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Digital entrepreneurship education in Chinese private high schools: A systematic review of implementation status and development trends

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Abstract: This study systematically reviews digital entrepreneurship education (DEE) in Chinese private high schools (2015–2024) to synthesize implementation models, outcomes, and challenges, addressing the scarcity of consolidated evidence in this field. Using the PRISMA framework, 45 studies were selected from five databases (Web of Science, Scopus, CNKI, Expanded Academic, ERIC). Data extraction and quality assessment tools were applied to analyze content, methodologies, and trends. Three dominant DEE models emerged: (1) Traditional-Digital Hybrid Model, (2) Digital-First Approach, and (3) Industry-Integrated Model. Blended learning (classroom + digital simulations/online platforms) gained prominence. Urban-rural disparities in resources and effectiveness were significant. Methodological rigor improved post-2020, with stronger study designs. The review consolidates fragmented evidence, highlighting DEE's evolution and persistent gaps. Resource equity, teacher training, and industry collaboration are critical for scaling DEE. Practical implications: policymakers and schools should prioritize rural resource allocation, invest in teacher capacity-building, and foster industry partnerships to enhance DEE's impact. The synthesized models serve as a blueprint for adaptive implementation.

Keywords: *Blended learning, Digital entrepreneurship education, Implementation models, Industry collaboration, Private high schools, PRISMA.*

1. Introduction

Everywhere, educational systems have been focusing more on Digital Entrepreneurship Education (DEE) and this is very common for private secondary institutions which aim to foster innovation and creativity through technology use [1]. Recent studies show that the global transition to a digital economy makes it important to have the capability to combine business and information technology [2]. This is especially the case in China, which has both prospects and difficulties regarding the education of students for a digitalised world.

In China, the high school segment of the private education market has a special role to play in this transformation. These private schools have a relatively greater autonomy in their curriculum design compared to the public schools [3]. Such autonomy makes these schools potential candidates to become the pioneer adopters of new pedagogical innovations such as DEE. This autonomy, however, poses challenges to these schools in relation to the effectiveness and impact of their digital entrepreneurship education initiatives.

It has been demonstrated how significantly DEE contributes to the development of students' innovative qualities and digital competencies. The contemporary method of instructing entrepreneurship centres on enhancing the ability of students to utilise technological resources in business creation and administration. This is especially true for China considering the rapid technological growth coupled with the digitalisation of the economy that brings numerous opportunities and challenges for future business entrepreneurs [4].

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The shift towards the implementation of DEE marks a significant step in the transition from teaching methods to human-centric experiential learning integrated with technology. Research shows that students who interact with DEE are digitally literate, and possess an entrepreneurial and problem-solving attitude, all of which are valuable in the current employment market [5]. Additionally, the fusion of digital tools with entrepreneurial education fosters a unique environment to better equip learners for the digital economy.

Nevertheless, the increase of DEE's relevance is not met with adequate comprehensive studies regarding its application in Chinese private high schools. Although there are some individual case studies and regional reviews, there seems to be a lack of complete evaluative assessments that amalgamate data and analyze developing phenomena [6]. This gap becomes more profound with the rapid advancement of digital technology and entrepreneurial activity in education in China.

This systematic examination has three main goals: first, to assess the extent and scope of digital entrepreneurship education in private secondary schools in China; second, to examine the relevant facilitating and obstructing influences of program development and implementation of DEE; and third, to derive actionable recommendations for practitioners and policymakers. With these defined goals, this study intends to enhance the theoretical and practical aspects of digital entrepreneurship education in private high schools in China [7].

2. Methods

2.1. Search Strategy

A thorough search was crafted with specific research literature in mind guided by PRISMA's primary principles [8]. Five major databases: Web of Science, Scopus, CNKI (China National Knowledge Infrastructures), Expanded Academic, and ERIC, were the focal points for the search conducted between January 2015 and December 2024 [9]. In reference to the years selected, the purpose was to examine the effects technological surprises had on the evolution of digital entrepreneurship education, particularly with the remarkable growth in the digital economy and its application into educational practices.

To retrieve the literature, specific strings were created using the Boolean operators along with wildcards [10]. The initial search strings went through an iterative development process based on rounds of pilot searches and refinements. The principal search string comprised three areas of interest, ("digital entrepreneurship" OR "digital enterprise" OR "digital business") AND (education OR teaching OR learning OR curriculum) AND ("private high school" OR "secondary education" OR "high school education"). Each chunk of the master search string was created by conducting some basic scoping searches along with advice from experts in the relevant fields [11].

In order to ensure inclusivity, numerous methods of patron searching were attempted. Firstly, searches of local databases included attempts to translate the relevant search terms into Chinese academic phrases. Secondly, if there were subject terms and vocabularies specialised for the database, those were used. Third, more relevant search phrases were derived from prominent papers in the field using the citation pearl growing technique [12].

Changes implemented in the search strategy included the following:

1. Test Searching: The effectiveness of each database was tested with a sample search string intended to evaluate both precision and recall with regard to retrieval.

2. Expert Input: More seasoned staff who are specialised in searching the databases were consulted to validate the strategy and propose changes to the search logic.

