AI tutors are equally effective as human teachers)

H1: μ > 50% (AI tutors are more effective than human teachers)

- Sample proportion ($\hat{p}$) = 58.1% (from "More effective than teachers" responses)
- Population proportion (p_0) = 50%
- n = 150
- σ = sqrt($p_0(1-p_0)/n$) = 0.0408
- **Zcalc = (0.581-0.5)/0.0408 = 1.99**
- **Ztab (α=0.05, one-tailed) = 1.645**



Conclusion:

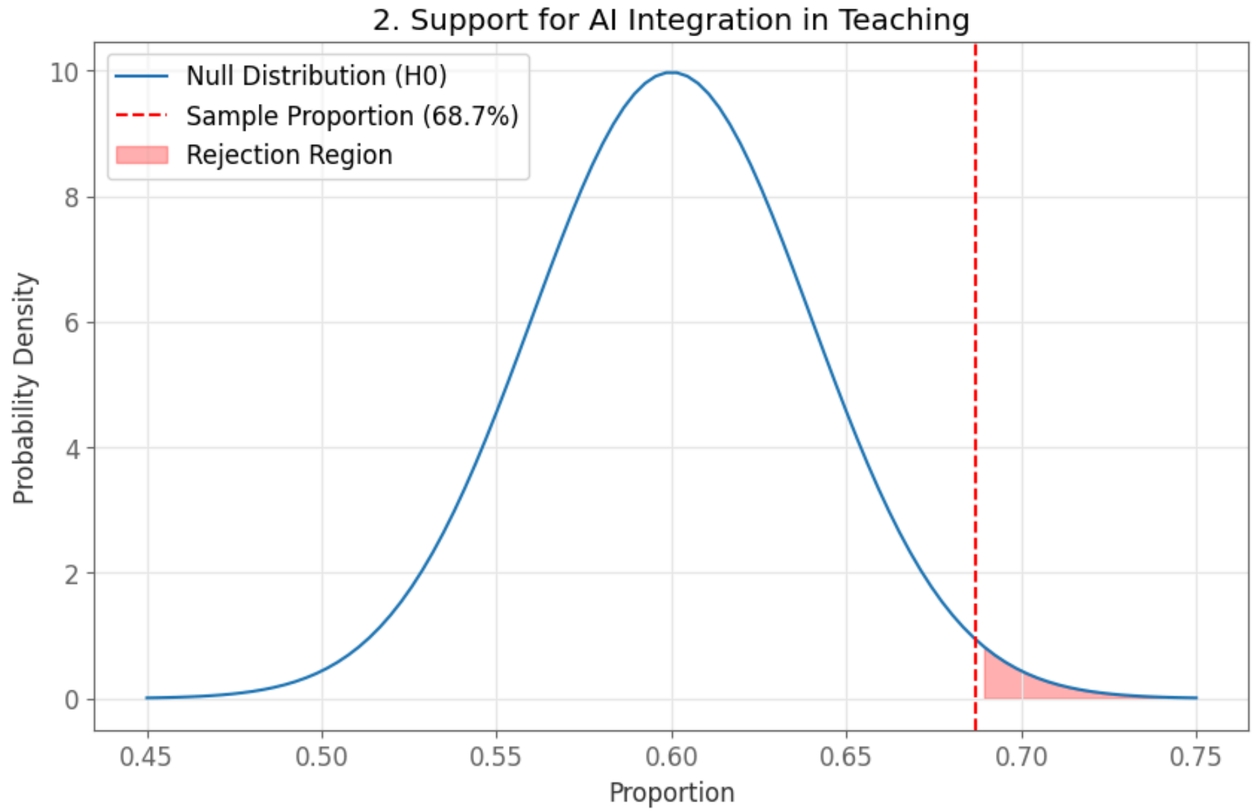
Since Zcalc (1.99) > Ztab (1.645), we reject H0. AI tutors are perceived as more effective than human teachers.

