

Article | Received 2 May 2026; Revised 23 May 2026; Accepted 28 May 2026; Published 15 September 2026
<https://doi.org/10.55092/phess20260009>

Building a digital educational ecosystem through a virtual english international court and a cloud-based twin campus

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Abstract: This study examines the construction path of an integrated digital educational ecosystem centered on the coordinated development of a virtual English international court and a cloud-based digital twin campus. By analyzing the practical demands of foreign-related legal talent cultivation and educational digital transformation, it clarifies the value of linking virtual simulation teaching with digital twin governance in terms of conceptual design, resource integration, technical support, organizational collaboration, and implementation pathways. The analysis shows that a student-centered and practice-oriented digital ecosystem can shift legal English education from knowledge transmission to competence development, enhance cross-department resource sharing and data-informed decision-making, and improve the adaptability of campus governance to emerging educational scenarios. The framework also supports students' procedural awareness, professional discourse competence, and intercultural communication ability, while promoting institutional modernization through visualization, monitoring, and feedback. Although challenges remain in infrastructure cost, teacher training, multilingual data quality, and student digital readiness, the framework provides a useful reference for application-oriented colleges seeking to advance smart education and cultivate foreign-related legal talent in internationalized contexts.

Keywords: virtual court; legal English; digital twin campus; smart education; educational governance; immersive simulation; interdisciplinary training.

1. Introduction

The digital transformation of higher education has reshaped expectations for teaching innovation and institutional governance. In practice-oriented disciplines, universities are expected not only to digitize classroom delivery but also to create authentic training environments and responsive management systems. Legal English is a representative case



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because it requires not only linguistic competence but also legal procedure, argumentative reasoning, documentary conventions, and intercultural communication. However, in many colleges, legal English teaching still relies heavily on vocabulary explanation, text reading, and limited classroom discussion, leaving students with insufficient exposure to near-real legal settings [1,2].

Meanwhile, campus governance in many institutions remains fragmented. Teaching spaces, laboratories, equipment, and administrative resources are often managed through separate systems, limiting data sharing and slowing decision-making. This fragmentation directly affects educational reform because innovative teaching platforms require timely scheduling, technical support, and coordinated resource allocation. Therefore, teaching modernization and smart-campus governance should be understood as interconnected agendas [6].

The “Fawei Yunting” framework responds to this need by linking a virtual English international court for immersive legal training with a cloud-based digital twin campus for resource visualization and management [4,8]. This study examines how the framework connects practical legal-English instruction, educational data processing, and institutional coordination, while also discussing implementation risks and future pilot evaluation. As a conceptual and framework-oriented study, its purpose is to propose and analytically validate an integrated model rather than report completed experimental verification.

2. Methods

This study adopts a qualitative content analysis and conceptual modeling approach. The primary materials include the original project documents and the related manuscript draft, while supporting references on virtual simulation teaching, digital twin campus construction, and smart education provide contextual grounding. As the research remains at a conceptual and pilot-preparation stage, it does not claim verified causal effects or completed empirical results; instead, it focuses on analytical reconstruction and framework synthesis.

The analysis proceeded in three steps. First, the research materials were coded around four dimensions: educational demand, technical architecture, governance goals, and expected outcomes. Second, these materials were reorganized into a social-science framework centered on pedagogy, institutional collaboration, and data-informed governance. Third, conceptual modeling was used to synthesize the internal logic of the framework and explain how virtual legal training, multilingual support, and digital twin management may reinforce one another within an integrated digital educational ecosystem.

This approach is suitable because it helps identify institutional priorities, implementation pathways, social value, and structural tensions before large-scale deployment. It also clarifies the distinction and interaction between pedagogical functions and governance functions, thereby supporting the conceptual coherence, institutional relevance, and implementation feasibility of the proposed framework.

3. Results

The results of the analysis indicate that an integrated framework can be constructed with educational, managerial, and institutional dimensions. The findings suggest that its distinctiveness lies in treating immersive legal training and smart-campus governance as mutually reinforcing parts of one digital ecosystem rather than as parallel innovations.

