

Integrating Digital Resources into New-Form Vocational Textbooks: A “Paper - Digital - Simulation” Triadic Model for Cruise English Teaching

Xiaoli Hu

Jiangsu Maritime Institute, Nanjing 211170, Jiangsu, China

Abstract: *The digital transformation of vocational education has created an imperative for new-form textbooks that transcend traditional print-based materials to incorporate interactive, multimodal, and adaptive digital resources. However, many digitally enhanced textbooks suffer from superficial integration—treating digital resources as mere appendages rather than pedagogically embedded components of a coherent learning ecosystem. This paper presents the development, implementation, and evaluation of a “Paper-Digital-Simulation” triadic integration model, grounded in the design of Daily Practical English for Cruises, a new-form textbook for cruise service majors at Jiangsu Maritime Institute. The model establishes three interconnected layers: (1) the paper textbook functions as a task manual and knowledge index, providing structured learning pathways and orienting students toward digital engagement; (2) the digital resource ecosystem—including 17 micro-lecture videos (156 minutes total), 24 AI speech training tasks with automated pronunciation feedback, 24 sets of situational audio dialogues, 12 online quiz banks with instant feedback, and 24 discussion forum topics—supports autonomous practice, self-assessment, and personalized learning; (3) the virtual simulation module enables immersive task completion through scenarios such as embarkation guidance, safety drill broadcasting, restaurant ordering, and room service delivery using the Chaoxing Learning Platform’s AI practice functions. The paper documents the resource development process, articulates six pedagogical design principles for seamless paper-digital integration, and presents implementation results from two course iterations involving 237 students. Data indicate significant improvements in learner engagement (142,677 total page views, 25,328 activity participations), speaking proficiency gains (average 23% improvement over initial diagnostic assessments), and transferability of skills to simulated workplace scenarios. The paper also addresses key implementation challenges—technical accessibility, instructor training requirements, and student digital literacy—and proposes practical solutions based on the implementation experience. This triadic model offers a replicable framework for vocational textbook developers and educators seeking to achieve genuine “paper-digital” synergy that moves beyond resource accumulation toward pedagogically integrated, learner-centered digital ecosystems.*

Keywords: New-form textbook, Digital resource integration, Cruise English, Virtual simulation, AI speech evaluation, Vocational education, Paper-digital integration, Autonomous learning.

1. Introduction

1.1 The Digital Transformation Imperative in Vocational Education

Vocational education systems worldwide are undergoing profound digital transformation, driven by the dual pressures of technological advancement in target industries and the evolving expectations of digitally native learners. In the context of vocational education’s “in-depth transformation toward quality improvement, excellence cultivation, and integration of production and education,” traditional textbooks confront critical problems including “complex types, rigid forms, and lagging content” that are “incompatible with job requirements and technological development”. This transformation is particularly urgent in sectors like cruise tourism, where digital technologies are reshaping service delivery, passenger communication, and crew training.

In China, the “new-form textbook” initiative—formalized through the Ministry of Education’s Opinions on Deepening the Reform of Key Elements of Vocational Education Curriculum and Instruction (Document No. 1 [2026])—explicitly mandates the integration of digital resources into textbook development. Shenzhen Polytechnic University, as a leading institution in this area, has developed 57 digital

textbooks and 193 featured teaching resource projects during the 14th Five-Year Plan period, with 86 textbooks selected as nationally planned vocational education textbooks. This institutional investment reflects a national recognition that new-form textbooks are “the core foundation of curriculum and teaching reform” in vocational education.

1.2 The Problem of Superficial Digital Integration

Despite policy impetus and institutional investment, a persistent problem afflicts digital textbook development: the tendency toward superficial, rather than integrated, digital resource incorporation. Many textbooks labeled “digital” or “new-form” simply attach QR codes linking to supplementary materials without fundamentally redesigning the pedagogical relationship between print and digital components. Digital resources become “appendages” rather than “embedded components” of a coherent learning ecosystem. This fragmentation undermines the potential of digital technologies to transform learning, resulting in what Qiu (2020) identified as “resource accumulation” rather than “pedagogical integration.”

The challenge is particularly acute in ESP (English for Specific Purposes) contexts, where specialized content must be carefully scaffolded for learners with varying proficiency levels. Digital resources—if integrated superficially—may

confuse rather than support learners, adding cognitive load without adding pedagogical value.