Support for AI Integration in Teaching

H0: p = 0.6 (60% support AI integration)

H1: p > 0.6 (More than 60% support AI integration)

- $\hat{p}$ = 68.7% (from "Yes, completely" and "Partially" positive responses)
- p_0 = 0.6
- σ = sqrt(0.6x0.4/150) = 0.04
- **Zcalc = (0.687-0.6)/0.04 = 2.175**
- **Ztab (α=0.05, one-tailed) = 1.645**



Conclusion:

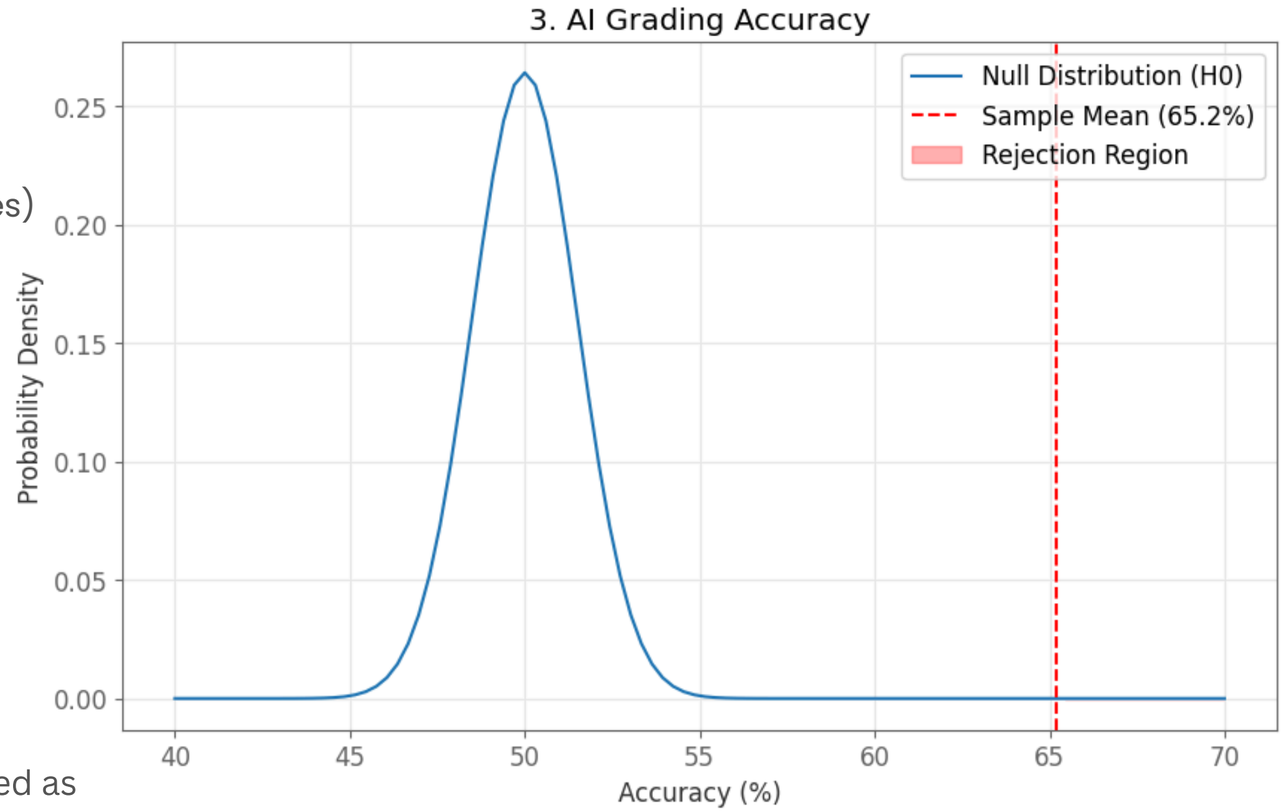
Since Z-calc (2.175) > Z-tab (1.645), we reject H0. More than 60% of respondents support AI integration in teaching.

AI Grading Accuracy

H0: μ = 50% (AI grading is 50% accurate)

H1: μ > 50% (AI grading is more than 50% accurate)

- Sample mean ($\bar{x}$) = 65.2% (from positive "accurate" responses)
- μ_0 = 50%
- Sample SD (s) = 18.5%
- n = 150
- **Zcalc = (65.2-50)/(18.5/sqrt150) = 10.05**
- **Ztab (α=0.05, one-tailed) = 1.645**



