Enhancing Student Engagement and Self-Directed Learning by Customised XIPU AI Tutor

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1. Background

As educational technology rapidly evolves, Artificial Intelligence applications in higher education have garnered increasing attention. This study examines the impact of integrating a customised AI teaching assistant (XIPU AI Tutor) into ACC307 "Advanced Taxation" at the International Business School Suzhou (IBSS). XIPU AI Tutor aims to provide personalized, emotionally supportive, and interactive learning experiences through advanced technologies like natural language processing, image recognition, machine learning, and big data analytics.

ACC307 is an elective accounting module designed to deepen understanding of complex tax laws and their real-world applications. However, taxation content is voluminous and highly specialized, posing major challenges, especially for non-native English speakers. According

to Cognitive Load Theory, reducing extraneous cognitive load helps students learn and retain knowledge more effectively. To address these challenges and alleviate learning burdens, we introduced a customised XIPU AI Tutor to support students and validate its effectiveness in promoting self-directed learning and improving learning experiences in complex accounting subjects.

2. Solutions

This study employed XIPU AI Tutor as a teaching tool to enhance learning through personalized, emotionally supportive, and interactive experiences. Specific implementation steps:

Step 1: Adding XIPU AI Chat Module to Course Pages

Following Learning Mall’s AI Tutor portal guidelines, the XIPU AI chat module was integrated into course pages. This provides a real-time interactive platform and emotional support through emotion recognition technology, enabling 24/7 access to specialized and personalized support that transcends traditional tutoring.

Step 2: Configuring XIPU AI Chat Module

Completion prompts were customized for ACC307’s specific requirements, including detailed module descriptions, learning

outcomes, and syllabi. Dialogues were scripted to create a tailored experience that helps students deconstruct complex tax concepts, reduce cognitive load, and improve learning efficiency.

Step 3: Asking Course-Related Questions

Once configured, registered ACC307 students could access the customised XIPU AI Tutor for comprehensive support on any topic. The system provides detailed step-by-step explanations ensuring thorough comprehension. Crucially, bilingual (Chinese-English) support addresses diverse linguistic needs, creating a more inclusive experience.

Key Features of Customised XIPU AI Tutor:

1. **Professionalism in UK Taxation:** Provides expert, detailed, and precise UK tax information beyond generic AI capabilities—critical for advanced taxation courses.
2. **Emotional Value & Encouragement:** Emotion recognition technology identifies emotional tones in student queries, offering encouraging responses to maintain positive learning attitudes.

3. **Bilingual Support:** Seamlessly provides Chinese-English responses, removing language barriers and boosting engagement.
4. **Socratic Dialogue Method:** Interactive questioning guides deep thinking, breaking complex concepts into digestible parts and encouraging critical analysis.
5. **Case Study Integration:** Bridges academic learning and professional application by embedding real-world scenarios that enhance problem-solving abilities.
6. **Simplified Language:** Avoids jargon to ensure clear, understandable communication, reducing cognitive load and improving efficiency.

3. Outcomes and Benefits

The customised XIPU AI Tutor significantly impacted ACC307 learning experiences.

Usage Data:

- 70% of students used the AI Tutor
- 61% strongly agreed that customised AI Tutor responses were more professional and targeted than generic XIPU AI

- 68% strongly recommended integrating customised XIPU AI Tutor into other modules

Feature Validation:

- 24/7 bilingual support and emotional encouragement were highly valued
- Particularly beneficial for students needing after-hours help and those preferring native language learning
- AI Tutor lowered language barriers, enabling smoother participation

Identified Improvement Areas:

Despite positive feedback, 27% were neutral or dissatisfied with bilingual support and emotional encouragement, possibly due to:

- Language proficiency differences creating unmet expectations for bilingual interaction
- Accuracy limitations in emotion recognition functionality
- Preference for traditional learning methods making AI interaction styles less comfortable

Additionally, 31% were neutral or dissatisfied with AI Tutor’s role in helping learn complex subjects, suggesting some students may not have

fully utilized or benefited from it—needing more personalized support, having insufficient motivation, or experiencing technical issues (e.g., response delays).

4. Replicability and Promotion Value

Cross-Module Promotion Potential: 68% strongly recommended integration into other modules, indicating high recognition of AI Tutor's value. Particularly valuable for courses requiring deep analysis of complex concepts (accounting, finance, law, etc.).

Technical Framework Transferability: The configuration method—providing detailed module descriptions, learning outcomes, syllabi—applies across disciplines. The six core features (professionalism, emotional support, bilingual function, Socratic dialogue, case integration, simplified language) can be customized for different courses.

Addressing Common Challenges: Successfully addressed three major challenges for non-native speakers in high cognitive-load courses: language barriers, lack of emotional support, and complex concept comprehension. This solution has typical significance in Sino-foreign cooperative university contexts.

Future Development: Should focus on enhancing AI Tutor capabilities for broader disciplines and more personalized experiences. By addressing

current limitations and leveraging strengths, XIPU AI Tutor could become a foundational student resource, creating more engaging and efficient learning environments.