Development of Online and Offline Mixed Teaching Materials for Higher Vocational Education Under the Background of Internet

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ABSTRACT

With the vigorous development of the Internet, higher vocational education is welcoming a new era of online and offline mixed teaching. Based on the deficiency of traditional teaching materials, this paper analyzes the present situation of higher vocational education under the Internet and the advantages of blended teaching. In order to realize the development of blended teaching materials in higher vocational colleges, this paper puts forward a concise and effective process, and taking Accounting as an example, probes into the influence of blended teaching materials on students' grades. The results show that the blended teaching materials improve the interactivity, stimulate students' interest in autonomous learning and effectively promote their learning enthusiasm. This not only improves the quality of higher vocational education, meets the social demand for skilled talents, but also cultivates students' teamwork and autonomous learning ability. These research results provide theoretical support for the development of hybrid higher vocational teaching materials in the Internet era.

KEYWORDS

Development Research, Higher Vocational Teaching Materials, Internet Background, Online and Offline Hybrid

As an important part of China's education system, higher vocational education undertakes the important task of cultivating skilled and applied talents (Zheng et al., 2023). In recent years, with the vigorous development of higher vocational education in China, a large number of applied talents have been trained for socialist modernization (Xia et al., 2021). However, the traditional teaching model still has some problems in teaching materials, such as outdated content, weak practicality, and inability to meet the individual needs of students (Peng et al., 2022). At the same time, with the continuous popularization of internet technology, educational informatization has become an important direction of educational reform in the new era (Peng et al., 2022). As a new teaching mode, online and offline mixed teaching combines traditional teaching with a network platform to realize the optimal integration of teaching resources and provide students with a richer learning experience (Jensen et al., 2007). In this mode, the development and innovation of teaching materials are particularly important (Nurutdinova

et al., 2016). This paper discusses the development of online and offline mixed teaching materials for higher vocational education under the background of the internet and provides an innovative teaching material development mode for higher vocational education (Kumar et al., 2021).

LITERATURE REVIEW

In recent years, scholars at home and abroad have conducted extensive research on the development of online and offline mixed teaching materials. Fu (2023) studied the advantages of online and offline mixed teaching. In mixed teaching, teachers and students use the network platform for teaching activities, including course resources, homework submission, exchange, and discussion, etc., which not only retains the advantages of face-to-face teaching in traditional classrooms but also makes full use of network technology to expand learning time and space (Li, 2022). By applying blended teaching to teaching practices, students' learning participation, autonomous learning ability, and social communication ability can be effectively improved, and at the same time, it has rich interactive functions (Liu & Ning, 2017). Teachers can know students' learning situation in real time through the network platform, realize personalized teaching, and stimulate students' learning interest and enthusiasm (Dang, 2023).

Yang (2022) studied the principles of teaching material development in higher vocational colleges. By combining traditional face-to-face courses with online courses, a teaching model was formed, which fully utilized internet technology to realize the sharing of teaching resources and the complementary advantages of teachers (Madariaga et al., 2023). This model is flexible, personalized, and interactive, which is conducive to improving students' learning interest and autonomous learning ability. At the same time, it adheres to the student-centered principle in the development of teaching materials in higher vocational colleges and meets students' individualized learning needs. Deeply integrated online and offline teaching resources improve teaching effect, innovate the form and content of teaching materials, highlight the characteristics of the times, and realize the digitalization and networking of teaching materials by using internet technology (Fu, 2023).

Chong (2023) studied the shortcomings of the blended teaching mode in the field of higher vocational education. With the online and offline blended teaching reform in higher vocational colleges in China, in the actual teaching process, there is a lack of teaching materials suitable for blended teaching in the current market, and curriculum resources are relatively scarce. The teaching method is too simple and lacks innovation. Many teachers still follow the traditional teaching methods, failing to give full play to the advantages of the network platform and improve students' interest and participation in learning. The teaching evaluation system is not yet mature, and some teachers still rely too much on traditional examination methods when evaluating students' learning achievements, failing to fully consider the characteristics of online learning (Xi, 2022).

