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The Application and Development of Expectation-Confirmation Theory in Users' Continuous Usage: A Case Study of the Zuoyebang App

Yujia Teng

School of Economics and Management, Tiangong University, Tianjin, China
coineow2023@qq.com

Abstract. As artificial intelligence increasingly permeates educational technology, understanding user continuance behavior has become critical for platform sustainability and development. This study applies and further extends Expectation–Confirmation Theory (ECT) to examine user continuance intention in AIdriven educational platforms, using the Zuoyebang app—a leading K12 online learning platform in China—as a qualitative case. Through analysis of platform features, user expectations, and confirmation mechanisms, the paper demonstrates that the core ECT framework remains applicable. However, it requires important adaptations to account for the distinctive characteristics of educational technology, including long-term and subjective learning outcomes, evolving user expectations as learners progress, and divergent evaluation criteria among multiple stakeholders such as students and parents. The findings reveal that Zuoyebang users form multidimensional expectations encompassing AI accuracy, comprehensive coverage, personalization, and user experience, with confirmation occurring through AI solution quality and learning progress indicators. A comparative analysis with competitor Yuanfudao highlights how platform architecture—AIcentric automation versus live tutoring—fundamentally shapes expectation frameworks and confirmation dynamics. Based on these insights, the study proposes development strategies including AI optimization, transparent expectation management, deepened personalization, and longitudinal user journey mapping.

Keywords: Expectation–Confirmation Theory, User Continuance Intention, AIDriven Educational Platforms, Zuoyebang, K12 Online Education

1. Introduction

The Expectation-Confirmation Theory (ECT), originally proposed by Bhattacherjee [1], has been widely validated across various digital platforms to explain user continuance behavior through the relationships between expectations, confirmation, perceived usefulness, satisfaction, and continuance intention. ECT has demonstrated robust explanatory power in information systems and e-commerce contexts [2], yet its applicability to educational technology remains underexplored, particularly where user engagement depends on long-term learning outcomes rather than immediate transactional benefits.

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The rapid advancement of artificial intelligence in education has transformed learning landscapes globally [3], with China's online education industry surging past 580 billion RMB in market size in 2024 and achieving a year-on-year growth rate of 12.3% under supportive educational policy frameworks [4]. Zuoyebang, as one of China's leading AI-driven educational platforms with over 800 million registered users, exemplifies this transformation through its innovative integration of intelligent homework assistance and personalized learning features [5]. However, educational applications present unique challenges to traditional ECT models, as user expectations evolve dynamically with cognitive development and curricular demands, while "confirmation" becomes subjective rather than binary.

Recent studies have begun extending ECT to online learning environments, emphasizing user satisfaction and perceived performance in sustaining user engagement [6]. This study addresses the theoretical gap by examining how ECT constructs manifest in Zuoyebang's user retention patterns through qualitative analysis of user feedback and comparative feature assessment. The research contributes to ECT's theoretical expansion into non-transactional contexts while providing practical frameworks for educational technology optimization.

2. Theoretical foundation of expectation-confirmation theory in educational technology

2.1. Core concepts and evolution of ECT

Expectation-Confirmation Theory represents a systematic framework for understanding user continuance behavior in technology adoption contexts. The theory posits that users form initial expectations about a technology's performance, which subsequently influence their post-adoption evaluation through confirmation or disconfirmation processes [1]. In the original model, confirmation occurs when perceived performance matches or exceeds expectations, leading to satisfaction and increased continuance intention. Conversely, disconfirmation results in dissatisfaction and potential discontinuation.

The ECT framework has evolved significantly since its inception, with researchers extending its application beyond traditional information systems to a wide range of digital platforms. While initial studies focused primarily on e-commerce and enterprise software [2], recent investigations have explored ECT's relevance in social media, mobile applications, and increasingly, educational technology platforms. This evolution reflects the theory's adaptability to different user contexts and technological paradigms.