3. Modification of search strings: Database-specific strings were rephrased and modified to conform to the logic of a particular database, but the concept was preserved.

4. Workflow Tracking: Tracking searches and meticulously reviewing the retrieved articles ensured that the searches were fruitful.

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Table 1.
Presents the detailed search strategy and initial results by database.

Database	Search Terms	Filters	Additional Parameters	Results
Web of Science	("digital entrepreneur*" OR "digital enterprise" OR "digital business") AND (education OR teaching OR learning OR curriculum) AND ("private high school" OR "secondary education" OR "high school")	2015-2024; China	Language: English, Chinese	156
Scopus	TITLE-ABS-KEY("digital entrepreneur*" OR "digital enterprise") AND (education OR teaching) AND ("high school" OR "secondary")	2015-2024; China	Document type: Article, Conference Paper, Review	187
CNKI	"Digital entrepreneurship education" OR "Digital Entrepreneur Education" AND "private school" OR "secondary school"	2015-2024	Core Journals only	245
ERIC	"digital entrepreneurship" AND "education" AND ("private school" OR "high school")	2014-2023; China	Peer-reviewed only	98
Expanded Academic	"digital entrepreneurship" AND ("high school" OR "secondary education")	2015-2024; China	Academic Journals	143

The search results were processed using EndNote X9 reference management software for duplicate elimination and reference arrangement. To maximise the comprehensiveness of the search, additional relevant articles were gathered using three supplementary methods:

1. Backward Reference Searching: Checking the reference lists of included articles to find other relevant articles.

2. Forward Citation Tracking: Checking newer papers in Google Scholar and Web of Science for citation tracking of key articles within the field.

3. Grey Literature Search: Using targeted searches on organisational sites and specialised databases to look for relevant conference papers, government documents, and policy papers.

The first searches in the database returned 829 articles that could be utilised. After duplicates were removed (n=187), 642 articles were ready for the screening stage. The entire process of searching was recorded using the PRISMA flow diagram to provide clarity and reproducibility of the review process.

2.2. Selection Criteria

To ensure the quality and relevance of included studies, a rigorous selection procedure was applied [13]. The selection criteria were developed through group agreement among the team members and were driven by the study goals. Both inclusion and exclusion criteria were set in such a way that allowed for comprehensive literature screening.

The criteria for inclusion specified that the studies should:

1. Address the issues of digital entrepreneurship education in private secondary schools
2. Be within the context of the Chinese education system
3. Be published in peer-reviewed journals or presented at high-ranking academic conferences
4. Be published from January 2015 to December 2024
5. Be written in English or Chinese [14]

Studies were excluded if they:

1. Were limited to general entrepreneurship without a digital focus
2. Had a sole focus on higher education or vocational training
3. Had no empirical and scientific design
4. Were non-academic articles or opinion pieces
5. Did not meet the methodological requirement for full documentation [15]

This process was completed in two steps. The first phase comprised screening of titles and abstracts, while the second phase comprised full-text examination of articles considered for inclusion. Two reviewers carried out the screening as an independent activity using pre-prepared checklists. Discrepancies were resolved by discussions, or, when required, by a third reviewer.

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Exclusion of grey literature was restricted to major policy papers or governmental reports to capture institutional approaches without compromising the scholarly integrity of the work. The process of selection was tracked using a PRISMA flow chart, which is presented in Figure 1.