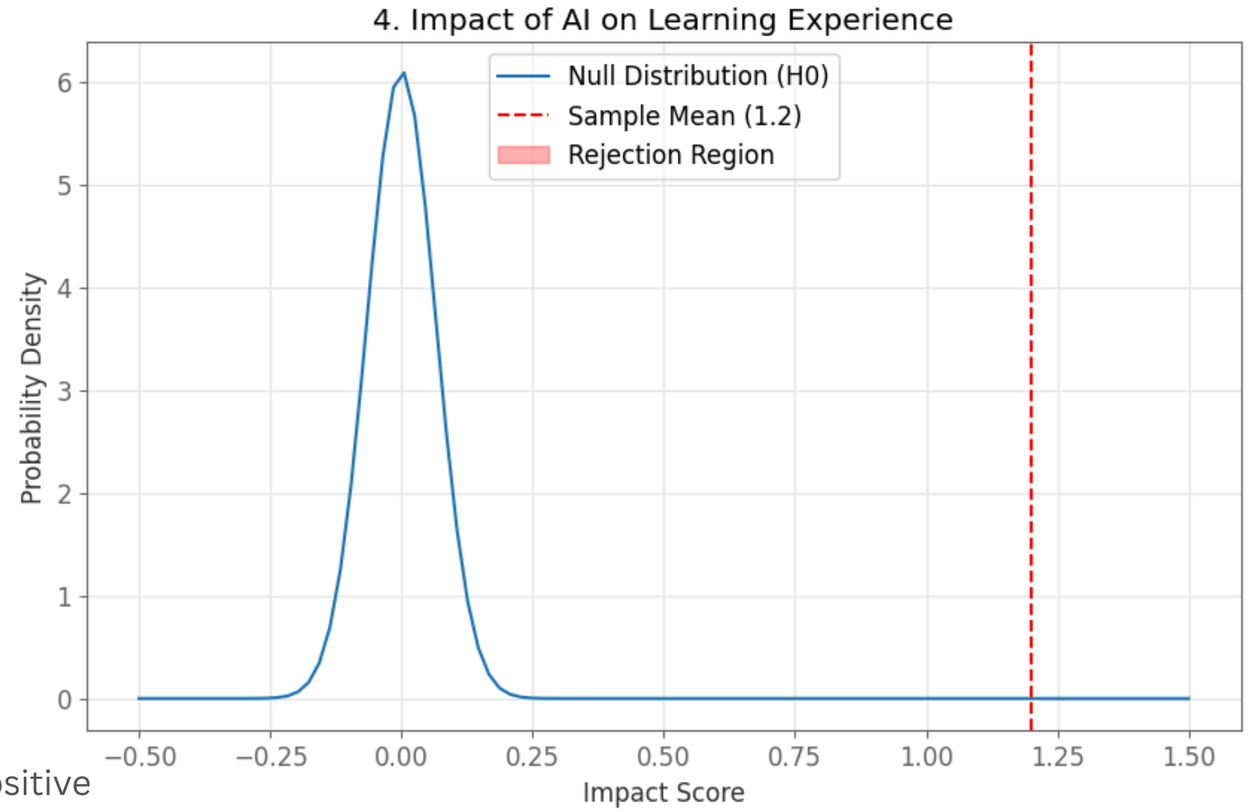
Conclusion:
Since Z-calc (10.05) > Z-tab (1.645), we reject H0. AI grading is perceived as significantly more accurate than 50%.

Impact on Learning Experience

H0: μ = 0 (No impact on learning experience)

H1: μ > 0 (Positive impact on learning experience)

- Sample mean ($\bar{x}$) = 1.2 (on a scale of -2 to +2 from responses)
- μ_0 = 0
- Sample SD (s) = 0.8
- n = 150
- **Zcalc = (1.2-0)/(0.8/sqrt150) = 18.37**
- **Ztab (α=0.05, one-tailed) = 1.645**