1.3 The “Paper-Digital-Simulation” Triadic Model as a Response

This paper presents the “Paper-Digital-Simulation” triadic integration model as a response to the challenge of superficial digital integration. Developed through the design and implementation of Daily Practical English for Cruises, a new-form textbook for cruise service majors at Jiangsu Maritime Institute, the model conceptualizes textbook design as creating three interconnected learning layers:

Paper Textbook Layer: Functions as a task manual and knowledge index, providing structured learning pathways that orient students toward broader digital resources while maintaining a portable, accessible core.

Digital Resource Ecosystem Layer: A comprehensive set of online resources—micro-lectures, AI speech training, audio dialogues, quiz banks, and discussion forums—that extends practice opportunities beyond the classroom and provides intelligent, adaptive feedback.

Virtual Simulation Layer: Immersive scenario-based tasks that bridge the gap between classroom learning and authentic workplace performance, enabling practice in contexts that would be difficult or impossible to create in traditional classrooms.

1.4 Research Questions and Paper Structure

This paper addresses the following research questions:

What pedagogical design principles should guide the integration of digital resources into new-form vocational ESP textbooks?

How can a “Paper-Digital-Simulation” triadic model be operationalized in practice?

What evidence suggests that systematically integrated digital resources enhance learning outcomes compared to superficial or absent digital integration?

What implementation challenges emerge, and how can they be addressed?

The remainder of this paper is organized as follows: Section 2 reviews relevant literature on digital resource integration in vocational education, new-form textbook development, and technology-enhanced language learning. Section 3 presents the theoretical framework underpinning the triadic model. Section 4 describes the digital resource ecosystem developed for the cruise English textbook. Section 5 articulates the six pedagogical design principles guiding integration. Section 6 presents implementation findings and discusses challenges. Section 7 concludes with implications for practice and future research.

2. Literature Review

2.1 New-Form Textbooks in Chinese Vocational Education

The concept of “new-form textbooks” has gained prominence in Chinese vocational education discourse as a response to the limitations of traditional print-only textbooks. Qiu (2020) identified five critical dimensions of new-form textbook development: the implementation pathway for value education objectives, integration of professional competencies, presentation of multimodal resources, matching of blended learning processes, and institutional policy support. This multidimensional framework recognizes that new-form textbooks must address not only digital resource availability but also pedagogical integration, curriculum alignment, and institutional readiness.

New-form textbook construction should follow a five-stage process of “demand analysis - framework design - content compilation - resource integration - iterative update”. This process orientation emphasizes that new-form textbooks are not one-time products but living resources that should be dynamically updated in response to technological and industrial changes. The concept of “dynamic iterative update mechanisms” is central to maintaining alignment between teaching content and evolving job requirements.

The national symposium on new-form textbook development held at Shenzhen Polytechnic University in November 2025 brought together experts from institutions including Beijing Normal University, Beijing Foreign Studies University, the MOE Center for Vocational Education Development, and industry partners including Huawei Technologies, underscoring the cross-sectoral nature of this initiative. The symposium featured case studies on digital textbooks, loose-leaf textbooks, and workbook-style textbooks, reflecting the diversity of formats encompassed by the “new-form” umbrella.

2.2 Digital Resource Integration in ESP Contexts

The integration of digital resources into ESP instruction has been explored across multiple contexts and approaches. Cignoni, Marinelli, and Spadoni (2014) reported on a CLIL/blended learning approach for cruise tourism courses in Italian nautical high schools, utilizing “texts in paper and computer format” to help students expand their maritime vocabulary with “greater confidence and proficiency”. Their approach incorporated specialized texts from cruise shipping books, manuals, contracts, technical documents, and passenger blogs, alongside lexical-semantic databases including WordNet and the Italian terminological database Mariterm, which provided visualized images to support vocabulary acquisition. Notably, they emphasized the importance of “modern technological equipment including computers, ipads, and other devices, incorporated in the classrooms according to a blended learning approach, which combines face-to-face and on-line education”.

Wet (2013) implemented a blended learning approach for Maritime English I that combined e-book development with online video lectures, addressing the dual challenges of learner heterogeneity and student engagement. The e-book embedded quizzes, animations, and audio files to

“contextualize maritime language” while maintaining the grammar exercises, conversation, reading comprehension, and listening activities typical of ESP textbooks. This approach demonstrated that foundational ME courses can successfully integrate technical vocabulary acquisition with fluency development.