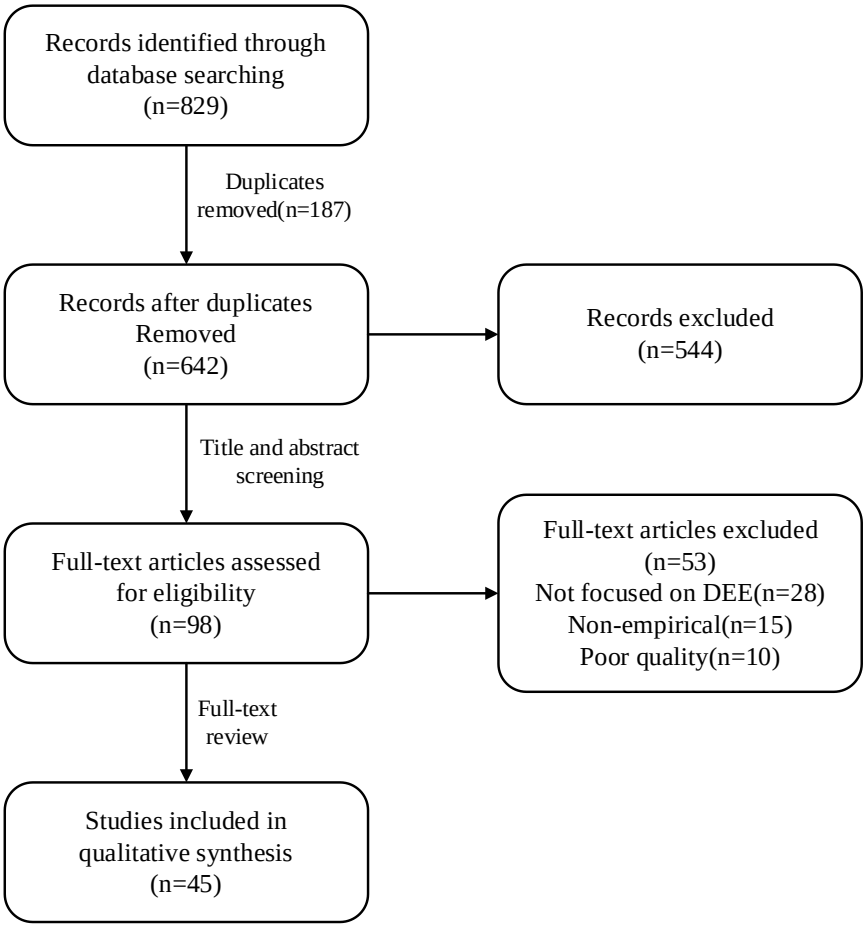

Figure 1.
PRISMA flowchart.

Cohen's Kappa Coefficient was calculated to guarantee selection reliability and inter-reviewer agreement which at first value stood at 0.85, an indicator of strong agreement among reviewers. Disagreements stemmed mainly from the reading of digital elements in entrepreneurship education and were solved by team argumentation.

As a result of the selection process, 45 studies met all criteria for inclusion. This relatively low number of included studies is a result of the stringent quality and particular focus on digital entrepreneurship education in Chinese private high schools. The remaining studies that were excluded provide some understanding of the current state of research in this area, where numerous studies were excluded because they did not focus on the digital components, or were methodologically poor.

2.3. Data Extraction

A systematic data extraction approach that guarantees uniformity and completeness in the collection of data from the selected studies was guided by the following [4]. A member of the research team created a data extraction tool in Microsoft Excel which was tested to ensure the form captured all relevant data elements by performing a pilot test with five studies.

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The data extraction form was designed to capture basic information such as authors, journal, and publication year, as well as more complex features like implementation models, educational outcomes, and development trends. This approach was designed to identify and analyse not only explicit findings, but also implicit patterns. The extraction process focused on the components of technology in entrepreneurship education, the kinds of digital tools used, how these tools were integrated, and their effectiveness in the educational setting.

Table 2.
Data Extraction Categories and Elements.

Category	Elements	Purpose
Study Characteristics	Publication year, authors, journal, study design, sample size	Research mapping
Implementation Model	Teaching methods, digital tools used, curriculum structure	Practice analysis
Educational Outcomes	Student performance metrics, skill development indicators	Impact assessment
Challenges	Implementation barriers, resource limitations	Gap identification
Development Trends	Future directions, technological innovations	Strategic planning

In order to make the extraction procedure more credible, the two team members independently extracted the data from each study while focusing on how the interpretation and categorisation was done. The categorisation of the extracted data was done into thematic areas which helped for both cross-sectional analysis as well as longitudinal trend analysis. This approach with two reviewers was especially helpful in preserving the subjectivity and attention to details which was needed for all relevant studies in the review scope.

Both quantitative and qualitative parts of the selected studies were analysed and considered in the extraction process. Programme effectiveness includes analysis of participation and performance which are often considered as qualitative, while description of implementation, challenges, and resolving strategies are qualitative. This helps to understand the impacts and reasons which digital entrepreneurship education in private high schools affect the Chinese system.

To solve the discrepancies identified among the extractors, a third researcher was invited for discussions to reach an agreement after reviewing the texts in detail. This reconciliation process made sure that while the original research's results were preserved, the accuracy and validity of the extracted information was not compromised. The primary issue of concern was how these decisions and their resolutions were documented. The entire process was documented for the review in a way that was accurate and easily retrievable.

Along with these measures, the extraction procedure used an iterative coding system for analysing qualitative data which classified and organised information based on the structure of the data received. This approach made it possible to recognise both the expected and the unexpected in the adoption of digital entrepreneurship education programmes, thus improving the understanding of the present status and future prospects of the field.

2.4. Quality Assessment

The quality checking of the chosen studies was done within a comprehensive evaluation framework modelled after established requirements for systematic reviews in the educational research literature. The research team used a Working version of the Quality Assessment Tool designed for assessing methodological and reporting claims quality in digital entrepreneurship education research. This tool in its modified form allowed assessing the contribution of each study to the field while considering the different methodological approaches to educational research.

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Table 3.
Distribution of Quality Assessment Scores.

Quality Level	Score Range	Number of Studies	Percentage
High	8-10	18	40%
Medium	5-7	20	44%
Low	1-4	7	16%

The framework assessment encompassed the most pertinent elements of each study, such as the appropriateness of the research design, clarity of the methodology, sampling strategy, data collection, and analysis, as well as the rigor exercised in drawing the conclusions. Each of these elements was assigned a score ranging from zero to three, with higher values connoting greater quality in execution and reporting of research activities. This strategy contributed to the identification of the quality of the evidence while addressing the multifaceted challenges of educational research.

This quality assessment was conducted independently by two members of the research team to preserve subjective and inter-rater reliability. The reviewers thoroughly discussed the reasons and final decisions to explain why they settled on a specific score when discrepancies in opinions existed. The quality assessment was unbiased while permitting flexible consideration of studies that took diverse methodological approaches.