To sum up, the existing research on the application and practice of online and offline mixed teaching mode in higher vocational education has been discussed, but there are still gaps in the development of teaching materials. Under the background of the internet, the development of teaching materials in higher vocational colleges should pay attention to modularization, systematization, and scene, and combine with modern educational technology to improve teaching effect (Chong, 2023).

MATERIALS AND METHODS

Vocational Education

Higher vocational education refers to the educational form of cultivating intermediate and senior specialized talents with certain professional skills and practical abilities to meet the needs of social and economic development and talent cultivation. The main goal of higher vocational education is to cultivate intermediate and senior specialized talents with certain professional skills and practical

abilities, meet the demand of society for various professional talents, and enhance the employment ability and competitiveness of workers. Higher vocational education usually offers three-year, four-year, or five-year vocational (vocational) and undergraduate (vocational undergraduate) courses. After graduation, students can obtain corresponding vocational or undergraduate degrees. Higher vocational education emphasizes practicality, and the curriculum is closely integrated with the needs of relevant industries, including theoretical courses, practical courses, and internship training. Higher vocational education emphasizes practical teaching and the integration of industry and education. Students will receive practical training in relevant industries during their school years to enhance their practical and applied abilities. Graduates of higher vocational education usually have strong practical skills and vocational skills and have a certain competitive advantage in the job market. They mainly work in enterprises, government agencies, social organizations, and other related industries.

Overall, higher vocational education plays an important role in cultivating practical and applied specialized talents, providing abundant talent resources for various industries in society and diverse employment choices and career development opportunities for students.

Higher vocational education also faces some difficulties and challenges in its development process. Compared to regular undergraduate education, the social recognition of higher vocational education is relatively low. Some employers and the general public do not have high recognition of vocational college graduates, which leads to them facing certain competitive pressure in the job market. Society could benefit from strengthening the publicity and promotion of higher vocational education, enhancing the recognition and importance of higher vocational education in society, changing the concept and attitude towards higher vocational graduates, and promoting their competitiveness in the job market.

Due to limitations in the teaching staff and facilities of some vocational colleges, the teaching quality of some schools is uneven, and some majors are disconnected from market demand, which affects the employment ability and competitiveness of students. Therefore, it would be beneficial to increase investment in teaching resources for higher vocational colleges, improve the level of teaching staff, improve teaching facilities, optimize curriculum settings, and ensure teaching quality and effectiveness.

An important characteristic of higher vocational education is the integration of industry and education. However, in practical implementation, the cooperation mechanism between some schools and enterprises is not good enough, resulting in low effectiveness of practical teaching and students lacking practical experience that closely integrates with market demand. Because of this, it would be beneficial to establish a sound mechanism for industry education cooperation, promote deep cooperation between higher vocational colleges and enterprises, closely integrate practical teaching with market demand, and enhance students' practical operation ability and employment competitiveness.

Some vocational colleges have relatively single majors, lacking diversity and foresight, which cannot meet the talent needs of different industries and fields, limiting students' career choices and development space. According to market demand and industry development trends, it would be advantageous to continuously adjust and expand the professional settings of higher vocational colleges, increase the professional settings of emerging fields and industries, and enhance the employment and development space of students.

Compared to regular undergraduate education, higher vocational education has relatively less investment in academic research and innovation, and the academic atmosphere is not strong enough to attract excellent teachers and students, which affects the overall academic level and reputation of the school. Therefore, it would be helpful to increase support for scientific research and innovation in higher vocational colleges, encourage teachers and students to participate in scientific research activities, enhance the academic atmosphere and research level of the school, and attract more outstanding talents to join.

In summary, there are some difficulties and challenges in the development of higher vocational education, which require joint efforts from relevant departments and universities to improve the quality