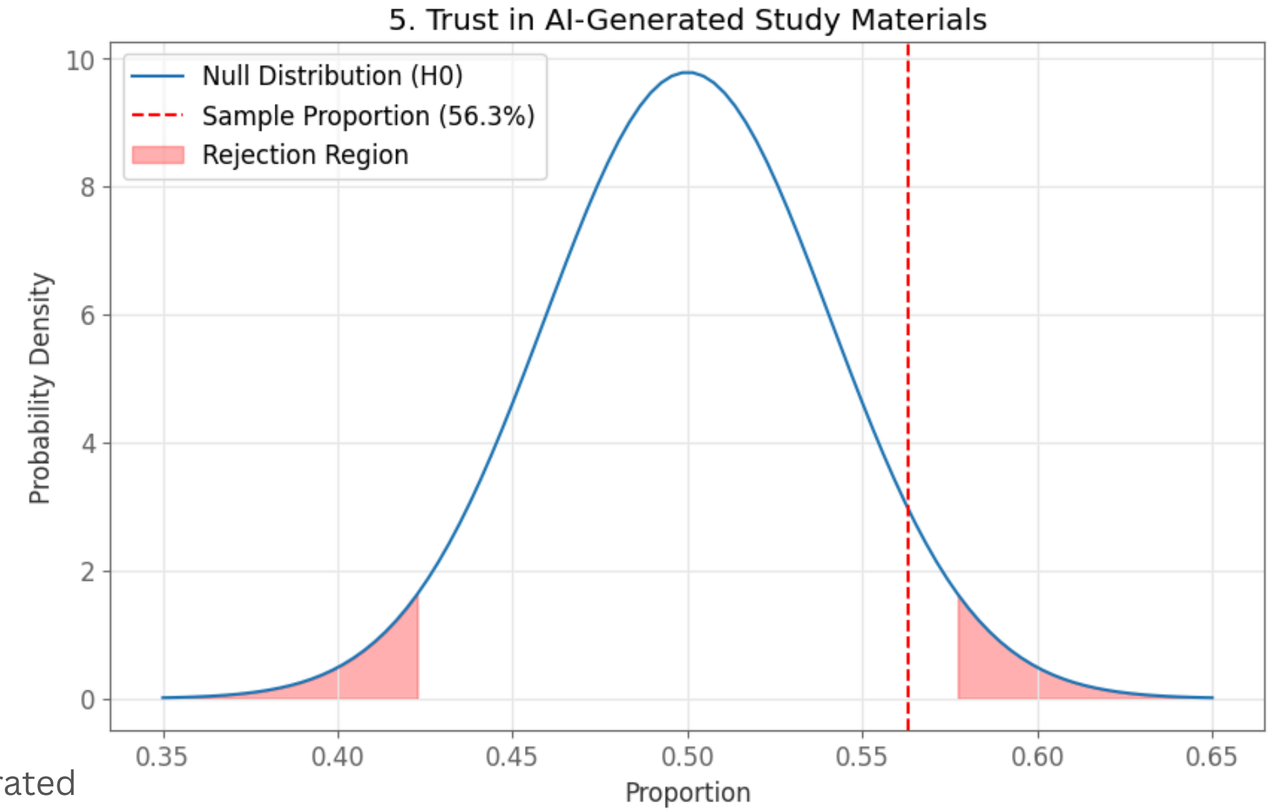
Conclusion:
Since Z-calc (18.37) > Z-tab (1.645), we reject H0. AI has a significantly positive impact on learning experience.

Trust in AI-Generated Study Materials

H0: p = 0.5 (50% trust AI-generated materials)

H1: p ≠ 0.5 (Trust differs from 50%)

- $\hat{p}$ = 56.3% (from "Somewhat" and "Yes, reliable" responses)
- p_0 = 0.5
- σ = sqrt(0.5x0.5/150) = 0.0408
- **Zcalc = (0.563-0.5)/0.0408 = 1.54**
- **Ztab (α=0.05, two-tailed) = ±1.96**