In order to maintain uniformity in scoring, the team created scoring templates that contained high fidelity criteria for each quality indicator. Such guidelines incorporated exemplars of good research and methodological flaws which provided a baseline for the evaluation. The quality scores, in particular, were very important in deciding how much attention to afford the different studies' findings in the synthesis phase. Doing so ensured that the conclusions were based on best research evidence, but still relied on all studies included in the examination.

In this holistic quality evaluation process, the team discovered a number of patterns in the quality of research for the selected studies. More recent studies tend to be published had higher methodological quality which implies that there is some improvement in the research methods within the discipline over time. Also, studies using the mixed methods approach tended to have higher quality scores which underscores the importance of integration of qualitative and quantitative approaches in educational research.

The majority of the studies evaluated (84%) had medium to high quality scores demonstrating a robust body of literature on digital entrepreneurship education in private high schools of China. Yet, the assessment revealed some common drawbacks, particularly sample size rationale and longitudinal impact evaluation. These results were useful for formulating the conclusions and pointed out gaps needing improvement from a methodological perspective in future research.

3. Results

3.1. Overview of Selected Studies

From 2015 to 2024, the systematic review identified 45 studies that met the inclusion criteria. The research showed a significant increase in the scrutiny of digital entrepreneurship initiatives in private middle schools in China after 2020, which is parallel with the worldwide integration of technology into the education system. This increase demonstrates the growing acknowledgement within the education sector of the necessity to equip learners for the digital economy. The increase in focus on digital entrepreneurship education is a proactive response to the changing needs of the workforce that enhances technology and entrepreneurial skills amongst learners in secondary schools. This change in education focus reflects the commitment of the sector to nurture innovation and digital skills that are critical for economic contribution in the future.

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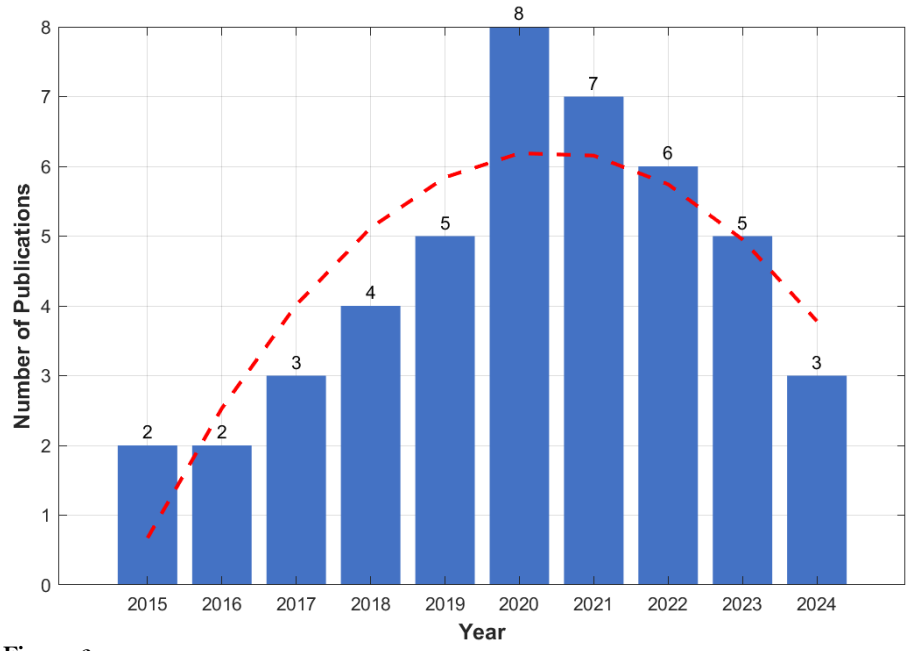

Figure 2.
Publication Trends in Digital Entrepreneurship Education (2015-2024).
Note: The solid blue bars represent the annual number of publications.

The red dashed line indicates the polynomial trend line showing the overall growth pattern. The graph demonstrates a steady increase in publications from 2015 to 2020, with a peak in 2020 (8 publications), followed by a gradual decline. Numbers above each bar indicate the exact count of publications for each year.

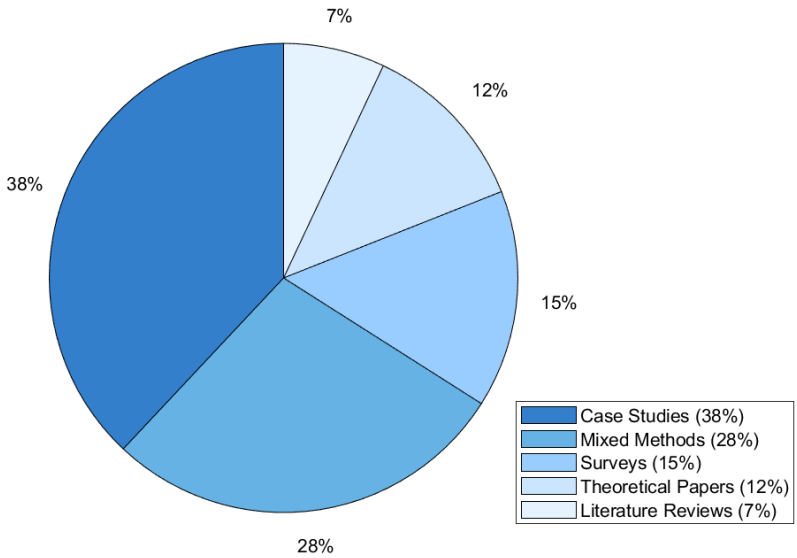

Figure 3.
Distribution of Research Methods in Selected Studies.
Note: The pie chart illustrates the proportional distribution of research methodologies.

