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Development and Empirical Investigation of a Program Management Model for Computer-Assisted English Teaching

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ABSTRACT

This study aims to develop and empirically validate a program management model for Computer-Assisted English Teaching (CAET) among English education major students at Hubei Engineering University, China. A total of 306 participants were involved, including 245 students, 54 teachers, and 7 administrators. Quantitative data were collected through structured questionnaires and analyzed using descriptive statistics and the Priority Needs Index Modified (PNImod). The average current values for all dimensions were above 3.24, ensuring the validity of PNI results. Among the management dimensions, leadership showed the highest priority need (PNI = 0.29). Expert interviews revealed that leadership should include specific practices such as regular training in teaching technology, incentive mechanisms for digital innovation, and open planning forums. Among the application dimensions, online resources and tools showed the highest gap (PNI = 0.30), indicating the urgent need to build a centralized digital resource library and adopt AI-based learning platforms. The proposed model links management dimensions (e.g., leadership) to application effectiveness (e.g., resource use), highlighting its structured and actionable nature. Teacher responses also revealed issues such as limited collaboration and lack of training, offering comparative insights with student perceptions. This study contributes a tailored management framework for CAET and expands project management theory by incorporating context-specific dimensions, such as Teacher Support, into educational technology models.

Keywords: Program Management; Computer-Assisted English Teaching; Education Model

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1. Introduction

Nowadays, with the internet and multimedia communication as its core, computer-assisted technology has been developing at a fast pace and has rapidly penetrated into every aspect of politics, economy, military, society, culture, science and technology, and education with its intense strength, presenting a picture where no area is separable from computer-assisted systems, and every field takes computer literacy as a basic indicator for talent consideration [1]. Students from the English education who will be trained to become teachers typically do not possess enough computer-related knowledge to master the process of making slides, videos, and audio editing, and information gathering. English programs traditionally focus on literature, language, and writing, rather than technical skills [2]. Therefore, their performance in the course "Computer-Assisted English Teaching Method" is relatively mediocre. According to the final test results of previous years, they may encounter difficulties in nearly every step: being unable to find the proper information online for the course; being unable to edit video or audio material; lacking knowledge in basic aesthetics, especially in the field of color arrangement, and so on. It is thus of great importance for them to be trained in such an area. To ensure computer teachers effectively implement the new computer curriculum standards, along with the associated content and teaching methods, current practices in computer teacher training need to be re-evaluated [3]. Therefore, there is an urgent need for the implementation of the national computer curriculum standards to train teachers with computer skills and computer knowledge and to help them to adapt to the new curriculum teaching, which is of great significance in creating citizens with good information literacy. The most important thing at present is how to design scientific, advanced, reasonable, and replicable training models and implementation strategies to improve the effectiveness of computer teacher training. The most important question is how to design scientific, advanced, reasonable, and replicable training models and implementation strategies to improve the quality of training in computer-assisted English teaching methods.

For these reasons, the researcher is interested in the application of computer-related technology to help teach English to English education major students in English teaching program and in the development of a program management model for this program.

1.1. Statement of the Problem

Although various CAET initiatives have been introduced, many English education departments in China operate without a coherent program management model that guides the planning, coordination, and evaluation of such efforts. Leadership tends to be reactive rather than strategic; communication is often unclear; and resources are allocated without long-term planning. Consequently, digital teaching tools are underused or misaligned with student and teacher needs. There is a pressing need to investigate the current state of CAET implementation, identify critical gaps, and develop a practical, data-driven management model tailored to institutional contexts like Hubei Engineering University.

1.2. Research Questions

In this research project, the School of Foreign Languages at Hubei Engineering University was used as the research site for collecting data and information concerning the opinions of students regarding problems in computer-assisted English-teaching methods and for developing a model of an effective computer-assisted English-teaching system for English Education Major Students.

The research questions of this research are:

1. What are the current status and expectations of computer-assisted English teaching for English education major students in Hubei, China?
2. How can a program management model for computer-assisted English teaching for English education major students in Hubei, China, be developed.
3. Is the program management model for computer-assisted English teaching methods for English education major students in Hubei, China, effective?

1.3. Research Objectives

1. To investigate the current status and needs of computer-assisted English teaching for English Education major students in Hubei, China;
2. To develop a Program Management Model of computer-assisted English teaching for English Education major students in Hubei, China;
3. To evaluate the effectiveness of the Program Manage-

ment Model of computer-assisted English teaching for English Education major students in Hubei, China.

The Conceptual Framework of this paper is shown in **Figure 1**:

