Robot-Led Instruction: AI-Driven Higher Education for the Future

[1]Dr. Lawrence Ibeh and Dr. Noah Mutai
Berlin School of Business and Innovation, Berlin Germany
[1]correspondence author's email-lawrence.ibeh@berlinsbi.com

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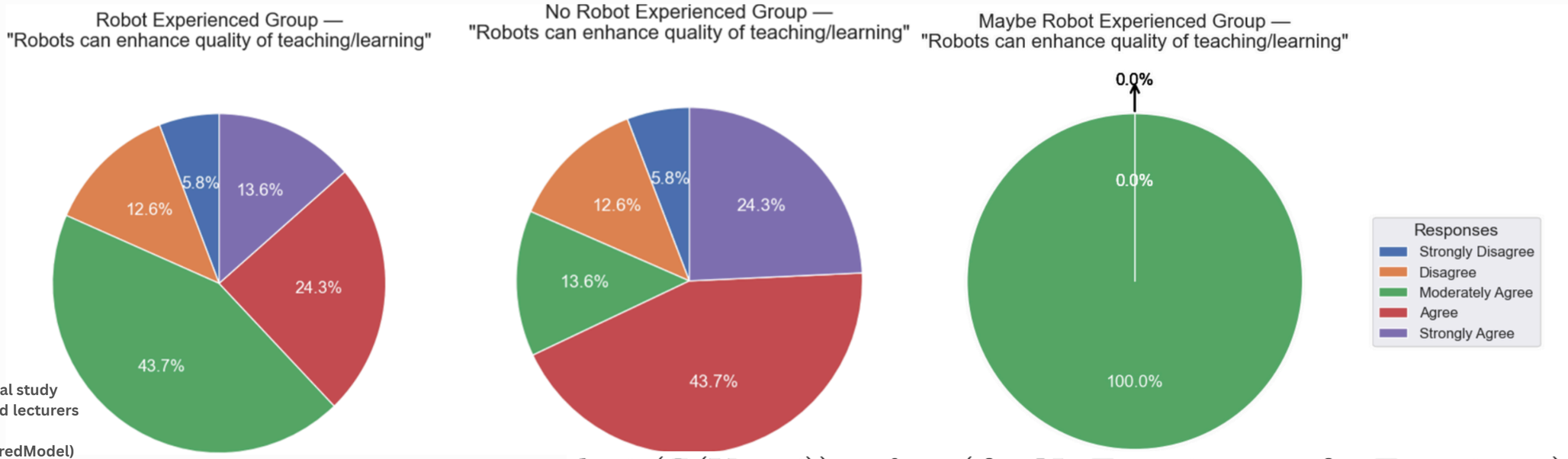
1.Introduction

As artificial intelligence (AI) continues to transform higher education, robot-led instruction is gaining momentum as a next-generation pedagogical model (Lim et al., 2022; Belpaeme et al., 2018). Educational robots offer the potential to support personalized learning, improve engagement, and assist instructors (Cabibihan et al., 2013). However, attitudes toward these innovations vary widely based on exposure and experience (van den Berghe et al., 2019). We examine how familiarity with educational robots affects stakeholders' openness to AI-led instruction.

2. Method

- Design: Mixed-methods quasi-experimental study
- A survey of 360 respondents(students and lecturers in universities in Germany)
- Model: Ordered Logistic Regression (OrderedModel)



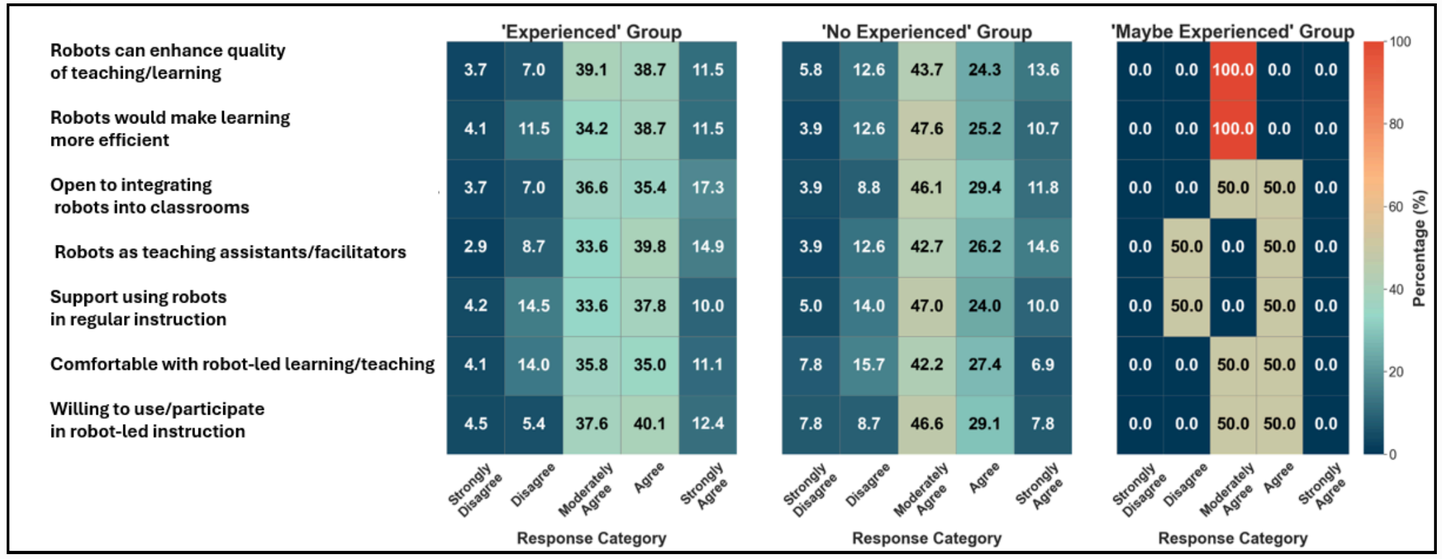
$$\text{logit}(P(Y \leq j)) = \theta_j - (\beta_1 \cdot \text{No Experience} + \beta_2 \cdot \text{Experience})$$

3.Results & Discussions

- Robot Experience Matters: Respondents with prior exposure ("Yes" group) were significantly more likely to agree that robots can enhance teaching quality, increase learning efficiency, and serve effectively as teaching assistants.
- Mixed Views on Comfort & Willingness: The "No" group showed significantly lower comfort and reduced willingness to engage with robot-led instruction.
- Neutrality on Integration: No strong differences were observed on openness to integrating robots into classrooms—suggesting evolving opinions.
- Threshold Variability: Several middle-response thresholds were non-significant, indicating many respondents are still forming clear attitudes.

4. Conclusion

Experience with robots positively influences perceptions of their value in education. However, lack of familiarity may reduce comfort and willingness. To fully realize the potential of AI-driven learning, institutions must focus on exposure, training, and gradual integration of robotics in teaching.



5. References

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