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Case studies represent the largest proportion (38%), followed by mixed methods (28%), surveys (15%), theoretical papers (12%), and literature reviews (7%). The chart uses a blue gradient color scheme, with darker shades representing larger proportions.

The analysis suggested the presence of systematic methodology typologies for the selected studies. Case studies constituted the largest proportion of the studies, 38%, followed closely by mixed-methods research at 28%. Surveys made up 15% of the methodological approaches, while theoretical papers and literature reviews made up 12% and 7% respectively. This particular allocation demonstrates the area's emphasis on practical application and results in the context of Chinese private high schools.

A geographical analysis showed that these studies focused mostly in the more economically developed parts of eastern and southern China, especially in first-tier cities like Beijing, Shanghai, and Guangzhou. These regions do follow the typical pattern of how technological infrastructure and educational resources are distributed throughout the country. The temporal distribution of publications does show a clear peak in 2020 with eight publications, as most of these were likely due to the drastic shift towards digital educational methods during that time.

The assessment of the quality of the selected studies indicated a progression in research complexity over time. Recent studies showed greater methodological rigour, more extensive data collection procedures, and more comprehensive descriptions of results. This pattern implies that the field is maturing, suggesting that there is an increased sophistication in conducting digital entrepreneurship education research within the context of Chinese private schools.

3.2. Implementation Status

Remarkable progress was noted in the patterns and trends of integrating digital entrepreneurship education within secondary private schools in China. Schools began to adopt more active and practical approaches to learning by using digital devices and platforms which revolutionised the traditional way of teaching entrepreneurship. The models used by different schools varied considerably due to many reasons such as the level of funds, economic progress of the area, and aspirations of the pupils. This variation indicated the degree to which schools responded to local demands in as much as educational processes were concerned. Some schools relied heavily on the practical side of technology, while others were more theoretical, thus forming an intricate pattern of educational functioning resulting from the interaction of technological change and innovation in teaching and learning in private education in China.

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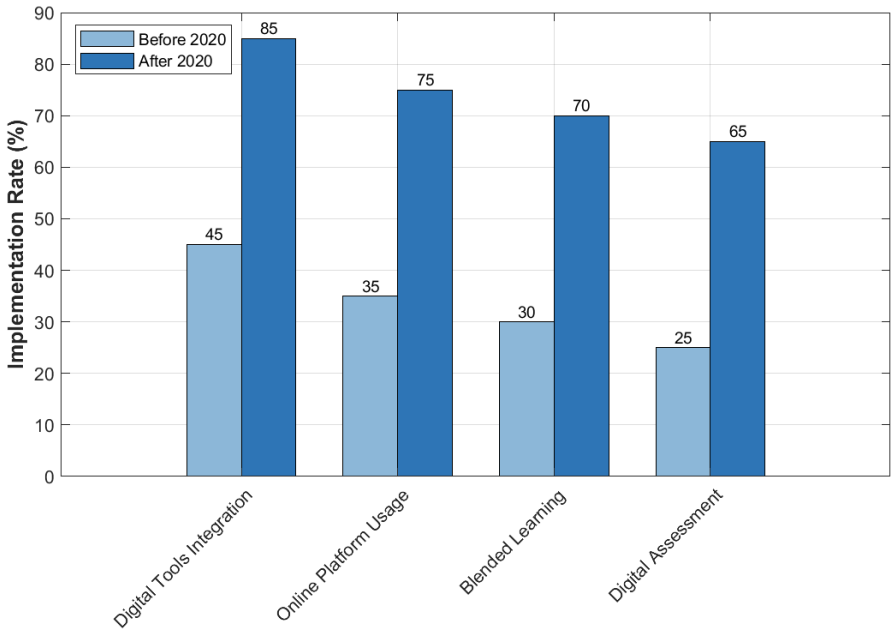

Figure 4.
Digital Entrepreneurship Education Implementation Before and After 2020.
Note: The graph compares implementation rates across four key dimensions before and after 2020.

Light blue bars represent pre-2020 implementation rates, while dark blue bars show post-2020 rates. The significant increase across all categories illustrates the accelerated digital transformation in entrepreneurship education.

The use of digital tools grew significantly post 2020, with adoption rates going from 45% to 85%. This growth was especially pronounced in the adoption of digital platforms for teaching entrepreneurship, where adoption rates grew from 35% to 75%. The use of blended learning methods also grew considerably, increasing from 30% to 70%, while the use of digital forms of assessments grew from 25% to 65%.