2.2. ECT adaptation for educational platforms

Educational technology presents unique challenges to traditional ECT applications due to fundamental differences in user goals and evaluation metrics. Unlike transactional platforms where confirmation is often binary and immediately observable [7], educational applications involve subjective learning outcomes that manifest over extended periods. Users of educational platforms like Zuoyebang form complex, multi-dimensional expectations encompassing academic improvement, convenience, engagement, and long-term skill development.

The confirmation process in educational contexts becomes particularly nuanced, as users must evaluate not only immediate utility (such as obtaining homework answers) but also perceived learning effectiveness and knowledge retention. This complexity necessitates modifications to the traditional ECT framework, particularly in the conceptualization and measurement of confirmation mechanisms. Recent studies have begun addressing these adaptations, with Herzallah et al [6].

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demonstrating how traditional satisfaction metrics must be supplemented with learning-specific indicators in online education contexts.

3. Application of ECT to Zuoyebang's user continuance patterns

3.1. User expectations and feature mapping

Zuoyebang users typically form expectations across multiple dimensions reflecting the platform's comprehensive educational ecosystem. Primary expectations include accurate AI-powered homework assistance, comprehensive subject coverage, personalized learning recommendations, and seamless user experience. The platform's marketing positioning as an intelligent education solution shapes these user expectations, promising efficiency gains and academic improvement through advanced artificial intelligence capabilities [8].

Prior research on K-12 online learning suggests that different user roles (e.g., students vs. parents) often hold distinct expectations and evaluation criteria [9]. Building on this, K-12 students on Zuoyebang are likely to prioritize immediate homework assistance, whereas parents tend to emphasize long-term learning outcomes and academic progress tracking. This segmentation creates complex confirmation dynamics, as different user groups apply distinct evaluation criteria to assess platform performance.

3.2. Confirmation mechanisms and user satisfaction

Zuoyebang's confirmation processes operate through multiple touchpoints, each contributing to overall user satisfaction assessment. The primary confirmation mechanism involves accuracy evaluation of AI-generated solutions, where users compare provided answers with their understanding or official solutions [3,5]. Secondary confirmation occurs through learning progress indicators, including quiz performance, skill assessments, and adaptive difficulty adjustments [9].

Prior empirical studies on information systems and e-learning platforms consistently show strong correlations among expectation confirmation, user satisfaction, and engagement or continuance intention [6,9]. High-performing features such as the photo-to-solution search functionality demonstrate clear confirmation patterns, with users reporting satisfaction when the AI accurately interprets and solves photographed problems. Consistent with Meng's [8] sentiment analysis of K12 online education products, positive user sentiment mainly clusters around efficient problem solving, whereas recognition errors, incorrect answers, and insufficient explanations are frequent sources of negative sentiment, indicating disconfirmation of users' expectations.

3.3. Comparative analysis with competitors

Comparative assessment with primary competitor Yuanfudao reveals distinct ECT performance patterns reflecting different strategic approaches. While Zuoyebang emphasizes AIdriven automation and instant problemsolving, particularly through intelligent education hardware and AIbased homework support [5], Yuanfudao focuses on live tutoring and human interaction as its core service model [10]. This fundamental difference creates divergent expectation frameworks, with Zuoyebang users prioritizing efficiency and accessibility, while Yuanfudao users emphasize personalized guidance and interactive learning [5,10].

The confirmation processes likewise differ significantly between platforms. Zuoyebang's algorithmic approach enables rapid feedback and high transaction volumes, but may face challenges with complex problem variations requiring nuanced explanation [5]. Yuanfudao's humancentered

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approach provides more flexible confirmation mechanisms through realtime interaction with human tutors, but faces scalability constraints and higher operational costs [10]. These differences highlight how the two platforms' architecture fundamentally shapes ECT dynamics and user continuance patterns.