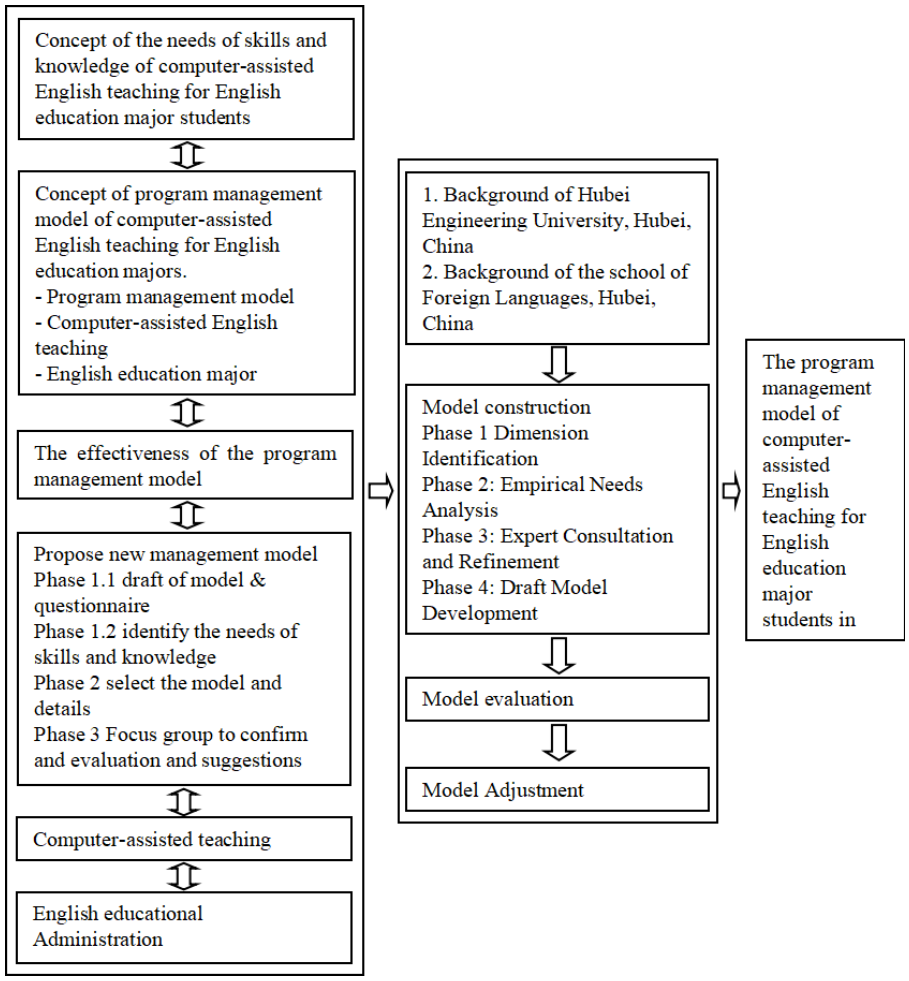

Figure 1. Conceptual Framework.

2. Literature Review

2.1. The Concepts of "Program Management"

Program management[4] refers to managing a group of related projects in a coordinated manner to achieve strategic objectives and benefits. This includes processes, practices, and standards for planning, executing, monitoring, and controlling a program to ensure alignment with organizational goals. Key components typically include program governance, lifecycle management, stakeholder management, risk management, resource management, benefits realization, financial management, communication management, and quality management.

The concept of program management has evolved significantly over the years, driven by the need to manage complex initiatives that span multiple projects. A robust Program Management Model ensures that organizations can achieve strategic objectives efficiently and effectively[5].

Program management has its roots in project management, but it has grown into a distinct discipline. Early frameworks focused primarily on individual project success, but as organizations recognized the interconnected nature of many projects, the need for a more holistic approach became evident. The evolution of Program Management has led to the development of comprehensive models that integrate various projects under a single program to maximize benefits.

The key factors of program management[6] are shown in **Table 1**:

Table 1. Key factors of program management.

Key Factors	Explanation
Benefits	The key difference between a project and a program is that benefits are delivered within the program lifecycle compared to a project when they are delivered after the project has finished.
Governance	The structure, process, and procedure to control internal operations and changes to performance objectives. Governance must include a set of metrics to indicate the health and progress of the program in the most vital areas.
Alignment	The program must support a higher-level vision, goals, and objectives. These are set out in the program vision and blueprint, which defines the future state for the organization, sector or community that will be significantly changed.
Transformation	A program will deliver major change, whether it is within an organization, a sector or a community. As such, the management of change and transition is a key characteristic of a program, not just the building a major capability.
Assurance	Verify and validate the program, ensuring adherence to standards and alignment with the vision. Programs should always have an assurance strategy.
Management	Ensure accountability through regular reviews, and that management of projects, stakeholders and suppliers is in place.
Integration	Ensure that component parts fit together properly to make the intended whole. Optimize performance across the program value chain, functionally and technically.
Finances	Track basic costs together with wider costs of administering the program and also the costs of change and transition to achieve benefits.
Infrastructure	Allocation of resources influences the cost and success of the program. Infrastructure might cover offices, version control, and IT.
Planning	Develop the plan bringing together the information on projects, resources, timescales, monitoring, and control.
Improvement	Continuously assess performance; research and develop new capabilities, and systemically apply learning and knowledge to the program.

Reiss and Rayner[7] point out that most respondents still consider "organization," "issues and risk," "planning," and "accounts and finance" as key to the success of programs, whereas "achievement of benefits," "stakeholder management," "communication," and "configuration management," which were identified by the developers of the model as key program components, seem less important. Generally speaking, organization, risk, planning, and cost management are key elements of program management.

To develop a practical and context-specific model for managing Computer-Assisted English Teaching (CAET), it is necessary to synthesize these key factors into core management dimensions that are both theoretically grounded and operationally feasible in the higher education context. Among the factors listed in **Table 1,** four were identified as particularly critical for guiding CAET program management in Chinese universities: planning, resource management and allocation, communication, and leadership. These dimensions were selected based on their recurring emphasis in both project/program management literature and digital pedagogy studies. Together, they provide a focused framework that captures the strategic, organizational, and human elements necessary for the sustainable implementation of CAET.