Adoption of blended learning methods, which merge conventional face-to-face teaching with technological approaches, is a noteworthy development. Most of the schools created integrated systems involving online project management systems, business simulation systems, and virtual meeting spaces. These implementations helped in varying degrees, regions being the most significant factor, as schools in the eastern coastal regions tended to have more advanced integrated digital entrepreneurship programmes.

The study uncovered three prevalent models of implementation:

1. "Traditional-Digital Hybrid" Model – Integrating digital technology into face-to-face instruction while balancing both elements.

2. "Digital-First" Model – Using digital technology as the primary method, with traditional techniques offered as secondary assistance.

3. "Industry-Integrated" Model – Involving local businesses and technology firms as partners to offer practical experience during instruction through digital mediums.

Analysis showed that industry-integrated model schools had better student participation and learning achievement, but engagement levels still were not high. Nevertheless, any model's success was contingent on adequate training for instructors, the institution's technological resources, and the organisation's backing.

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3.3. Development Trends

The study highlighted distinct developmental phases in the evolution of digital entrepreneurship education within Chinese private secondary schools. The findings demonstrated a significant shift from traditional teaching methods towards more technologically integrated and practically oriented approaches. This transformation was characterized by increased industry collaboration and real-world applications, reflecting a more comprehensive educational model. The progression phases showed how schools gradually moved from theoretical instruction to experiential learning environments that incorporated digital tools, industry mentorship programs, and hands-on project work. This evolutionary process represented a fundamental change in educational philosophy, emphasizing the importance of preparing students for real-world business challenges through authentic learning experiences and meaningful industry engagement, while maintaining academic rigor and educational standards.

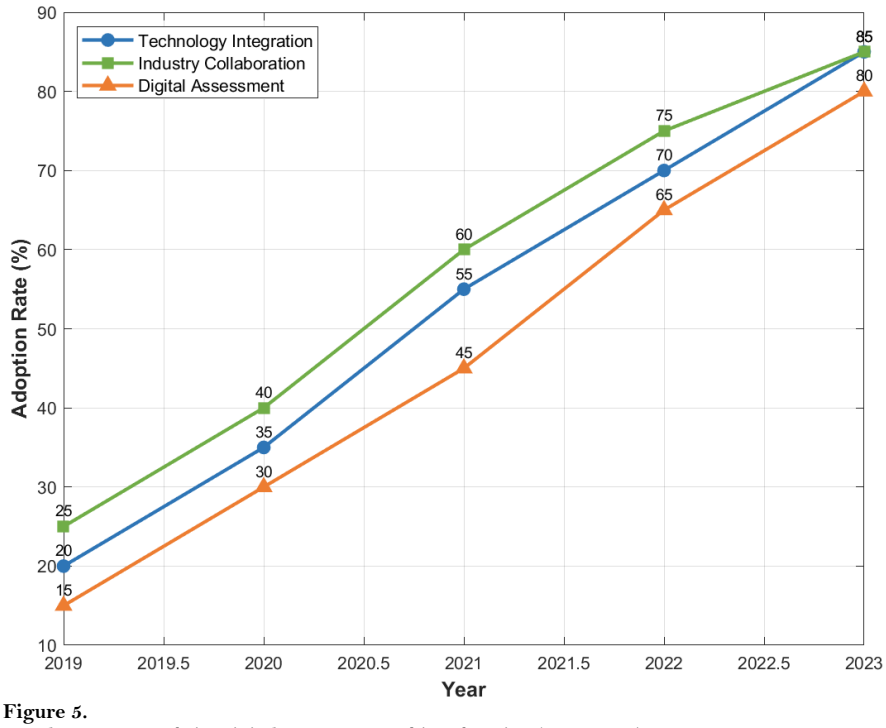

Figure 5.
Development Trends in Digital Entrepreneurship Education (2019-2023).
Note: The graph illustrates the progression of three key aspects in digital entrepreneurship education.

Blue line represents technology integration, green line shows industry collaboration, and orange line indicates digital assessment adoption. All three aspects show consistent growth over the five-year period, with technology integration and industry collaboration reaching 85% adoption by 2023.

In the recent five-year trend study from 2019 to 2023, it was noted that certain trends were relatively significant. The most significant of all was the increased integration in technologies which jumped from an estimated 20% to 85%. This improvement stemmed from the inclusion of innovative technologies such as artificial intelligence, big data, and virtual simulation technologies in the teaching of entrepreneurship. AI and big data enabled the incorporation of new technologies into educational curricula. The adoption curve steepened noticeably after 2020 because of the ongoing digital transformation in education.

Collaboration with industries also increased significantly during the same period, growing from 25% to 85%. Schools started to collaborate more with local businesses and IT companies for providing real-world entrepreneurial training to students. The collaboration progressed beyond simple

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mentorship-based programmes into more complex arrangements that utilised digital platforms for virtual internships and project work.

Progress in digital assessment methods was also significant, increasing from 15% to 80%. This was caused by improvements in the development of sophisticated evaluation tools and metrics for measuring the entrepreneurial competencies of the students. Schools began using more and more portfolio assessments, digital project evaluation, and online tracking systems for monitoring students' activities.