Figure 1. Development Framework of Higher Vocational Teaching Materials Under the Background of the Internet
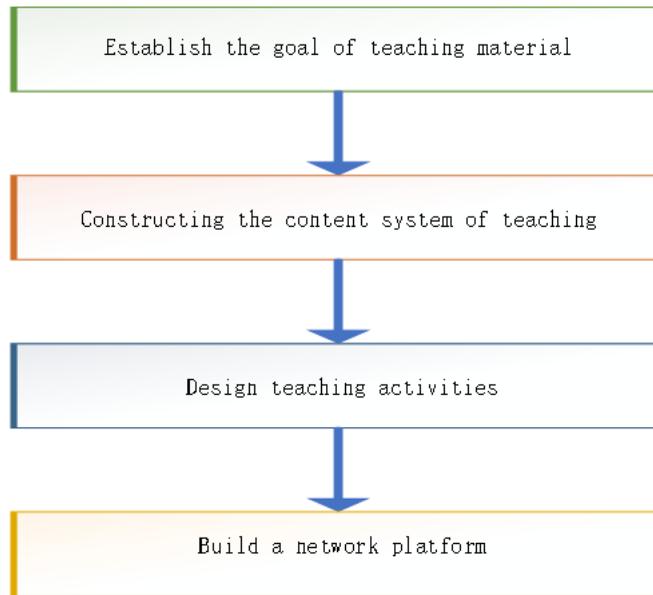
of education, increase social recognition, promote the integration of industry and education, broaden professional settings, strengthen academic construction, and better serve the career development and socio-economic development of students.

Development of Higher Vocational Textbooks

With the rapid development of science and technology, big data, intelligence, and other technologies emerging one after another, information-based teaching is becoming a new trend. At present, the construction of teaching materials and teaching resource pools in higher vocational colleges has not kept pace with social change and technological development. Due to the limitation of layout and pages, traditional teaching materials greatly limit the exposition and display of knowledge, and it is difficult to meet the needs of teaching reform (Zhang et al., 2023). By investigating the classroom teaching process in higher vocational colleges, this paper finds that teachers only demonstrate and explain the curriculum practice in class, students have little knowledge, and there are no available resources for effective review and practice, so students can't learn while doing, which greatly reduces students' interest in learning in class and consolidates exercises after class (Yang, 2022). In this regard, this paper proposes a higher vocational teaching material development process based on the internet background, as shown in Figure 1.

Teaching material development goal: according to the characteristics of higher vocational education and talent training needs, determine the goal of teaching material development. Curriculum standards, as an outline explanation of disciplines, define the objectives and core learning contents of the curriculum (Wen, 2022). The construction of teaching materials should generally follow the requirements of curriculum standards, reflect the characteristics of disciplines, and determine the corresponding content for students at different learning stages. At the same time, through the establishment of diversified teaching methods, students can better understand theoretical knowledge, master basic methods and master basic skills, and form the core literacy of the subject.

Textbooks, as an important carrier of learning knowledge, bear the heavy responsibility of imparting knowledge and cultivating skills. At the same time, they can also shape students' minds

Figure 2. Flow Chart of Online Resource Teaching Video Design
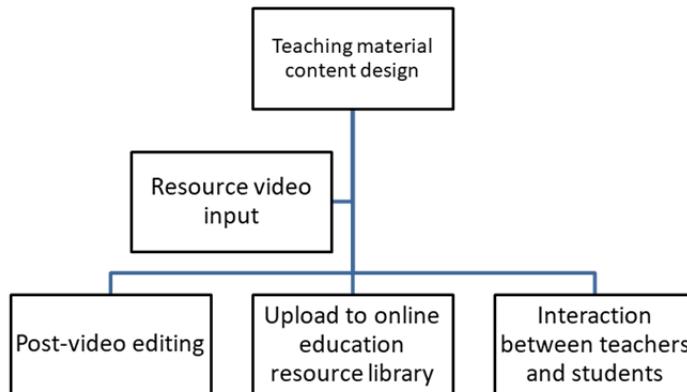
and cultivate students' professional qualities. By organically integrating ideological and political elements with the contents of textbooks, with the goal of cultivating students' professional skills, the cultivation of professional skills and professionalism is highly integrated, and the ideological and political role and humanistic value of textbooks are fully exerted, so that the images of textbooks are more stereoscopic, and the contents are more substantial.

Constructing teaching material content system: integrating online and offline high-quality resources and constructing a teaching material content system that meets the needs of mixed teaching (Jin et al., 2023). The users of online and offline mixed textbooks are mainly students from higher vocational colleges. Considering the nature of the school and students' learning ability, the actual situation should be fully considered when selecting the content of textbooks. When setting the content of online and offline mixed teaching materials, the knowledge of operation and procedure should be taken as the main objective so that students can use the teaching materials more conveniently and efficiently by reducing the difficulty of knowledge understanding (Nair et al., 2023).