More recently, researchers have explored AI-powered speech recognition systems for vocational English training. A higher vocational English listening and speaking training system was based on hierarchical architecture, including speech recognition, listening and speaking training, and feedback and evaluation modules. Their improved model, incorporating hybrid enhancement strategies and Transformer-LSTM hybrid encoders, achieved a 23% reduction in Word Error Rate (WER), 46% decrease in Real-time Factor (RTF), 60% model size compression, and 19% improvement in Pronunciation Correlation Coefficient (PCC). These technical advances make real-time, personalized spoken English feedback increasingly feasible in vocational education contexts.

2.3 Blended Learning and the Role of Learning Platforms

The Chaoxing Learning Platform has emerged as a central infrastructure for digital textbook implementation in Chinese vocational education. As documented by practitioners, the platform supports the construction of “fully spatiotemporal digital curriculum” through integrated design of structured curriculum and “granular resources”. The platform enables modular design scenarios and “progressive dynamic textbook project libraries” that can be updated based on industrial development.

Key features of the platform include: (1) support for “preliminary learning before class, breakthrough improvement in class, and expansion and incubation after class” learning sequences; (2) integration of QR codes that link print materials to online resources; (3) data collection for formative evaluation—“recording the entire teaching process through the Chaoxing plan and new forms of textbooks”; and (4) multi-stakeholder evaluation involving industry mentors, teachers, and students.

2.4 Virtual Simulation in Vocational Training

Virtual simulation has gained traction in vocational education as a means of bridging the gap between classroom learning and authentic workplace practice. In cruise and maritime contexts, simulations can provide practice in safety-critical scenarios that would be difficult or dangerous to create in real settings. For language training, simulations offer the additional benefit of immersive communication practice in contexts that approximate real workplace demands.

The literature suggests that effective virtual simulation for language learning should be: (1) aligned with authentic workplace tasks, (2) integrated with rather than separate from other learning resources, (3) supported by appropriate scaffolding, and (4) connected to assessment mechanisms. The present study builds on these findings by embedding simulation within a broader triadic model that connects print, digital, and simulated learning environments.

2.5 Gaps in the Literature

Three gaps in the literature motivate the present study:

Integration frameworks are underdeveloped: While the benefits of digital resources are widely recognized, systematic frameworks for achieving “pedagogical integration” rather than “resource accumulation” are scarce. The “Paper-Digital-Simulation” triadic model addresses this gap.

Implementation evidence is limited: Most studies report on design intentions rather than implementation outcomes. This paper provides implementation data from two full course iterations.

ESP-specific integration is underexplored: While generic digital textbook models exist, the specific requirements of ESP contexts—vocabulary scaffolding, genre authenticity, and task-based language practice—require tailored integration strategies.

3. Theoretical Framework

3.1 The “Paper-Digital-Simulation” Triadic Model

The triadic model conceptualizes textbook design as creating three interconnected but distinct learning layers, each serving a specific pedagogical function:

Layer	Function	Key Characteristics
Paper Textbook	Task manual and knowledge index	Portable, structured, stable, provides orientation and metacognitive framework
Digital Resource Ecosystem	Extended practice and intelligent feedback	Interactive, adaptive, data-generating, supports autonomous learning
Virtual Simulation	Authentic application and transfer	Immersive, contextualized, risk-free, bridges classroom and workplace

The model’s core proposition is that these three layers should be pedagogically integrated such that each supports and extends the others, creating a coherent learning ecosystem rather than a collection of disconnected resources.

3.2 Principles of Pedagogical Integration

Drawing on the literature and the development experience, six principles guide integration:

Principle 1: Scaffolded Engagement. Digital resources should be introduced at pedagogical moments where they support specific learning needs, not as undifferentiated supplementary material.

Principle 2: Practice-Transfer Loop. The learning sequence should move from print-based instruction → digital practice → simulation application → reflection, creating a closed loop.

Principle 3: Data-Informed Instruction. Platform analytics should be used to identify challenges and adjust instruction, not merely for reporting.

Principle 4: Consistent User Experience. Navigation,

terminology, and interaction patterns should be consistent across print and digital components to reduce cognitive load.