3.1. Integrated teaching–data–governance framework

The reconstructed framework contains three interrelated layers. The first is an immersive teaching layer built around a virtual English international court, which reproduces legal scenarios such as hearings, argumentation, evidence presentation, and multilingual communication. In this layer, learning is organized through procedural participation and role-based interaction [3,4]. This design enables students to practice legal English in context rather than treating it only as isolated terminology or textual knowledge.

The second is a data-support layer that includes speech transcription, optical character recognition, entity extraction, and knowledge-graph-assisted retrieval. These tools support legal document reading, courtroom expression, writing tasks, and rapid matching of legal rules or case elements [5].

The third is a governance layer centered on a digital twin campus, including IoT sensing, cloud integration, and resource visualization for classrooms, laboratories, libraries, and equipment. This layer aims to improve campus coordination, scheduling efficiency, and administrative responsiveness [8]. Together, the three layers connect teaching activities and governance responses through shared data flows. This layered design shows that the framework is not a simple combination of teaching tools and management technologies, but a coordinated ecosystem in which learning activities, data processing, and institutional governance interact continuously. It also provides a structural basis for transforming scattered educational resources into an integrated and adaptive support system.

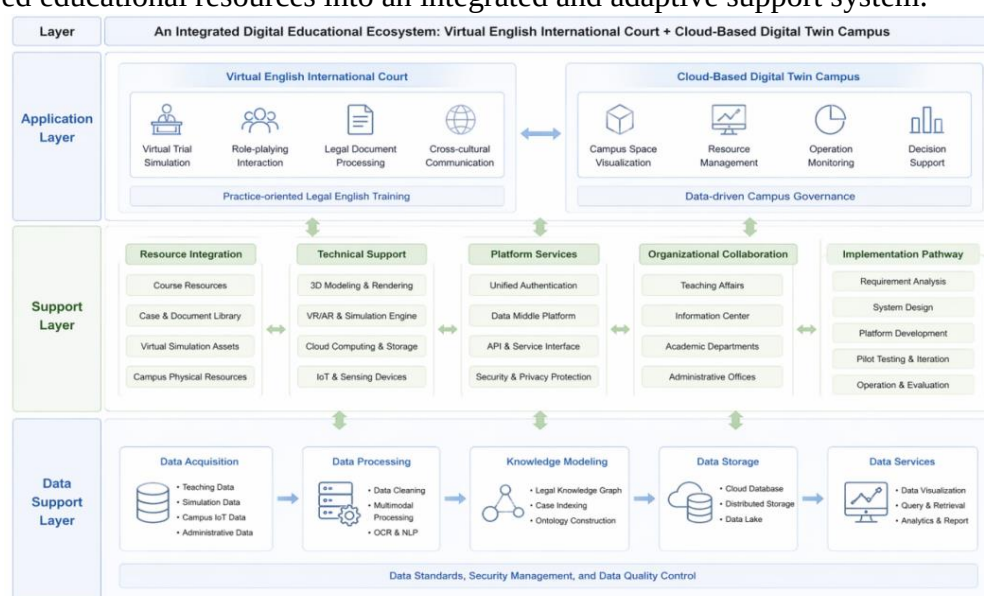


Figure 1. Overall framework of the coordinated digital educational ecosystem.

3.2. Functional mechanism and main contributions

Functionally, the virtual court serves as the teaching domain by organizing legal–English learning through procedural simulation, role allocation, and multilingual interaction. The digital twin campus serves as the governance domain by supporting real–time visualization and coordinated scheduling of institutional resources. The data–support layer functions as the linking domain, connecting learning activities with governance responses through multimodal records, retrieval tools, and feedback mechanisms.

Compared with studies that focus separately on simulation teaching or smart–campus governance, this framework makes three contributions. First, it integrates teaching reform and governance modernization within a single analytical model. Second, it develops a three–layer structure of immersive teaching, data support, and digital governance, offering a clearer explanation of how a digital educational ecosystem may operate. Third, it highlights a data–feedback loop linking learning activity, platform records, and governance adjustment, thereby clarifying how educational practice and institutional decision–making may reinforce each other.

Table 1. Analytical mapping of key problems, mechanisms, and expected effects.