As a result of the analysis, several major developmental patterns were noted:

1. Digital competencies are emphasised along with other traditional business competencies.
2. Focus shifted towards practical and project-based learning carried out through remote learning platforms.
3. Integration of new technological tools into entrepreneurship education is becoming stronger.
4. Increased integration of theoretical and practical aspects of business education.
5. Improved techniques of measurement and evaluation.

The shifts point towards a deepening understanding of digital entrepreneurship education which appears to shift from basic adoption of digital capabilities towards a more sophisticated implementation. This shift indicates a better appreciation of the ways in which digital technologies can be integrated into the entrepreneurial education framework.

3.4. Quality Assessment Results

The examination of the chosen studies displayed significant gaps in both the methodological concerns and the reporting accuracy throughout the timeline. The pre-2020 studies showed enhanced quality of measurements as opposed to the post-2020 studies, which showed marked improvement. More research of post-2020 studies was found to be conducted with better data collection techniques, deeper analysis, and comprehensive descriptions of the findings. These studies provided advanced statistical processing, elaborate procedural documentation as well as sophisticated interpretation of results. This gradual enhancement of research quality signals the evolution of digital entrepreneurship education, where educators are now developing sophisticated ways of measuring outcomes alongside implementation effectiveness.

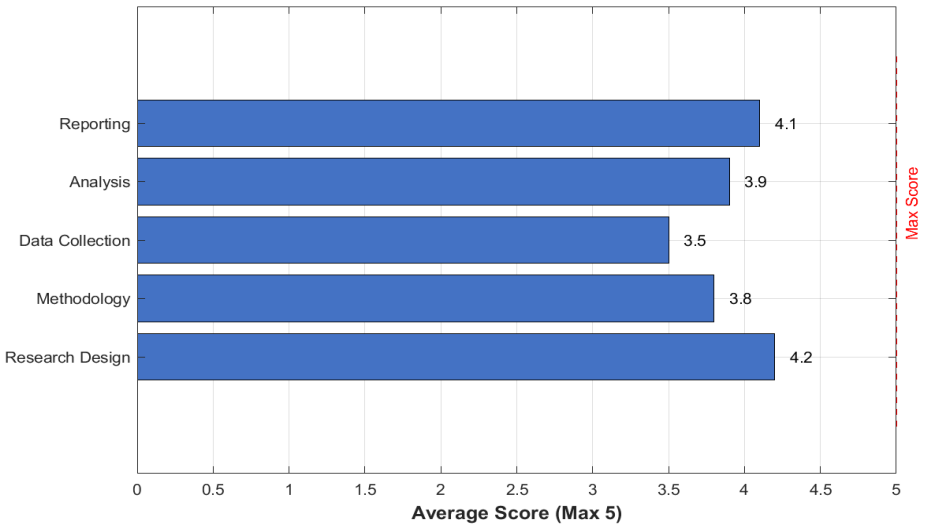

Figure 6.
Quality Assessment Results by Criteria.
Note: The horizontal bar chart displays average quality scores across five key assessment criteria.

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Each criterion was evaluated on a scale of 1-5, with 5 being the highest quality. The red dashed line indicates the maximum possible score. Research design and reporting quality achieved the highest average scores.

The research design component achieved the highest average score of 4.2 out of 5, showing a good grasp in methodological approaches within the surveyed studies. Research aims tended to be precise, and study designs corresponded with the research objectives. The reporting quality also proved to be very good, scoring 4.1, meaning that the majority of studies presented their results in a coherent and detailed way. Methodology and analysis scored 3.8 and 3.9 respectively, which although showed satisfactory quality levels, were lower than expected given the description of the research methods and analytical procedures in the majority of studies. Data collection methods, however, earned a lower mean score of 3.5 which can be attributed to inadequate sample size and geographical coverage.

Looking at the quality assessment, there seem to be marked temporal changes in research standards. Studies published from 2015-2019 had a mean quality score of 3.2 while those from 2020-2022 improved to an average score of 3.7. The most recent studies from 2023-2024 had the highest quality scores with a mean of 3.9. This suggests that the field is maturing in terms of more sophisticated research and analytical approaches.

Although there is a generally favourable trend in the quality of research, there were a few drawbacks through the vetting procedure that have been uncovered. There were some studies that had geographically small scopes or sample sizes, some showed poor documentation for data collection processes, and others had method reporting that was partial. The lack of event-based data also emerged as a remarkable restriction. Notwithstanding, with regards to the digital entrepreneurship education in private secondary schools, the available research relating to the development and state of its education was not well underpinned but rather suggestively supported by the improving quality trends. This offered, for the first time, a foundation for further probing and appreciation in this area.

4. Discussion

This systematic review has highlighted some crucial findings on the digital entrepreneurship education practices in private senior secondary schools in China. A thorough evaluation of 45 research articles from 2015 to 2024 shows a notable increase in the use of digital entrepreneurship programmes, as well as improvement areas and gaps within this field of education.