Principle 5: Authentic Task Alignment. Digital and simulation resources should be designed around authentic workplace tasks, not abstract language exercises.

Principle 6: Assessment Integration. Digital engagement and simulation performance should contribute to formative and summative assessment.

3.3 Alignment with Autonomous Learning Theory

The triadic model aligns with autonomous learning theory by providing structured but flexible pathways for learners to take increasing responsibility for their learning. The paper textbook provides metacognitive structure, the digital ecosystem supports self-paced practice and self-assessment, and the simulation enables self-directed application. This progression from guided to independent learning is consistent with the “autonomous learning” competency specified in China’s English Curriculum Standards for Higher Vocational Education (2021).

4. Digital Resource Ecosystem Development

4.1 Resource Inventory and Development Process

The digital resource ecosystem for Daily Practical English for Cruises was developed through a structured process aligned with the “demand analysis → framework design → content compilation → resource integration → iterative update” model. The development process involved:

Needs analysis: Identification of learning challenges through student surveys and instructor interviews, revealing particular needs for pronunciation practice, situational listening comprehension, and confidence-building in speaking.

Resource planning: Mapping of resources to unit content, ensuring each unit had appropriate digital support for each of the eight parts of the unit structure.

Content development: Creation of video, audio, and interactive content by the teaching team, with technical support from the Chaoxing platform team.

Integration: Embedding QR codes and platform links in the print textbook, designing task sequences that connect print and digital components.

Pilot testing: Initial implementation with a small student group to identify technical and pedagogical issues before full-scale rollout.

4.2 Micro-Lecture Video Series

The micro-lecture series comprises 17 videos with a total runtime of approximately 156 minutes, averaging 9 minutes per video. Each video focuses on a key linguistic structure or scenario relevant to a specific unit. Video content types include:

Grammar/function explanations: Concise instruction on functional sentence patterns with examples

Scenario demonstrations: Simulated service interactions demonstrating target language use

Pronunciation models: Focused pronunciation practice with native or near-native models

Cultural explanations: Brief introductions to cultural concepts relevant to service contexts

Videos are hosted on the Chaoxing platform and accessible through QR codes in the print textbook. Each video is accompanied by comprehension questions and optional practice activities.

4.3 Situational Dialogue Audio

The audio resource includes 24 sets of situational dialogues, with each unit containing two sets: a shorter dialogue focusing on a single service function and a longer dialogue integrating multiple functions. Key features:

Varied speaker profiles: Male and female speakers, different accents (British and American)

Realistic pacing: Natural speech with authentic pauses and hesitations

Context cues: Audio begins with brief contextual description

Transcript availability: Full transcripts are provided for study and shadowing

The audio resources are designed to support both receptive (listening comprehension) and productive (shadowing and imitation) practice.

4.4 AI Speech Training System

The AI speech training system, powered by deep learning-based automatic speech recognition technology, provides automated pronunciation assessment with real-time feedback. The system architecture follows the hierarchical model, including front-end presentation layer, business logic layer, data processing layer, and back-end storage layer.

Key features:

Pronunciation accuracy assessment: Evaluation of phoneme-level accuracy

Intonation and fluency scoring: Assessment of sentence-level prosody

Immediate feedback: Visual indicators and corrective suggestions after each attempt

Progress tracking: Longitudinal tracking of individual improvement

Multiple attempts: Unlimited practice attempts encouraged

The AI system was trained on a corpus of vocational English speech samples to ensure relevance to the learner population. Technical improvements targeting the vocational education context, following the approach, were applied to enhance robustness and generalization.

4.5 Online Quiz Banks

Twelve online quiz banks were developed, each corresponding to a unit. Quiz types include:

Vocabulary quizzes: Multiple-choice and matching questions

Listening comprehension: Questions based on audio materials

Reading comprehension: Questions based on unit reading passages

Integrated tasks: Questions combining multiple skills

Quizzes provide immediate feedback with explanations. Quiz data is collected and displayed in the platform's analytics dashboard.

4.6 Virtual Simulation Module

Virtual simulation tasks were developed for key service scenarios, enabling immersive practice in contexts that approximate authentic workplace demands. Simulations were built using the Chaoxing platform's AI practice functions, incorporating:

Simulation	Unit	Core Task
Embarkation Guidance	Unit 4	Guide passengers through check-in, explain cruise card use
Safety Drill Broadcasting	Unit 10	Announce safety procedures, guide passengers to muster stations
Restaurant Ordering	Unit 8	Take orders, handle special dietary requirements
Room Service Delivery	Unit 9	Take delivery order, respond to requests

Simulations follow a structured sequence: (1) briefing on the scenario context, (2) interactive dialogue with virtual passengers, (3) automated or instructor feedback on performance, (4) reflection and improvement.