The frequency of the four key components cited in the literature is summarized in **Table 2**.

Table 2. Key components of program management.

Scholar	Planning	Resource Allocation	Communication	Leadership
Thiry (2016)[4]	✓			✓
Didinsky (2017)[8]	✓	✓	✓	✓
Reiss, G. (2006)[9]	✓	✓	✓	
Kendrick, T. (2016)[10]	✓		✓	✓
Morris & Pinto (2007)[11]	✓	✓		
Project Management Institute(2017)[12]	✓	✓	✓	
Lycett, M., et al, (2004)[13]	✓	✓		
Brown, J. T. (2008)[14]	✓		✓	✓
Rothman, J. (2016)[15]	✓		✓	✓
Bojeun, M. C. (2013)[16]			✓	✓
Frequency	9	5	7	6

2.2. The Key Components of Computer-Assisted English Teaching Method

There are many components worth mentioning in this field, but the following five are the most important ones that have gained the most attention from scholars around the world and are generally accepted by most English teachers. The five of the most important components of the Computer-Assisted English Teaching Method (Warschauer & Healey, 1998, pp. 57–71):

Software and Applications

Language learning software and educational apps provide interactive and engaging ways for students to practice English. They offer exercises, games, and activities that cater to various language skills, such as grammar, vocabulary, reading, writing, listening, and speaking (Blake, 2013, pp. 49–55).

Interactive Learning Activities

These activities include computer-based exercises, simulations, virtual language labs, and collaborative projects. They make learning more engaging and interactive, helping students apply what they have learned in practical and meaningful ways (Egbert & Hanson-Smith, 2007, pp. 447–465).

Online Resources and Tools

Access to websites, online platforms, digital libraries, and web-based assessment tools provides a wealth of resources for both students and teachers. These tools enhance learning and offer opportunities for additional practice and exploration beyond the classroom (Garrett, 2009, pp. 719–740).

Assessment and Feedback

Automated testing, quizzes, and data analytics tools offer immediate feedback and help monitor student progress. This allows for timely interventions and personalized support, ensuring that students can improve their language skills effectively (Chapelle, 2001, pp. 44–50).

Teacher Training and Support

Effective integration of technology in teaching requires well-trained teachers. Professional development programs and technical support ensure that teachers can utilize CAET tools efficiently and confidently, enhancing the overall learning experience for students (Stockwell, 2012, pp. 275–277).

These components are crucial as they directly impact the effectiveness, engagement, and success of computer-assisted language learning. The frequency of the five key components cited in the literature is summarized in **Table 3**.

Table 3. Key components of computer-assisted English teaching method.

Scholar	Software & Applications	Interactive Learning	Online Resources & Tools	Assessment & Feedback	Teacher Training & Support
Chapelle (2001) [17]	✓		✓	✓	✓
Beatty (2013) [18]	✓	✓	✓		✓
Levy (1997) [19]	✓	✓			✓
Dudeney & Hockly (2012) [20]	✓		✓		✓
Kern (2006) [21]	✓		✓	✓	✓
Blake (2013) [22]	✓	✓		✓	✓
Warschauer & Healey (1998) [23]	✓	✓	✓		
Bahari, A., et al. (2021) [24]	✓	✓	✓		
Rogerson-Revell (2021) [25]	✓		✓	✓	
Hinkel, E. (2022) [26]	✓	✓	✓	✓	✓
Total	10	6	8	5	7

3. Methodology

This study employed a mixed-methods research design to ensure both breadth and depth in the development and validation of a program management model for Computer-Assisted English Teaching (CAET). The quantitative component was used to measure perceptions and needs across a wide sample, while the qualitative component provided expert insights to guide model refinement.

3.1. Research Approach

This study employed a quantitative research approach, supplemented by expert feedback for model validation. The main goal was to assess the needs and implementation gaps in Computer-Assisted English Teaching (CAET) and to develop a structured management model based on empirical data. Although expert input provided qualitative insights, the core design and analysis were quantitative.

3.2. Participants

In this part of the research, a survey was distributed to 245 participants, all of whom were from the School of Foreign Languages, Hubei Engineering University, China. These participants were randomly chosen from all the students in the School of Foreign Languages using the Taro Yamane formula. Altogether, 245 questionnaires were sent, and all of them were received with valid responses. The study involved a total of 306 participants from Hubei Engineering University, including 245 English education major students, 54 English teachers, and 7 academic administrators. Participants were selected using a combination of purposive and convenience sampling, ensuring all respondents had direct experience with CAET.

3.3. Research Instruments

A questionnaire was developed based on a literature review of program management aspects. It was divided mainly into two aspects in addition to general information: Management and Application. There are 4 aspects in the Management module, namely, Planning, Resource Allocation, Communication, and Leadership, and 5 in the Application module, namely, Software and Applications, Interactive Learning Activities, Online Resources and Tools, Assessment and Feedback, and Teacher Training and Support. Each item was rated on a 5-point Likert scale, ranging from 1 ("lowest") to 5 ("highest"). The content and construct validity of the questionnaire were reviewed by five experts, with each item achieving an Item Objective Congruence (IOC) score of ≥ 0.80.