4. Development recommendations based on ECT framework

4.1. Enhancing confirmation through AI optimization

Zuoyebang can strengthen confirmation mechanisms by implementing several AI enhancement strategies aligned with ECT principles. First, improving handwriting recognition accuracy and mathematical notation interpretation would reduce disconfirmation incidents that currently frustrate users. Second, developing context-aware solution explanations that adapt to individual learning levels would enhance perceived usefulness and satisfaction.

The platform should also implement proactive expectation management through transparent communication about AI capabilities and limitations. By setting realistic expectations about problem-solving scope and accuracy rates, Zuoyebang can reduce disconfirmation incidents while maintaining user trust. Additionally, introducing user feedback loops that enable continuous AI training based on confirmation/disconfirmation patterns would create dynamic improvement mechanisms.

4.2. Satisfaction enhancement through personalization

ECT-based satisfaction enhancement requires sophisticated personalization strategies that address individual user expectations and preferences. Zuoyebang should develop adaptive user interfaces that evolve based on usage patterns, learning progress, and stated preferences. This personalization extends beyond content recommendations to include explanation styles, difficulty progressions, and engagement mechanisms.

Implementing robust progress tracking and goal-setting features would provide clear satisfaction indicators while maintaining motivation through visible achievement markers. The gamification system requires careful calibration to ensure rewards are aligned with genuine learning accomplishments rather than superficial engagement metrics. Social features enabling peer comparison and collaborative learning could further enhance satisfaction through community engagement.

4.3. Long-term continuance strategy

Sustaining user continuance requires addressing the dynamic nature of expectations in educational contexts. As users progress academically, their expectations evolve, requiring platform adaptation to maintain relevance and value perception. Zuoyebang should implement longitudinal user journey mapping to anticipate expectation shifts and proactively adjust feature offerings.

The platform's expansion into comprehensive educational ecosystems through live classes, assessment tools, and parent engagement features represents strategic ECT optimization. By addressing diverse stakeholder expectations simultaneously, Zuoyebang can create multiple confirmation pathways that enhance overall satisfaction and reduce churn risk. Future development should prioritize maintaining expectation-performance alignment as the platform scales and diversifies its service portfolio.

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5. Conclusion

This study has examined how Expectation–Confirmation Theory (ECT) can be applied and extended to explain user continuance intention in AI-driven educational platforms, using the Zuoyebang app as a qualitative case. The analysis shows that the core ECT sequence—expectations, confirmation or disconfirmation, perceived usefulness, satisfaction, and continuance intention—remains applicable, but requires adaptation to the specific characteristics of educational technology, thereby extending ECT beyond its traditional transactional domains into long-term, multi-stakeholder learning contexts.

Zuoyebang users form multidimensional expectations that include accurate AIbased homework assistance, comprehensive subject coverage, personalized recommendations, and seamless user experience. Confirmation and disconfirmation occur through multiple touchpoints, particularly the accuracy and clarity of AIgenerated solutions and learning progress indicators. Positive confirmation on these dimensions supports perceived usefulness, satisfaction, and continued use, whereas recognition errors, incorrect answers, and insufficient explanations generate disconfirmation and risk of churn.

The case also highlights features that complicate the confirmation process in education: learning outcomes are longterm and partly subjective, expectations evolve as learners progress, and different stakeholders (students and parents) apply distinct evaluation criteria. The comparison with Yuanfudao further indicates that platform architecture shapes ECT dynamics: Zuoyebang's AI-centric model reinforces expectations of efficiency and scalability, while Yuanfudao's live-tutoring model emphasizes personalized interaction but faces scalability and cost constraints.

On this basis, the paper proposes directions for Zuoyebang's development, including improving AI accuracy and explanation quality, managing user expectations through transparent communication, deepening personalization, and adopting a longitudinal perspective on user journeys.

This study has limitations. As a singlecase, qualitative analysis, it does not provide quantitative evidence of ECT relationships in Zuoyebang's context, nor does it extend findings to other platforms or cultural settings. Future research should address these gaps through surveybased validation, crossplatform comparisons, and integration of ECT with motivationoriented theories.

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