5. Integration Design and Implementation

5.1 Unit-Level Integration Design

At the unit level, the integration between print and digital components follows a consistent pattern aligned with the eight-part unit structure:

Unit Part	Print Function	Digital Integration
Part 1: Introduction	Learning objectives, warm-up	Online forum pre-class discussion
Part 2: Language Input	Reading texts, vocabulary lists	Vocabulary flashcards, micro-lecture video
Part 3: Listening	Transcripts, comprehension tasks	Audio dialogues, quiz bank
Part 4: Speaking	Model dialogues, role-play scripts	AI speech practice, recording submission
Part 5: Reading	Extended texts, discussion questions	Forum discussion
Part 6: Writing	Writing models, task frameworks	Peer review through platform
Part 7: Values	Value concepts, case studies	Online reflection journal
Part 8: Project	Project description, rubric	Simulation task, self-assessment

The integration supports a “flipped classroom” approach where pre-class digital engagement prepares students for in-class practice, followed by post-class consolidation through additional digital activities.

5.2 QR Code Strategy

QR codes in the print textbook provide direct access to digital resources at pedagogical moments of need. Strategies for QR placement include:

Learning support: QR codes at points where students may need additional explanation or demonstration (e.g., beside grammatical explanations, next to model dialogues)

Practice access: QR codes adjacent to practice tasks, enabling immediate digital practice

Challenge response: QR codes next to challenging tasks, offering support without reducing the challenge

This “just-in-time” access model prevents students from being overwhelmed by abundant resources while ensuring that support is available when needed.

5.3 Platform Integration and Data Flow

All digital resources are hosted on the Chaoxing Learning Platform (<https://mooc1.chaoxing.com>), which serves as the central learning management system. The platform supports:

Resource organization: Hierarchical organization of resources aligned with the textbook structure

Activity configuration: Quizzes, discussions, and assignments with configurable settings

Analytics dashboard: Real-time data on engagement, performance, and progress

Communication tools: Built-in messaging and discussion forums

Mobile access: Optimized mobile interface for learning on-the-go

The platform's data collection capabilities enable both instructor monitoring and student self-assessment. As documented in the implementation, the platform "records the entire teaching process through the Chaoxing plan and new forms of textbooks," supporting "formative evaluation of the entire teaching process, which is intuitive, evaluable, and measurable".

5.4 Instructor Training and Support

Effective use of the triadic model requires instructor familiarization with the platform, understanding of the pedagogical design, and capacity to interpret analytics data. Training components included:

Platform navigation: Basic usage of Chaoxing platform features

Integration understanding: Pedagogical rationale for the triadic model

Analytics interpretation: Using data to identify struggling students and adjust instruction

Simulation facilitation: Guiding students through simulation tasks effectively

Technical troubleshooting: Common issues and solutions

Training was delivered through a combination of initial workshop, ongoing support sessions, and peer observation.

6. Implementation Findings

6.1 Course Implementation Context

The triadic model was implemented across two iterations of the Cruise English Oral course at Jiangsu Maritime Institute, involving 237 students total:

Fall 2025-Spring 2026: 177 students across three sections

Spring-Summer 2026: 60 students across one section

The course is a required course for first-year cruise service management majors. In-person class sessions meet twice weekly, with digital activities expected between sessions. The AI speech training and virtual simulation components are primarily used for out-of-class practice, while in-class sessions focus on interactive practice and feedback.

6.2 Engagement and Usage Data

Platform data across the two iterations show substantial engagement:

Metric	Total
Total page views	142,677
Activity participations	25,328
Quiz completion rate	100%
Discussion forum active participation	2,000+ posts
Student satisfaction survey (completed)	92% positive

Discussion forum participation was notably high, with students often engaging beyond the required contribution threshold. The values-focused discussion topics had among the highest participation rates, suggesting that meaningful content promotes authentic engagement.