Also, expert feedback forms were used during the model development phase to validate dimensions and gather operational recommendations.

3.4. Data Collection Process and Quality Control

All questionnaires were internet-based and distributed in person on campus with the support of faculty coordinators. Before distribution, researchers conducted orientation sessions with class monitors and department staff to ensure accurate delivery and explanation of the instrument. Respondents were guaranteed anonymity and completed the survey voluntarily during scheduled class hours.

To ensure data reliability:

Incomplete or inconsistent questionnaires were excluded from analysis.

Each questionnaire was coded manually.

Double-entry validation was conducted before analysis to prevent data entry errors. Data were entered twice by two research assistants working independently, and the results were compared to identify and correct any discrepancies. The data were then checked for completeness, missing responses, and unusual values. Obvious errors were corrected based on the original questionnaires, and the final dataset was reviewed to confirm it was ready for analysis.

Out of the total 320 questionnaires distributed, 306 were deemed valid (validity rate: 95.6%).

3.5. Data Analysis

The data were analyzed using descriptive statistics, including mean, standard deviation, and the Priority Needs Index Modified (PNImod). The applicability of the model and the extent to which academic management was implemented were assessed using mean and standard deviation (S.D.). Additionally, the Modified Priority Needs Index (PNI)[27] was employed to determine the gap between the current state and the expected level, helping to identify priority areas for improvement. The Modified Priority Needs Index (PNI modified) was employed instead of the traditional PNI formula to account for proportional differences between current and expected scores, thereby producing a more standardized and scale-independent measure of needs. While the traditional PNI formula is expressed as (I−D)/I, PNI modified is calculated as (I−D)/D, where I represents the mean expected score and D represents the mean current score. This adjustment mitigates the limitations of scale dependency in traditional PNI, particularly when Likert-scale data are used across multiple dimensions with varying baseline scores. PNI modified has been recommended in educational management research to enable more meaningful cross-dimension comparisons and more precise identification of priority areas.

$$\text{PNI modified} = (\text{I} - \text{D})/\text{D} \quad (1)$$

I: Desired situation (expectation for the management)

D: Current situation (current status for the management)

To avoid index distortion, all current mean values were confirmed to be above 3.24. The PNImod helped identify priority areas for intervention. Leadership emerged as the highest-need management dimension (PNI = 0.29), while Online Resources and Tools had the largest gap overall (PNI = 0.30).

These results were further triangulated with expert opinions to refine and validate the model dimensions.

4. Results

4.1. The Program Management Model

After analyzing all aspects of the program management model from relevant documents, four aspects of the model were selected as the draft model for computer-assisted English teaching at Hubei Engineering University, China, and an interview guideline was developed. Five experts were invited for a detailed interview. These experts provided professional insights into the development of a Program Management Model on computer-assisted English teaching at Hubei Engineering University, China. All the experts agreed on these four dimensions' appropriateness and based on the collected data, a draft Program Management Model was developed, consisting of four key dimensions: Planning, Resource and Allocation, Communication, and Leadership. This model integrates the four aspects of program management, and thus guides the application of computer-assisted English teaching to English major students at Hubei Engineering University, China.

4.2. Current and Expected Conditions of CAET

Altogether, 245 students, 54 English teachers and 7 administrators participated in this study. All 306 questionnaires have been successfully distributed to the research subjects, systematically collected, and subjected to analysis using SPSS software. The data were meticulously organized into three principal sections: (1) general information, (2) perceptions regarding the current status and the expectations for the management on computer-assisted English teaching at Hubei Engineering University, China, and (3) perceptions regarding the current status and the expectations for the application on computer-assisted English teaching. The results are shown in **Tables 4–7**:

Table 4. The comparison between students' current situation and expectation for the management on computer-assisted English teaching at Hubei Engineering University.

Items	Current Situation			Expected Situation			PNI	PNI RANK
	$\overline{x}$	S.D.	Meaning of Scale	$\overline{x}$	S.D.	Meaning of Scale		
Planning	3.30	1.04	Moderate	4.18	0.79	High	0.27	2
Resource Allocation	3.29	1.02	Moderate	4.17	0.77	High	0.27	2
Communication	3.28	1.01	Moderate	4.17	0.78	High	0.27	2
Leadership	3.27	1.02	Moderate	4.20	0.78	High	0.29	1

Table 5. The comparison between students' current situation and expectation for the application on computer-assisted English teaching at Hubei Engineering University.

Items	Current Situation			Expected Situation			PNI	PNI RANK
	$\overline{x}$	S.D.	Meaning of Scale	$\overline{x}$	S.D.	Meaning of Scale		
Software and Applications	3.24	1.00	Moderate	4.18	0.79	High	0.29	2
Interactive Learning Activities	3.24	1.04	Moderate	4.19	0.77	High	0.29	2
Online Resources and Tools	3.24	1.01	Moderate	4.19	0.78	High	0.30	1
Assessment and Feedback	3.28	1.00	Moderate	4.20	0.79	High	0.28	4
Teacher Training and Support	3.29	1.05	Moderate	4.18	0.79	High	0.27	5

Table 6. The comparison between teachers and administrators' current situation and expectation for the management on computer-assisted English teaching at Hubei Engineering University.