Problem dimension	Structural cause	Coordinated mechanism	Expected effect
Insufficient practical training in legal English	Overreliance on text explanation and limited scenario rehearsal	Virtual courtroom simulation, role rotation, and task-based interaction	Improvement in procedural awareness, oral advocacy, and professional discourse
Weak precision in legal information retrieval	Fragmented legal resources and low efficiency in identifying key entities	OCR, entity extraction, and knowledge-graph-assisted retrieval	Faster document reading, stronger legal matching, and better writing support
Fragmented campus resource management	Departmental separation and weak real-time visibility of resource use	IoT sensing, cloud integration, and digital twin visualization	Higher scheduling efficiency, stronger coordination, and more evidence-based governance
Limited feedback in teaching and management	Lack of integrated data circulation between learning and administration	Shared data flows and feedback loops linking teaching activity with governance response	Improved adaptive teaching and more responsive institutional management

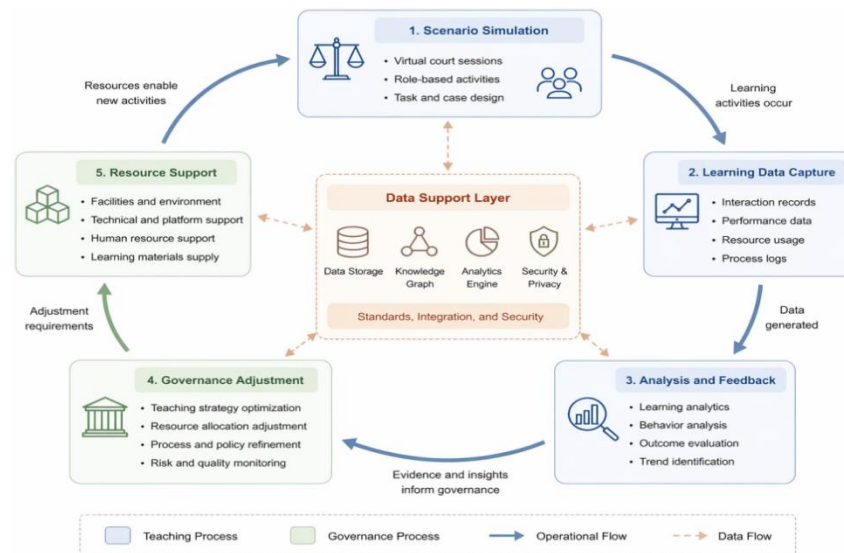


Figure 2. Operational mechanism of teaching–governance coordination.

3.4. Future evaluation and practical constraints

Although the present study is not an empirical evaluation, future pilot studies may assess the framework from three dimensions: educational outcomes, platform engagement, and governance efficiency. Educational outcomes may include students' legal writing, oral advocacy, procedural accuracy, and intercultural communication performance; platform engagement may be examined through usage records, task completion, revision behavior, and interaction data; and governance efficiency may be evaluated through classroom and laboratory utilization, scheduling efficiency, response time to resource requests, and cross-department data sharing. These indicators would help determine whether the framework can generate measurable improvements in both learning practice and institutional coordination. At the same time, practical constraints should be considered, including infrastructure and maintenance costs, teacher training burden, multilingual data quality, and uneven student digital readiness. If these constraints are not addressed, they may affect user participation, system sustainability, and the reliability of platform-generated data. Therefore, the framework should be implemented through staged pilots and further validated through mixed-method evaluation combining quantitative indicators with qualitative user feedback [5,9].

Table 2. Functional structure of the coordinated digital educational ecosystem.

Dimension	Core module	Main function	Expected value
Teaching	Virtual courtroom simulation	Role-play,hearing rehearsal,multilingual communication,and legal writing practice	Improves practical competence,procedural awareness,and cross-cultural legal communication
Data support	Multimodal analysis tools	Speech recognition,OCR,entity extraction,legal retrieval,and traceable learning records	Improves feedback quality,legal search precision,and document support
Governance	Digital twin campus interface	Real-time visualization of spaces,equipment,schedules,and usage conditions	Improves coordination,resource allocation,and evidence-based decision-making
Coordination	Data-sharing and feedback loop	Connects learning performance,platform usage,and governance response across departments	Strengthens adaptive teaching and integrated institutional management

**Figure 3.** Conceptual mock-up interface of the coordinated platform and digital twin visualization.

4. Discussion

From a pedagogical perspective, the framework addresses a long-standing weakness in legal English education: insufficient access to realistic, repeatable, and role-based practice. In conventional settings, students may understand legal terminology but still struggle to use it persuasively in courtroom procedures or institutional interactions. By embedding language learning in procedural simulation and role-based action, the proposed virtual court helps bridge this gap and supports the cultivation of foreign-related legal talent in multilingual and cross-border contexts [1,2].