In the design of teaching materials, it would be beneficial to make full use of online resources, including but not limited to online courses, teaching videos, e-books, etc. Figure 2 shows the design flow chart of online resources teaching videos, which can provide students with more flexible and convenient learning methods. In addition, online resources provide teachers with more teaching tools and teaching support to help them better design and organize online and offline mixed teaching activities. At the same time, the innovation of teaching methods and means need attention to provide students with more vivid and rich learning experiences through multimedia teaching and interactive teaching.

Design teaching activities: design various teaching activities according to the content of teaching materials, and realize the organic combination of classroom and outside, teacher-student interaction and autonomous learning (Li et al., 2023). Through video teaching, online discussion, online homework, and other forms, students can get teaching resources at any time and any place and improve the convenience and flexibility of learning. Offline practice can be carried out through experiments, field trips, internships, and other ways so that students can combine theoretical knowledge with practical operation to improve the depth and breadth of learning.

Through online and offline mixed teaching activities, students' awareness and ability of autonomous learning can be cultivated, and they can be more active in learning, which can also promote the interaction and communication between teachers and students. Through the online platform, students can communicate and interact with teachers more conveniently, ask questions, and discuss learning contents. Offline practice allows teachers to understand students' learning situations and needs more intuitively and provide timely guidance and feedback. This interaction and communication can

Figure 3. Process of Building Online and Offline Mixed Teaching Materials Network Platform
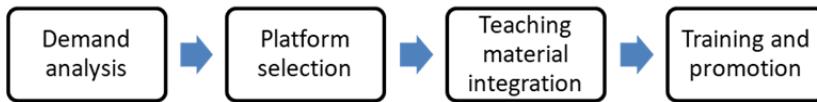
promote communication between teachers and students, establish closer teacher-student relationships, and provide students with more personalized and caring teaching services (Krismadinata et al., 2020).

Building online and offline mixed teaching materials network platform: mainly using internet technology, build a network platform suitable for mixed teaching, providing teaching resources, exchange and discussion, homework submission, and other functions (Setiadi et al., 2023). First of all, from the demand determination, the teaching needs of teachers in higher vocational colleges select appropriate teaching materials, technical tools, and platform functions. Secondly, select appropriate teaching, content management systems and online teaching tools, and design and develop functional modules and interfaces. Then, integrate online and offline teaching materials, and produce online courses, teaching videos, e-books, and other teaching content, and design online tests, homework, and interactive activities. Training and promotion of platform technology for teachers and students is essential to make more people use the platform. This process is shown in Figure 3.

There Should Be a Level Two Heading Here to Introduce Your Methods

This article focuses on vocational college students and explores the impact of textbook types on their academic performance. Convenient sampling method was adopted, and students were divided into a general textbook group and a mixed online and offline textbook group based on their chosen courses. The sample size of the general textbook group is 55, and the sample size of the online and offline mixed textbook group is 58. The sample features include students' course selection, academic performance, etc. Students are assigned to different teaching material groups based on their course choices, ensuring the operability and practicality of the experiment.

Possible sampling errors include sample selection bias and insufficient sample size, but errors can be reduced through large sample sizes and random allocation of teaching materials. The representativeness of the sample is influenced by the course selection, but random allocation of textbook groups can to some extent ensure the representativeness of the sample. This study involves the academic performance of students and should comply with the ethical norms of the school to ensure that the rights and privacy of students are protected.

RESULTS AND ANALYSIS

Taking a higher vocational college as an example, this paper draws the design process diagram of accounting teaching material according to the research practice and process, as shown in Figure 4.

In the teaching process of higher vocational education courses, teaching materials, as an important supporting resource, should pay attention to the connection with the post reality, close to the real work situation, and highlight the professionalism of teaching materials. At the same time, the teaching materials should cover the technical skills, standards, and professional qualities needed for employment (Cao, 2023). Table 1 shows the employment direction of students in higher vocational colleges. As can be seen from Table 1, the employment direction of graduates is mostly to cashiers, so the design of teaching materials focuses on the quality and ability requirements to achieve full convergence.

According to the relevant knowledge of accounting, this paper defines the basic duties and work contents of a cashier and divides the elements of a cashier's post ability into knowledge and skills.