Items	Current Situation			Expected Situation			PNI	PNI RANK
	$\overline{x}$	S.D.	Meaning of Scale	$\overline{x}$	S.D.	Meaning of Scale		
Planning	3.18	0.98	Moderate	4.01	0.75	High	0.26	2
Resource Allocation	3.20	0.91	Moderate	4.02	0.72	High	0.26	2
Communication	3.19	0.94	Moderate	4.07	0.76	High	0.28	1
Leadership	3.24	0.92	Moderate	4.04	0.76	High	0.25	4

Table 7. The comparison between teachers and administrators' current situation and expectation for the application on computer-assisted English teaching at Hubei Engineering University.

Items	Current Situation			Expected Situation			PNI	PNI RANK
	$\bar{x}$	S.D.	Meaning of Scale	$\bar{x}$	S.D.	Meaning of Scale		
Software and Applications	3.23	0.97	Moderate	4.06	0.73	High	0.26	3
Interactive Learning Activities	3.25	0.94	Moderate	4.05	0.74	High	0.25	4
Online Resources and Tools	3.22	0.86	Moderate	4.02	0.71	High	0.25	4
Assessment and Feedback	3.18	0.98	Moderate	4.04	0.74	High	0.27	1
Teacher Training and Support	3.16	0.98	Moderate	4.02	0.69	High	0.27	1

According to the analysis of student questionnaires (n = 245), the current status of CAET across all nine dimensions is rated at a moderate level, with mean scores ranging from 3.18 to 3.29. The expectation scores, however, are consistently high, ranging from 4.02 to 4.20. The gap between current and expected levels was evaluated using the PNI modified formula: (I − D)/D. Higher PNI modified values indicate greater gaps and higher priority for improvement.

Among students, the two highest PNI modified values were observed in the dimensions of Online Resources and Tools (0.30) and Leadership (0.29). Open-ended feedback from students revealed dissatisfaction with outdated digital platforms, lack of integration of AI tools, and limited interactive content. Leadership gaps were attributed to unclear vision, minimal guidance in learning planning, and limited motivation mechanisms. Students also reported insufficient training opportunities and limited feedback channels for technical support.

Teacher and administrator responses (n = 54 and n = 7 respectively) were also collected. The current status across the four management dimensions was rated moderate (mean = 3.20, S.D. = 0.94), while expectations were rated high (mean = 4.04, S.D. = 0.75). This corroborates student feedback. Teachers highlighted issues such as a lack of centralized coordination, irregular meetings, and insufficient professional development. Administrators noted fragmented communication and underdeveloped leadership strategies. These comparative insights underscore systemic weaknesses in both communication and leadership practices.

The use of PNI modified is statistically valid in this context. Since all current values (D) for both students and teachers are above 3.16, the risk of index distortion due to very small denominators is avoided.

4.3. Development and Evaluation of the Program Management Model

The development of the Program Management Model, later conceptualized as the PRACTICAL Model, was a systematic and iterative process grounded in both theoretical exploration and empirical validation. The process began with an extensive literature review of established frameworks in program management, educational leadership, and technology-enhanced language learning. This review enabled the identification of key success factors in managing complex educational programs that integrate digital technologies. From this foundation, nine initial dimensions were synthesized and grouped into two overarching categories: four dimensions related to program management—Planning, Resource Allocation, Communication, and Leadership—and five dimensions related to program implementation—software and applications, interactive learning activities, online resources and tools, assessment and feedback, and teacher training and support.

Following the theoretical construction, the model was further refined through a series of in-depth expert interviews and focus group consultations. A total of ten experts participated, including specialists in computer-assisted language learning, educational management, English teaching, as well as school administrators. These interviews aimed to assess the feasibility, clarity, and applicability of each proposed dimension and to elicit practical recommendations that could enhance the model's functionality in real teaching environments. Semi-structured interviews were conducted with the ten experts, each lasting approximately 45–60 minutes. The interviews followed a pre-designed outline, covering topics such as the conceptual validity of the dimensions, operational definitions, and potential implementation strategies.

All sessions were audio-recorded with participants' consent and transcribed verbatim. The transcription accuracy was verified by a second reviewer. The transcripts were analyzed using conventional content analysis, which involved three main steps: (1) reading through the transcripts repeatedly to achieve immersion, (2) coding relevant statements and grouping similar codes into categories, and (3) synthesizing the categories into broader themes related to the study objectives.

Experts provided critical insights into the operationalization of each dimension. For example, under the Leadership dimension, multiple experts recommended the inclusion of "regular digital pedagogy training programs" for teachers, coupled with performance evaluation mechanisms to ensure ongoing professional growth. For the Communication dimension, suggestions included establishing real-time dashboards or notification systems to streamline internal communication between administrators and instructors. Within Resource Allocation, experts emphasized the importance of creating cloud-based repositories that allow for shared access to instructional materials, AI-enhanced tools, and sample teaching modules.

Each expert's contribution was systematically coded and analyzed, and recurring themes were extracted to validate and enrich the original model structure. Revisions were made not only to include these operational tools but also to redefine the interconnections among the dimensions—for example, how strong leadership directly facilitates resource planning and how teacher training underpins the effective deployment of online tools.