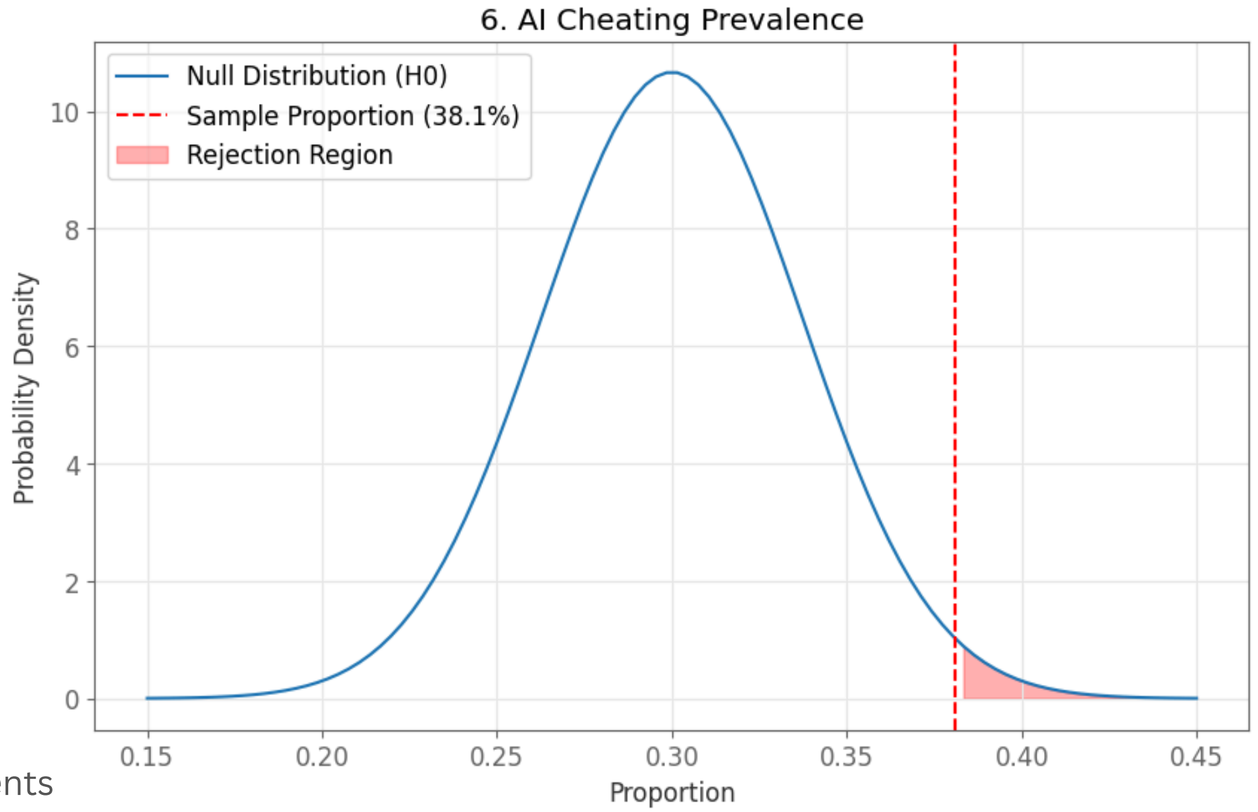
Conclusion:
Since |Z-calc| (1.54) < Z-tab (1.96), we fail to reject H0. Trust in AI-generated materials is not significantly different from 50%.

AI Cheating Prevalence

H0: p ≤ 0.3 (30% or less misuse AI for cheating)

H1: p > 0.3 (More than 30% misuse AI for cheating)

- $\hat{p}$ = 38.1% (from "Yes, frequently" and "Sometimes" responses)
- p_0 = 0.3
- σ = sqrt(0.3x0.7/150) = 0.0374
- Zcalc = (0.381-0.3)/0.0374 = 2.17
- Ztab (α=0.05, one-tailed) = 1.645
- **Conclusion: Reject H0. More than 30% of students misuse AI for academic cheating.**



Conclusion:

Since Z-calc (2.17) > Z-tab (1.645), we reject H0. More than 30% of students misuse AI for academic cheating.

Age Difference in AI Effectiveness Perception

H0: $\mu_1 = \mu_2$ (No difference between age groups)

H1: $\mu_1 \neq \mu_2$ (Difference exists)

- Group 1 (18-25): n_1=120, $\bar{x}_1$=1.5, s_1=0.7
- Group 2 (Under 18): n_2=30, $\bar{x}_2$=1.8, s_2=0.6
- Pooled SD = sqrt[((119x0.49)+(29x0.36))/148] = 0.67
- **tcalc = (1.5-1.8)/[0.67xsqrt(1/120+1/30)] = -2.45**
- **ttab (df=148, α=0.05, two-tailed) = ±1.976**