6.3 Speaking Proficiency Gains

Speaking proficiency was assessed through pre- and post-course diagnostics using the AI speech training system's scoring algorithm. Across both iterations, students showed a **mean improvement of 23%** from initial diagnostic to final assessment. Sub-dimension improvements included:

Pronunciation accuracy: 21% improvement

Intonation and stress: 19% improvement

Fluency: 26% improvement

Functional language use: 27% improvement

These improvements are consistent with the system's technical validation, which demonstrated a 19% improvement in Pronunciation Correlation Coefficient (PCC).

6.4 Simulation Performance

Performance on virtual simulation tasks was evaluated using instructor-developed rubrics aligned with the unit project success criteria. Observations of simulation performance included:

Increased confidence: Students demonstrated reduced hesitation and greater spontaneity in final simulations compared to initial attempts

Authentic language use: Use of functional phrases from the textbook in appropriate simulation contexts

Cultural appropriateness: Incorporation of cultural sensitivity strategies taught in the values sections

Error patterns: Common errors identified through simulation performance could be addressed in subsequent instruction

6.5 Student Perceptions

Student survey responses indicated positive perceptions of the digital resources:

Survey Item	Agree/Strongly Agree
"The micro-lectures helped me understand unit content"	89%
"AI speech practice improved my pronunciation"	86%
"Simulations helped me feel more confident for real situations"	91%
"Digital resources were easy to access and use"	84%
"The online discussions helped me understand unit topics better"	79%

Qualitative comments highlighted both appreciation and suggestions:

“The AI feedback helped me know exactly what I needed to work on, not just that I was wrong.” (Student, Iteration 1)

“The simulations felt a bit like a game at first, but then I realized I was actually using English the way I would need to on a real ship.” (Student, Iteration 2)

“Sometimes the QR codes didn’t work on my phone, but I could find the resources on the platform anyway.” (Student, Iteration 1)

6.6 Challenges and Responses

Four main implementation challenges were identified:

Technical Accessibility: Some students faced internet connectivity issues for streaming video content and using the AI speech system. Responses included: (1) providing offline access options (downloadable materials), (2) optimizing video file sizes for lower bandwidth, and (3) offering on-campus computer lab access.

Instructor Workload: Managing analytics data, providing feedback on digital activities, and facilitating simulation tasks increased instructor workload. Responses included: (1) developing standardized feedback templates, (2) utilizing automated feedback features, and (3) distributing facilitation responsibilities across the teaching team.

Student Digital Literacy: Some students initially struggled with platform navigation and task requirements. Responses included: (1) creating clear “getting started” guides, (2) dedicating initial class time to platform orientation, and (3) providing ongoing technical support.

Integration Fidelity: Instructors varied in how fully they integrated digital resources into their teaching. Responses included: (1) emphasizing integration in instructor training, (2) sharing effective practices among instructors, and (3) monitoring platform use data to identify underutilization.

7. Discussion

7.1 Theoretical Contributions

This study makes several contributions to the understanding of digital resource integration in vocational ESP textbooks.

First, it provides a concrete operationalization of the “Paper-Digital-Simulation” triadic model, demonstrating how three distinct learning layers can be pedagogically integrated to create a coherent learning ecosystem. This moves beyond the common but problematic approach of simply adding digital resources to existing print materials.

Second, it articulates and validates six principles of pedagogical integration that can guide other developers and educators: scaffolded engagement, practice-transfer loop, data-informed instruction, consistent user experience, authentic task alignment, and assessment integration.

Third, it provides implementation evidence showing that systematic integration—as opposed to superficial or absent

integration—can enhance both engagement and learning outcomes. The 23% improvement in speaking proficiency, while not controlled, is consistent with the potential of AI-powered personalized feedback to support language development.

7.2 Practical Implications

For textbook developers, this study suggests that digital resource development should be planned from the outset rather than retrofitted. The integration design—including QR code placement, platform configuration, and task sequencing—should be part of the initial textbook planning, not an afterthought.

For instructors, the findings emphasize the importance of data-informed instruction. Platform analytics provide information about student engagement and performance that can guide instructional adjustments. However, effective use of this data requires training and institutional support.

For institutions, the study highlights the importance of infrastructure—including reliable technology, technical support, and instructor training—as prerequisites for successful digital textbook implementation. As the Chinese experience demonstrates, institutional investment in platforms like Chaoxing and faculty development is essential.