From a governance perspective, the framework shows the value of connecting smart education with institutional coordination. While smart education is often discussed in terms of platforms, software, or digital content, its success also depends on resource coordination and timely managerial response. Compared with approaches that treat simulation teaching and campus governance separately, this framework links language training, institutional collaboration, and governance modernization through visible, integrated, and data-responsive structures. It also suggests that digital education is not merely the addition of technical tools to existing teaching, but a restructuring of relationships among curriculum, data, and institutional response [6]. Nevertheless, the present analysis remains conceptual and exploratory, and its claims should be tested through pilot implementation, user interviews, observational data, and outcome measures.

5. Conclusion

This study has examined “Fawei Yunting” as an integrated research framework that combines a virtual English international court with a cloud-based digital twin campus. The results suggest that the framework has value not only as an educational technology initiative but also as an institutional governance model, offering a coherent analytical pathway for connecting immersive teaching, data support, and digital governance within one educational ecosystem. Since these effects have not yet been empirically verified, future research should move beyond conceptual reconstruction and conduct pilot-based evaluation using performance indicators, platform data, and stakeholder interviews [9]. Therefore, this study should be understood as a theoretically grounded starting point for later empirical validation rather than a substitute for field-based evidence.

Declaration of generative AI and AI-assisted technologies

During the preparation of this manuscript, the authors used generative AI tools only to improve language and readability. The authors reviewed and edited the output as needed and take full responsibility for the content of the manuscript.

Acknowledgments

This study was supported by the National College Students’ Innovation and Entrepreneurship Training Program of China (Grant No. 202513520009). The authors acknowledge the academic support associated with research development at Guangxi Police College.

Authors’ contribution

Conceptualization, L.H. and H.S.; project analysis, L.H., F.J. and X.Q.; writing-original draft, L.H.; writing review and editing, C.Y. and H.S.

Conflicts of interests

The authors declare no conflict of interest.

Ethical statement

This study is based on research documents and institutional design materials. It does not involve human–subject experiments or personal data analysis requiring formal ethical review.

References

- [1] Song Y, Fan H. The 70 Years of Legal Education in China from 1949 to 2023: historical development, current issues and future innovations. *Asian J. Leg. Educ.* 2024, 11(2): 201–218.
- [2] Luan L. Legal English teaching and training of foreign law talents. *Front. Educ. Res.* 2023, 6(2): 68–71.
- [3] Nhac T. Enhancing legal English skills for law students through simulation–based activities. *Int. J. Learn. Teach. Educ. Res.* 2023, 22(9): 533–549.
- [4] Rocheleau G, Rocheleau B, Wombacher M. The effectiveness of role–playing in a virtual court simulation on increasing knowledge and empathy among criminal justice students: an exploratory case study. *J. Crim. Justice Educ.* 2025 (Online first): 1–17.
- [5] Premasiri D, Ranasinghe T, Mitkov R, El–Haj M, Frommholz I. Survey on legal information extraction: current status and open challenges. *Knowl. Inf. Syst.* 2025, 67: 11287–11358.
- [6] Fernández A, Gómez B, Binjaku K, Mege E. Digital transformation initiatives in higher education institutions: a multivocal literature review. *Educ. Inf. Technol.* 2023, 28: 12351–12382.
- [7] Huang R, Liu D, Kanwar A, Zhan T, Yang J, *et al.* Global understanding of smart education in the context of digital transformation. *Open Prax.* 2024, 16(4): 663–676.
- [8] Ye X, Jamonnak S, Zandt S, Newman G, Suermann P. Developing campus digital twin using interactive visual analytics approach. *Front. urban rural plan.* 2024, 2(1): 9.
- [9] Polin K, Yigitcanlar T, Limb M, Washington T. Smart campus performance assessment: framework consolidation and validation through a Delphi study. *Buildings.* 2024, 14(12): 4057.