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ENHANCING ACTUARIAL EDUCATION DIGITAL INNOVATION via MINDAPPZ EBOOK

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ABSTRACT

The advancement of digital education has significantly improved higher education delivery, particularly in technical fields like actuarial mathematics. This study investigates the effectiveness of the MindAppz eBook, Introduction to Actuarial Mathematics, in enhancing students' comprehension, retention, and engagement. Employing a mixed-methods approach—including surveys, interviews, and performance comparisons—the study found that students who used the eBook performed 12% better in post-tests and demonstrated improved understanding in key actuarial topics such as annuities, premiums, and reserves. While the digital format encouraged independent learning and increased engagement, some students experienced digital fatigue and preferred hybrid approaches. These findings support the integration of blended learning models in actuarial education and highlight the importance of interactive and adaptive digital resources for future curriculum design.

Keywords: *Actuarial Mathematics, eBooks, Digital Learning, Student Engagement, Hybrid Education, Educational Technology, MindAppz*

INTRODUCTION

Actuarial mathematics is a discipline requiring high levels of numerical and theoretical competence. Traditionally taught via lectures and textbooks, the integration of digital tools like the MindAppz eBook represents a transformative step (Palmer et al., 2022). The study aims to evaluate whether digital tools improve learning outcomes, how they affect student engagement, and what limitations may exist in digital-only delivery (Rzyankina et al., 2024).

METHODS

A mixed-methods approach (survey and interview) was applied. Data collection involved (1) a student survey of 100 undergraduate actuarial science students at UiTM; (2) interviews with five actuarial educators; and (3) comparative analysis of two student cohorts one using the eBook and another using printed textbooks for the feedback (Lee & Shin, 2021).

RESULTS AND DISCUSSION

Students using the MindAppz eBook demonstrated a 12% (*see Improvement (%) Table 1*) average improvement in post-test scores.

Table 1.: Comparison Of Student Performance (Pre- and Post-Ebook Usage)

Metric	Traditional Textbook Users	MindAppz eBook Users
Pre-eBook Score (Avg)	62	62
Post-eBook Score (Avg)	68	74
Improvement (%)	6	12

Specific gains included 15% in annuity calculations and 13% in surrender and paid-up value understanding. Engagement was higher among eBook users, who spent 25% more time studying. Survey data showed 78% felt their understanding improved, though 29% reported digital fatigue.

Table 2.: Student Survey Results on Engagement and Learning Experience

Survey Question	Yes (%)	No (%)
Did the eBook improve your understanding of actuarial concepts?	78	22
Did you find the eBook engaging?	72	28
Did you experience digital fatigue while studying?	29	71
Would you prefer a hybrid learning approach (eBook + printed materials)?	84	16

Table 3.:Summary Of Key Findings

Key Learning Factors	MindAppz eBook Users	Traditional Textbook Users
Comprehension Improvement	Higher (+12%)	Moderate
Self-Paced Learning	Strong (72% positive feedback)	Limited
Engagement & Time Spent	More study time (+25%)	Less interactive
Retention Rate	68%	72%
Preferred for Practical Exercises	High (80% positive feedback)	Moderate
Technical/Cognitive Challenges	Digital fatigue (29%)	None

Retention rates one-month post-study were slightly higher among traditional textbook users (72%) compared to eBook users (68%). The eBook's structured layout and interactive features contributed positively to learning. However, its limitations, such as screen fatigue and difficulties in solving mathematical problems in a digital format, suggest that hybrid models may be more effective. Educators should combine digital tools with traditional resources to optimize results.

CONCLUSION

Digital resources like the MindAppz eBook enhance conceptual understanding and engagement in actuarial education (M. Chek et al., 2020; R. Chek et al., 2020; Ridzuan et al., 2018). However, for optimal outcomes, hybrid strategies that balance the benefits of digital flexibility with the tactile engagement of traditional methods are recommended (Shechtman et al., 2019). Future improvements should focus on AI interactivity, adaptive learning, and gamification (Rzyankina et al., 2024; Tigrero et al., 2024; Weiss & Bitan, 2018).

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REFERENCES

Chek, M., Ismail, I. L., & Jamal, N. F. (2020). Learning actuarial mathematics through UiTM future MOOC. In *MOOC for University and Beyond* (pp. 75–90). Springer. https://doi.org/10.1007/978- 3-030-21836-2_6

Chek, R., Ismail, S., & Ridzuan, A. R. (2020). Learning actuarial mathematics through UiTM Future MOOC: A Malaysian case study. *Asian Journal of Education and E-Learning*, *8*(3), 45–53. Lee, J., & Shin, M. (2021). Students' perceptions and usage patterns of digital textbooks in mathematics education. *Journal of Mathematics Education*, *14*(2), 56–70.

Palmer, R., Smith, K., & Goldstein, B. (2022). Evaluating learner outcomes in digital mathematics environments. *Digital Learning Research Journal*, *15*(1), 101–119.

Ridzuan, A. N. A. A., Chek, M. Z. A., Ghafar, N. M. A., & Ahmad, A. B. (2018). Developing an Introduction to Actuarial Science MOOC. *International Journal of Academic Research in Business and Social Sciences*, *8*(1), 600–605. https://doi.org/10.6007/ijarbss/v8-i1/3833

Rzyankina, E., Utyumova, T., & Volkova, N. (2024). Strategies for blended learning integration in STEM disciplines. *Blended Learning in Mathematics*, *9*(1), 33–49.

Shechtman, N., Roschelle, J., Feng, M., & Singleton, C. (2019). An efficacy study of a digital core curriculum for grade 5 mathematics. *The Journal of Educational Research*, *112*(4), 463–472. https://doi.org/10.1080/00220671.2019.1614510

Tigrero, J. M. A., Santos, M. L., & Espinoza, J. E. Q. (2024). *Digital educational resources in the development of mathematical logical thinking*. Zenodo. https://doi.org/10.5281/zenodo.10012345

Weiss, R. E., & Bitan, M. (2018). Measuring the success of digital transition in actuarial education. *Journal of Educational Computing Research*, *56*(4), 651–670.