Ultimately, the model was not just a static framework, but a functional and adaptive system designed to respond to the evolving needs of computer-assisted English teaching. The integration of both strategic management elements and practical instructional components led to the formation of the PRACTICAL acronym itself, which encapsulates the model's dual emphasis on Planning, Resource Allocation, Assessment, Communication, Technology, Interactive Learning, Collaboration, Administration, and Leadership. This evolution ensured that the model was grounded in both academic theory and field realities, enabling it to serve as a scalable and context-sensitive tool for English education programs in higher education institutions.

5. Discussion

This section discusses the main findings of the study and aligns them explicitly with the research objectives. The study aimed to identify gaps between current and expected states of Computer-Assisted English Teaching (CAET), analyze priority needs through the PNI framework, and develop a targeted program management model (PRACTICAL). The findings underscore critical needs in both management and application aspects, especially in areas such as leadership, communication, and online resources.

5.1. Management Aspects

The four key dimensions of the program management model—Planning, Resource Allocation, Communication, and Leadership—were all rated at a moderate level in their current state but were associated with high expectations from students. Among these, leadership showed the highest Priority Needs Index (PNI), indicating a pressing need for improvement. This aligns with prior research suggesting that strong leadership is crucial for educational technology integration [28]. Without active guidance and well-defined objectives, both instructors and students may struggle with effective adoption of computer-assisted English teaching tools. This finding supports Research Objective 1, which explores the current state of management dimensions. To address leadership deficits, institutions should consider forming a CAET leadership task force composed of academic leaders, digital experts, and senior faculty. This team should define measurable goals, lead institutional policy cycles, and regularly review implementation outcomes. In addition, leadership development programs should be offered, including digital strategy training for department heads, monthly leadership coaching workshops, and hands-on case analyses of successful CAET implementations in other institutions.

Communication was another dimension requiring attention. The study found that both students and teachers felt that program objectives were not clearly communicated, leading to confusion regarding course expectations and resources. Effective communication strategies, such as regular feedback loops and interactive meetings, could enhance engagement and program efficiency. This finding echoes Thiry [4], who emphasizes that successful program management relies

heavily on robust communication strategies to align all stakeholders toward a shared goal. Structured communication strategies such as real-time dashboards, faculty-student digital forums, and monthly program progress newsletters are recommended. Additionally, establishing "digital communication officers" within departments could help coordinate and monitor communication flows among students, teachers, and administrators.

Gaps in planning and resource allocation indicate a misalignment between available tools and their actual use. Institutions should implement participatory planning workshops to involve faculty and students in decision-making. The adoption of a Work Breakdown Structure (WBS), based on PMBOK principles, can help ensure clear task assignments, resource allocation, and milestone tracking. Annual digital resource audits should be carried out to assess tool relevance, and underused technologies should be replaced or repurposed.

5.2. Application Aspects

In terms of application, five dimensions were analyzed: Software and Applications, Interactive Learning Activities, Online Resources and Tools, Assessment and Feedback, and Teacher Training and Support. Among these, Online Resources and Tools had the highest PNI, indicating that students found the current resources insufficient for effective learning. This finding aligns with previous studies on the role of online learning materials in language acquisition [29]. Expanding the range of digital materials, integrating more multimedia resources, and ensuring accessibility could significantly enhance student learning experiences. Among them, Online Resources and Tools presented the highest PNI value (PNI = 0.30), directly addressing Research Objective 2 regarding implementation gaps. To meet this need, institutions should create a centralized, school-based digital resource library that houses multimedia materials, CEFR-aligned reading and listening passages, sample tests, and digital dictionaries. Incorporating AI-based recommendation engines will personalize content delivery, ensuring resources match student proficiency and learning goals. Teachers should be trained to contribute to and curate this repository based on course needs.

Interactive Learning Activities and Software and Applications also showed considerable gaps. The moderate ratings in these areas suggest that while some tools are available, they are not utilized to their full potential. Students require more engaging, interactive content that fosters active participation and practical application of language skills. The incorporation of gamification, AI-driven learning platforms, and adaptive learning technologies could help bridge this gap.

Teacher Training and Support, although relatively stronger, still reflected a notable gap. A three-tiered professional development framework is proposed:

1. Foundational workshops covering CAET fundamentals, including course design principles for blended learning.
2. Tool-specific training for software like Moodle, ChatGPT, or Edmodo, including sandbox environments for teachers to practice.
3. Continuous peer mentorship through departmental teaching circles, where faculty present CAET case studies and receive feedback.

Additionally, teachers should be encouraged to develop digital teaching portfolios with reflective narratives, classroom applications, and student outcome analyses. Recognition through certificates and promotion points will incentivize participation.

5.3. Theoretical Contribution of the PRACTICAL Model

The PRACTICAL model offers a contextualized innovation in program management for education. While traditional models like PMBOK emphasize universal project parameters (scope, cost, time, quality), PRACTICAL adapts these to digital pedagogy.

- The addition of "Teacher Training and Support" extends the human resource focus by integrating continuous professional development.
- "Interactive Learning Activities" reinterpret quality control in terms of learner engagement and cognitive interactivity.
- The cyclical feedback structure reflects agile methodologies, supporting adaptability and rapid response to changing educational technologies.

These elements position PRACTICAL as a tailored, education-specific project management model that fills a gap in existing theoretical frameworks.