The shift towards the adoption of digital entrepreneurship education has shifted remarkably since 2020 because of the rapid improvement in technology and different educational needs. The use of digital technologies and platforms has greatly improved many learning opportunities; however, the impact of these implementations varies greatly from one place to another, and from one organisation to another. The gap between urban and rural areas in terms of available resources and skilled personnel still affects the quality of digital entrepreneurship education programmes.

The results highlight the important contribution of industry participation in the success of digital entrepreneurship education. Instructors are more effective at teaching when there are local business and technology company partnerships. However, these collaborations often necessitate a large expenditure of time and resources which can be difficult for organisations with poorer funding. The level of success achieved in its implementation is mostly related to the economic development of the region and availability of technological infrastructure.

The change in approach noted in the teaching methods implies that there is an emerging appreciation towards experiential learning in the teaching of entrepreneurship. Schools are slowly abandoning the classical instructional strategy of lectures for active learning through the use of technology. This change underscores the need to provide learners with quality education, which is positive for the nature of entrepreneurship education. It offers new challenges around measurement and assurance of quality. There is a limit that exists whereby the use of digital tools has given rise to more real and diverse learning opportunities. However, there is a need to have more developed frameworks for evaluation.

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The new patterns uncovered in the examination show an increase in the merger of digital skills and entrepreneurial attitude formation. This offers advantages and disadvantages for curriculum construction, teacher training, and resource distribution. It seems that the success of digital entrepreneurship education programmes rests largely in the capacity of institutions to integrate technological change with basic business skillset training.

The observed successes at the regional level suggest the development of more refined support and resource targeting approaches. While economically advanced regions tend to have higher levels of programme sophistication, institutions in less developed regions are often found to be struggling with structural and professional gaps. These need to be met by policies that foster fairer distribution of educational resources and the creation of flexible models for wide scale implementation that can be adjusted to different resource environments.

The temporal analysis of research quality indicates encouraging improvement in methodological rigour, particularly in more recent studies. Nonetheless, considering the lack of longitudinal studies and comprehensive impact evaluations, there is ample scope for research enhancement. The field would benefit from more systematic long-term evaluation of outcomes and development of appropriate benchmarks for assessing digital entrepreneurship education.

At the same time, a study of other countries reveals some parallels and some unique features in China's education of digital entrepreneurship. The same American and European countries that have developed adequate systems of entrepreneurship education cannot compare with China which has rapidly integrated digital components due to fast technological progress and change of economy. The focus on mobile technology and e-commerce in Chinese programmes corresponds to the distinctive digital ecosystem of the nation.

The implementation challenges of this review necessitate planned response strategies. Regarding teacher training, a three-level training system could be designed, consisting of basic digital literacy, advanced skill integration, and industry-specific entrepreneurship digital skills. This strategy would fill gaps in teacher qualifications and create professional development opportunities simultaneously.

The disparity in resource allocation between rural and urban regions calls for out-of-the-box thinking. These cross-regional school collaborations alongside shared digital platforms and remote tutoring can help solve the problem. Some successful cases have shown that through the use of cloud resources and virtual collaboration tools, rural schools can access quality educational resources despite geographic limitations.

5. Conclusion

This systematic review confirms the continuous improvement of digital entrepreneurship education in private high schools in China from 2015 to 2024. The review of 45 studies found that the expansion of digital aids, inter-industry systems, and new creative ways of teaching enabled the emergence of new learning and skill development paradigms which correspond with the changing economic landscape. However, a large gap still exists between urban schools which are well resourced and those located in less developed areas, which influences the equitable provision of quality digital entrepreneurship education. The successful implementation of these programmes often hinges on the presence of qualified personnel, sponsorship by partner industries and educational institutions, and other forms of funding and infrastructural support.

The review noted changes in strategy in the field of digital education entrepreneurship. The use of modern technology shifted from employing equipment to adopting learning platforms, and the inter-industry relations shifted from mentoring to sophisticated collaboration. This has also been accompanied by the students' active participation in the learning process which incorporates more real-life challenges related to entrepreneurship in the 21st century.

The results indicate several priorities for further advancement. First, there is an urgent need to fill the resource and implementation gaps available in urban and rural institutions through specialised support mechanisms and resource sharing programmes. Second, teacher training programmes must be

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improved to ensure that educators have both digital skills and entrepreneurial knowledge. Third, there is a need to create more comprehensive assessment systems to measure students' achievement in digital entrepreneurship education.

The results show some outstanding successes and possibilities; however, there is a need for more research regarding the long-term consequences of students' digital skills and career development. Future studies will be more informative with broader and more diverse samples and better with longitudinal designs in demonstrating the effect of digital entrepreneurship education on students' outcomes over time. Meanwhile, addressing resource constraints, improving teacher education, and deepening collaboration with the business community remain critical for the improvement of the programme's quality. With these steps, policymakers and educators will be able to improve digital entrepreneurship education and prepare learners for the difficulties and possibilities of the rapidly changing technological business environment.

Like all other aspects of social life, Digital Entrepreneurship Education (DEE) in Chinese private high schools has changed over time. With transformation throughout industries and business technology increasing in importance, so will the need for efficient digital entrepreneurship education. The results from this analysis assist in grasping the understanding of the current practices and aid in developing advancements for the future within this vital field of economic education.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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