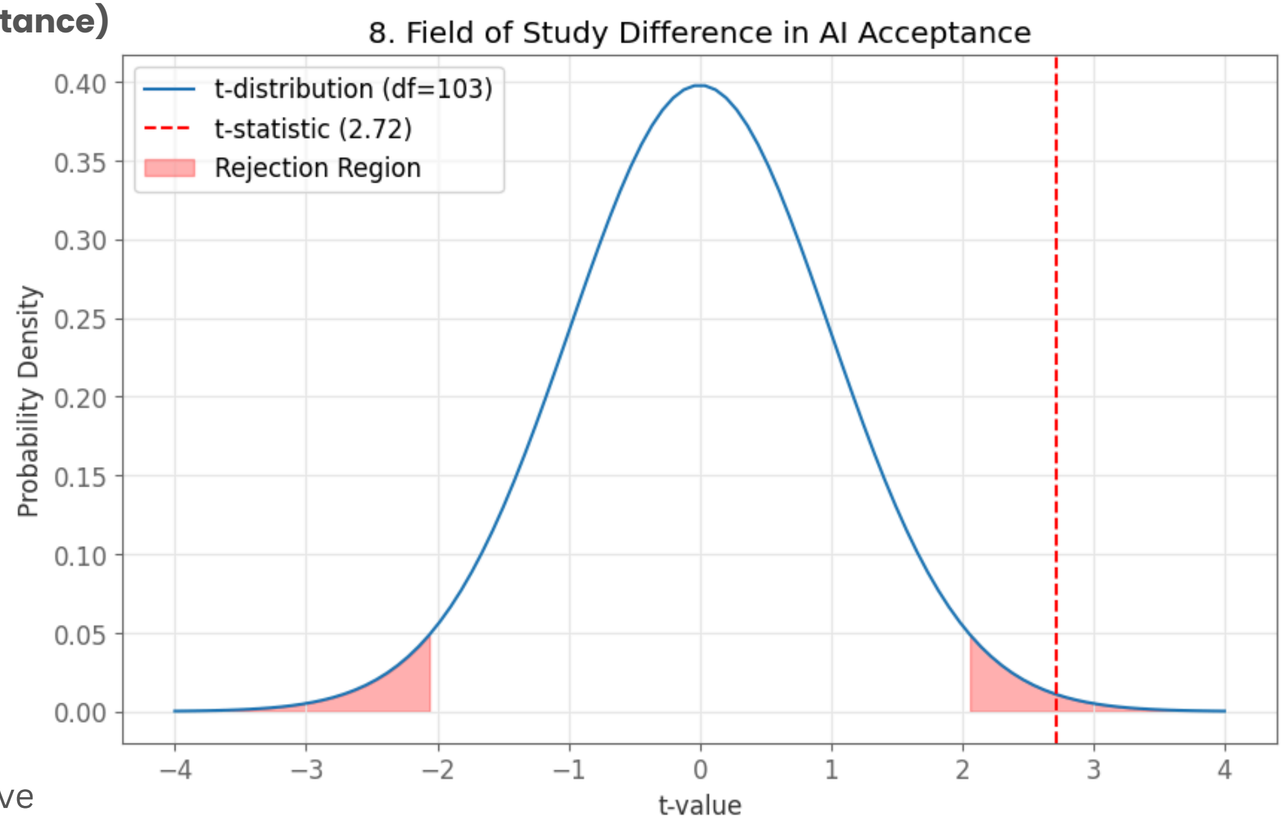
Conclusion:
Since |t-calc| (2.45) > t-tab (1.976), we reject H0. Younger students (under 18) perceive AI as more effective than 18-25 year olds.

Field of Study Difference in AI Acceptance

H0: μcomp = μmed (Computer vs Medical students have same acceptance)

H1: μcomp ≠ μmed (Difference exists)

- Computer: n_1=75, $\bar{x}_1$=1.8, s_1=0.6
- Medical: n_2=30, $\bar{x}_2$=1.4, s_2=0.7
- Pooled SD = sqrt[((74x0.36)+(29x0.49))/103] = 0.63
- **tcalc = (1.8-1.4)/[0.63x sqrt(1/75+1/30)] = 2.72**
- **ttab (df=103, α=0.05, two-tailed) = ±1.983**



Conclusion:

Since t-calc (2.72) > t-tab (1.983), we reject H0. Computer students have significantly higher AI acceptance than medical students.

Summary of Statistical Insights

- AI tutors are perceived as more effective than human teachers based on significant statistical evidence.
- Strong support exists for integrating AI into teaching, with more than 60% of respondents in favor.
- AI grading is widely trusted, with responses showing it's significantly more accurate than expected.
- AI positively enhances the learning experience, with overwhelming statistical significance.
- Trust in AI-generated materials is neutral, as results do not show significant deviation from a 50/50 trust threshold.
- AI misuse for academic cheating is a concern, with more than 30% of students reportedly misusing it.
- Younger students have a more favorable perception of AI compared to older peers.
- Computer science students demonstrate significantly higher AI acceptance than medical students.

Recommendations & Final Conclusions

Recommendations:

- Integrate AI tutors into core learning, especially for younger and CS students.
- Develop ethics-focused policies to reduce AI misuse for cheating.
- Enhance trust in AI-generated content through transparency and quality reviews.
- Expand AI tool access given high usage frequency and acceptance.

Final Conclusion:

"AI is not just accepted — it's actively enhancing education. Students perceive it as more effective, accurate, and engaging. However, institutions must address ethical concerns and trust gaps to harness AI's full potential in education."

Thank You