According to the opinions of experts in the related fields and the feedback from the questionnaires, the draft of the program management model is as **Figure 2**.

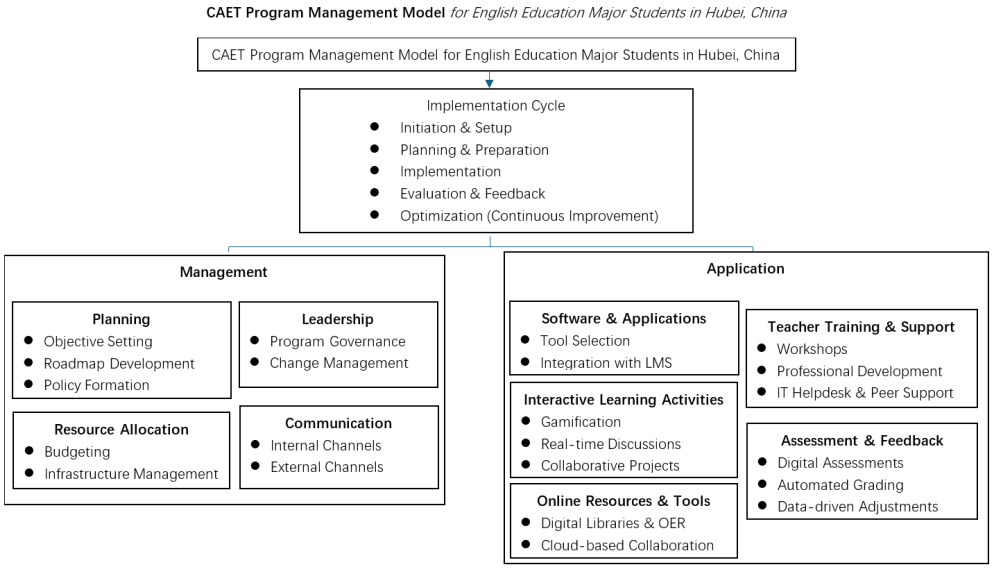

Figure 2. Model Structure Diagram of CAET Program Management Model.

The CAET Program Management Model is a complete plan for using computers to teach English, designed for English education majors in Hubei, China. It has two main parts: the management side and the application side. The management side focuses on setting clear goals, planning the timeline, ensuring sufficient financial and technology, keeping everyone informed, and having strong leadership to guide the program. The application side takes care of choosing the right computer tools and software, creating fun and interactive learning activities, offering plenty of online resources, regularly checking student progress with assessments, and providing ongoing training and support for teachers. Overall, the model starts by setting up and planning, then moves into putting everything into action, and finally uses feedback to make constant improvements, ensuring that both the planning and the practical use of technology work well together.

5.4. Model Evaluation and Modification

In order to evaluate the model, an educational expert panel, including experts from different universities and various related disciplines in China, was invited to review the first draft of the Program Management Model on Computer-Assisted English Teaching (CAET) for English education major students in Hubei, China.

Figure 3 shows the results of the expert's evaluation on the first draft of the program management model on Computer-Assisted English Teaching (CAET) for English education major students in Hubei, China.

The bar chart presents the experts' evaluation of the draft Program Management Model for Computer-Assisted English Teaching (CAET). The ratings indicate areas of strength and those requiring improvement. Lower scores in categories such as curriculum integration, faculty training, and assessment methods highlight the need for a structured approach to incorporating CAET into teaching practices. Communication efficiency also received low scores, suggesting the necessity of transitioning from traditional communication methods to digital collaboration tools. Resource management and allocation, as well as software applications were moderately rated, showing that while technology was available, accessibility and usability needed enhancements. Higher scores in leadership and support teams indicate that institutional roles were clear but required modernization for more effective CAET implementation.

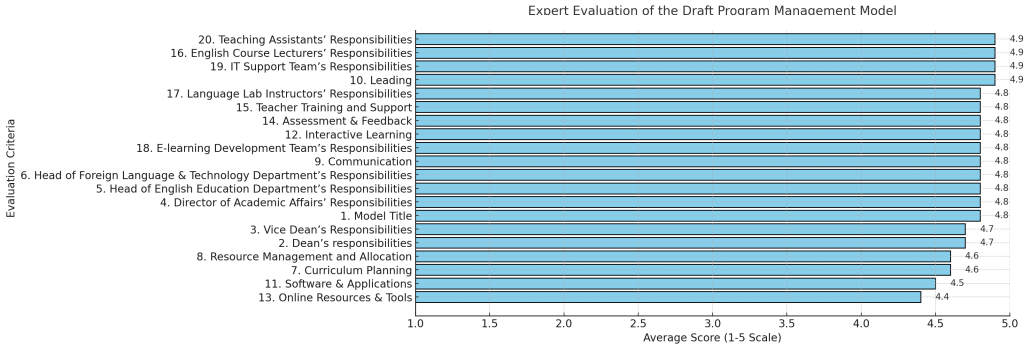

Figure 3. The Bar Chart of the Evaluation Results.