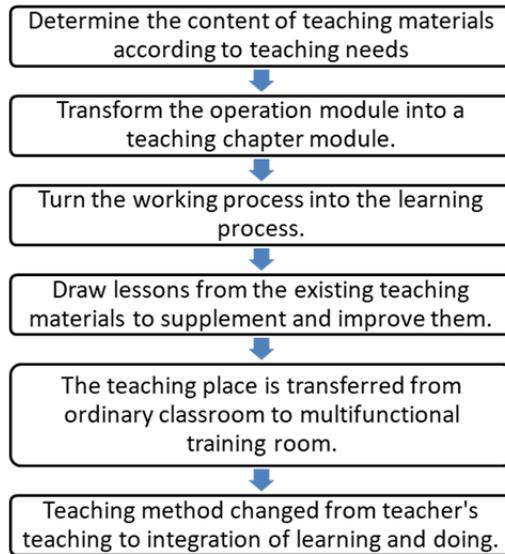**Figure 4. Design Process Diagram of Accounting Textbook**

Table 1. Employment Direction of Students in Higher Vocational Colleges

Employment direction	Proportion of people(%)
cashier	49.23
cashiering	23.12
financial analysis	15.01
cost control	12.64

Knowledge mainly refers to the basic accounting knowledge that a cashier needs to learn. Skills are the accounting operation skills that cashier post personnel should have.

The core contents of accounting mainly include accounting balance formulas, account and double-entry bookkeeping, accounting vouchers, accounting books, economic business accounting, property inspection, accounting procedures, and financial statements. By dividing the actual accounting workflow into various work links, each work link corresponds to the knowledge points of the textbook one by one, forming a system module. Through modular teaching, students are guided to participate in every link. Every time a module is completed, the corresponding working ability and working knowledge are obtained. When all modules are completed, the working process will also end (Haningsih & Rohmi, 2022). Therefore, the work module is pedagogically processed and decomposed into several sub-modules. Each sub-module is regarded as a teaching module, and each teaching module is divided into several teaching items. Each learning task forms teaching results through independent teaching, including explaining theoretical knowledge, demonstrating operation steps, consolidating classroom exercises, checking and filling gaps, etc. (Xu, 2022). Table 2 shows how to transform the work modules of "prepare original vouchers" and "prepare accounting vouchers" into the teaching material chapter module of "prepare vouchers".

The traditional classroom is "teacher-centered". Teachers instill knowledge unilaterally and students passively accept it. The teaching method is single. Students lack specific perceptual

Table 2. "Prepare Vouchers" Textbook Chapter Module

Teaching module	Teaching project	Learning tasks
prepare vouchers	2.1 original voucher	2.1.1 identification and preparation of original vouchers 2.1.2 verification of original vouchers
	2.2 double-entry accounting	2.2 double-entry accounting 2.2.1 double-entry bookkeeping 2.2.2 double-entry accounting 2.2.3 accounting account
	2.3 accounting voucher	2.3 accounting voucher 2.3.1 prepare accounting vouchers 2.3.2 verification of accounting vouchers

knowledge, sufficient professional judgment ability, and practical work ability, and their learning enthusiasm is not high. It is difficult to master basic accounting knowledge and practical accounting work skills (Ahmed et al., 2022).

In this paper, the teaching organization form is changed from "fixed classroom and collective teaching" to "multi-functional training room online and offline mixed teaching," and a modern training room with computers as the core and network technology is built to build an integrated teaching venue. This allows the traditional theoretical teaching and training venue to be integrated, and a real working environment to be created, so that theoretical teaching and skill training can be integrated. At the same time, it's necessary to speed up the construction of simulation training places, optimize training software and hardware facilities, and improve the software utilization rate. By making some physical models to simulate the bookkeeping process in practical work, students' practical ability is strengthened in many ways and their interest in learning is enhanced.