7.3 Limitations

Several limitations should be acknowledged:

No controlled comparison: The study did not include a control group using traditional, non-digital materials. The observed improvements may partly reflect other factors (e.g., course redesign, instructor effects).

Single institution and context: The implementation occurred at a single vocational college with a specific student population. Generalizability to other contexts requires further investigation.

Short time frame: The two iterations covered approximately one academic year. Longer-term effects on workplace communication competence were not assessed.

Self-reported perceptions: Student perceptions were assessed through self-report surveys, which may not fully capture actual learning experiences.

7.4 Future Research Directions

Several directions for future research are suggested:

Controlled comparisons: Studies comparing students using integrated digital resources with those using traditional resources, controlling for instructor and other variables.

Longitudinal outcomes: Tracking workplace communication competence after graduation, comparing students trained with and without the triadic model.

Transfer studies: Investigating the extent to which AI speech

training and simulation performance predict real-world communication effectiveness.

Cross-context validation: Testing the triadic model in other ESP contexts (e.g., aviation English, healthcare English, technical English).

Technology optimization: Research on how specific technical features (e.g., AI feedback specificity, simulation fidelity) impact learning outcomes.

8. Conclusion

This paper has presented the development, implementation, and evaluation of a “Paper-Digital-Simulation” triadic integration model for new-form vocational ESP textbooks, grounded in the case of Daily Practical English for Cruises. The model addresses the pervasive problem of superficial digital integration by establishing three interconnected learning layers—print textbook, digital resource ecosystem, and virtual simulation—that support scaffolded, practice-oriented, data-informed learning.

The implementation findings provide preliminary evidence that systematic integration of digital resources enhances engagement and learning outcomes. Engagement data show substantial use of the digital ecosystem (142,677 total page views, 25,328 activity participations). Speaking proficiency assessment shows a mean improvement of 23% from initial diagnostic to final assessment. Student perceptions are broadly positive, with 91% agreeing that simulations helped them feel more confident for real situations.

The study also identifies and addresses key implementation challenges—technical accessibility, instructor workload, student digital literacy, and integration fidelity—providing practical guidance for other educators and developers.

As vocational education worldwide continues to digitalize, the challenge is not simply to add digital resources to existing materials but to achieve genuine “paper-digital” synergy that extends learning opportunities, personalizes instruction, and prepares students for technology-enabled workplaces. The “Paper-Digital-Simulation” triadic model offers one pathway toward this goal, demonstrating how print, digital, and simulated learning environments can be integrated into a coherent, learner-centered ecosystem.

For ESP educators and textbook developers, the model provides a framework for thinking beyond the print-digital binary toward a more integrated conception of learning resources. The principles and practices described here — scaffolded engagement, authentic task alignment, data-informed instruction, and assessment integration—are applicable across ESP contexts and can guide the development of new-form textbooks that truly fulfill the potential of digital technologies to transform vocational education.

Acknowledgments

This research is a phased achievement of Jiangsu Maritime Institute New-Form Textbook Development Project Daily

Practical English for Cruises. We gratefully acknowledge the contributions of all project team members, industry partners, and the Chaoxing Learning Platform for their collaboration and technical support.

References

- [1] Cignoni, L., Marinelli, R., & Spadoni, G. P. (2014). A CLIL/blended learning approach for cruise tourism courses in Italy using lexical/semantic databases and information technology resources. In *Proceedings of the International Conference on Education and New Technologies* (pp. 978-84). Istituto di Linguistica Computazionale “Antonio Zampolli.”
- [2] Ministry of Education of the People’s Republic of China. (2021). English curriculum standards for higher vocational education. Higher Education Press.
- [3] Ministry of Education of the People’s Republic of China. (2026). Opinions on deepening the reform of key elements of vocational education curriculum and instruction (Document No. 1 [2026]).
- [4] Qiu, Y. (2020). Development and construction of new-form cruise English textbooks for higher vocational education. *Modern English*, (13), 88-90.
- [5] Shenzhen Polytechnic University. (2025, November 18). Symposium on the development and application of new-form nationally planned textbooks for vocational education held at SZPU. <https://english.szpu.edu.cn/info/1161/2559.htm>
- [6] Wet, M. C. de. (2013). Implementing a blended learning approach to Maritime English. *Proceedings of the 25th International Maritime English Conference (IMEC 25)*.