Based on all the information provided by all the experts from related fields, a modification and development of the model has taken place. The modified and optimized model is shown in **Figure 4**:

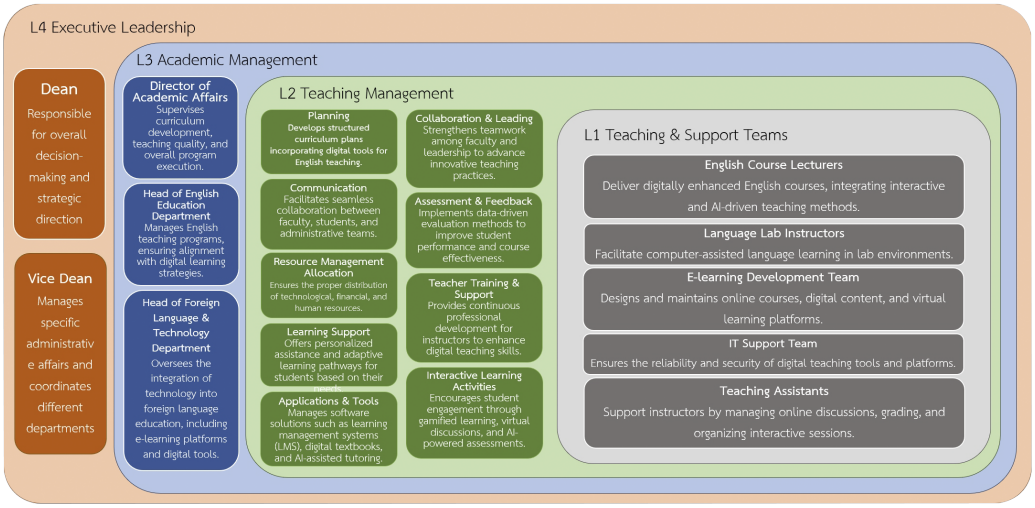

Figure 4. The modified program management model for CAET: PRACTICAL Mode.

The PRACTICAL model provides a structured framework to enhance the management and implementation of the Computer-Assisted English Teaching (CAET) program at the School of Foreign Languages in Hubei, China. It aims to address existing challenges in resource allocation, assessment, communication, and teacher training while building on the good practices already in place. By establishing a more mature and strategic approach, this model ensures that CAET evolves from its current moderate performance into a well-integrated, student-centered, and technologically advanced learning system.

5.5. Practical Recommendations

The previous findings suggest that the PRACTICAL program management model can significantly enhance Computer-Assisted English Teaching (CAET) by bridging policy gaps, strengthening institutional frameworks, and promoting more effective teacher–student interactions. However, successful implementation requires a holistic approach that aligns leadership decisions, resource allocation, faculty training, and learner engagement. To ensure effective implementation of the PRACTICAL model, the following recommendations are proposed:

5.5.1. Policy and Leadership

1. Set clear, quantifiable CAET objectives and disseminate them across all departments through internal webinars and online CAET vision documents.
2. Establish regular policy review cycles using student and faculty feedback, digital analytics, and external expert consultations.

3. Create incentive systems acknowledging digital innovation in faculty evaluations by integrating digital rubrics into promotion criteria.
4. Publicize CAET-related budgets to increase institutional transparency and conduct annual town hall meetings to explain digital spending.
5. Form cross-functional CAET committees and appoint digital champions with reduced teaching loads and clear mentoring responsibilities.

5.5.2. Institutional Structure

6. Set up a dedicated CAET Coordination Office equipped with instructional designers, IT support, and content developers.
7. Match technological resources to course intensity through tiered support systems: basic technology for general courses, and advanced tools for AI/VR-enhanced curricula.
8. Run technology review protocols, including cost-benefit analyses, student feedback cycles, and pilot testing using standardized checklists.

5.5.3. Teacher Strategies

9. Provide structured professional development and mentoring cycles, including summer digital bootcamps and semester-long coaching programs.
10. Encourage action research on CAET effectiveness through mini-grants and research colloquia.
11. Embed CAET participation into promotion criteria with clear benchmarks for innovation, training hours, and student feedback.

5.5.4. Student Strategies

12. Offer mandatory CAET orientation and digital literacy workshops during freshman induction and before core CAET courses.
13. Integrate personalized, AI-supported feedback systems into LMS platforms with progress dashboards and custom practice paths.
14. Promote ethical digital behavior through embedded micro-modules and interactive online quizzes with real-life CAET case scenarios.

5.6. Recommendations for Future Research

Future studies should adopt longitudinal designs to observe how the PRACTICAL model impacts student outcomes and institutional behavior over time. Comparative case studies across different institutional contexts—such as under-resourced universities—could yield insights into context-sensitive adaptations. Finally, the integration of emerging technologies (e.g., VR, AR, AI chatbots) within the PRACTICAL framework should be assessed for pedagogical effectiveness, technical feasibility, and ethical implications, ensuring CAET remains innovative and inclusive.

Author Contributions

Conceptualization, S.M., A.U., and T.P.; methodology, S.M., A.U., and T.P.; validation, A.U., and T.P.; formal analysis, S.M., A.U., and T.P.; investigation, S.M., A.U., and T.P.; data curation, A.U., and T.P.; writing— original draft preparation, S.M.; writing—review and editing, S.M., A.U., and T.P.; supervision, A.U., and T.P.; project ad-ministration, S.M. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Dhonburi Rajabhat University (protocol code: 009/2568 and date of approval: Jan.24th, 2025).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data that support the findings of this study are available from the author upon reasonable request.

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Conflicts of Interest

The authors declare no conflict of interest.

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