In the teaching material design of accounting, the real accounting data of a group of enterprises are taken as real cases to guide students to complete the work tasks according to the actual work steps and contents. The operation steps are recorded as videos, which are attached to the corresponding work tasks in the form of two-dimensional codes. They can learn while watching and completing the work tasks with the video. Through the training and operation of each task, students can strengthen their understanding of accounting admission, develop the ability of independent thinking, analyzing and handling problems and hands-on operations, and shorten the gap between theoretical teaching and practical teaching. After a semester's practice, it is found that students' interest in learning, autonomous learning ability, and classroom participation have been significantly improved. At the same time, teachers can know students' learning situation in real time through the network platform, realize personalized teaching, and improve teaching quality.

Table 3 shows the influence of online and offline mixed textbooks on students' performance. As can be seen from Table 3, it is beneficial to promote the improvement of students' academic performance using mixed vocational teaching materials. T-test is a statistical method used to compare whether there is a significant difference between two means, usually applied in small sample

Table 3. Influence of Online and Offline Mixed Teaching Materials on Students' Performance

Teaching material selection	Class size	Average grade (points)	Variance
General teaching materials	55	69.12	10
Online and offline mixed teaching materials	58	78.32	20

situations. When conducting a t-test, we first compare the mean and variance of the two sets of data, then calculate the t-value, and finally look up the t-distribution table based on the t-value and degree of freedom to find the critical t-value at the confidence level in order to determine whether there is a significant difference between the mean values of the two sets of samples. Through t-test, we can conclude whether to reject the null hypothesis (i.e., if the means of the two groups are equal), and thus determine whether there is a significant difference in the means of the two groups of samples.

We can conduct a t-test to compare whether the use of general textbooks and blended online and offline textbooks has a significant impact on student average grades. In this case, assuming:

Zero hypothesis (H0): The use of general textbooks and blended online and offline textbooks has no significant impact on students' average grades.

Alternative hypothesis (H1): The use of general textbooks and blended online and offline textbooks has a significant impact on students' average grades.

General textbook: Sample size ($n1$)=55, average score ($\overline{x1}$) =78.32, variance ($s1^2$)=10

Mixed online and offline textbooks: sample size ($n2$)=58, average score ($\overline{x2}$) =69.12, variance ($s2^2$)=20

Continue to calculate the value of t according to the formula.

$$t = \frac{\left(\overline{x1} - \overline{x2}\right)}{\sqrt{\dfrac{s1^2}{n1} + \dfrac{s2^2}{n2}}}$$

Substituting the data into the formula yields $t \approx 12.68$.
Next, calculate the degrees of freedom.

$$df = n1 + n2 - 2 = 55 + 58 - 2 = 111$$

Finally, refer to the t-distribution table or use statistical software to determine the significance level of the t-value. According to the calculation results, if the t-value is greater than the critical value, we can reject the null hypothesis and accept the alternative hypothesis, that is, using different types of textbooks has a significant impact on student performance.

Under the background of the internet, the development of teaching materials in higher vocational colleges insists on taking students as the center, paying attention to students' individual differences, being task-oriented, strengthening the cultivation of practical ability, using modern educational technology, improving teaching interaction, paying attention to evaluation and feedback, and promoting students' autonomous learning. Through the implementation of online and offline mixed teaching, the teaching quality of higher vocational education can be effectively improved, the social demand for high-quality skilled talents can be met, the learning interest and enthusiasm of students can be effectively improved, and the teaching quality can be improved. It is interactive and helpful to cultivate students' teamwork ability and autonomous learning ability.

Although the online and offline mixed teaching mode has achieved certain results in the field of higher vocational education, it still faces many challenges, such as uneven development level of teaching materials, low information literacy of teachers, uneven distribution of teaching resources, etc. Therefore, it is necessary to further promote the development of higher vocational education from the aspects of policy level, teacher training, and teaching management.

CONCLUSION

Through the discussion of online and offline mixed teaching mode, this study puts forward a framework for the development of higher vocational teaching materials based on the internet. From the practical effect, the blended teaching mode is helpful to improve students' learning interest and autonomous learning ability and promote the interaction between teachers and students. The blended teaching materials have obvious advantages and help improve the teaching quality and students' learning experience.

Although this paper puts forward that online and offline mixed teaching materials have great influence on teaching, there is still much room for improvement. Prospects and work include:

(1) With the development of internet technology, teaching content should be updated in time to meet the needs of industry development.
(2) Blended teaching puts forward higher requirements for teachers, so it is necessary to strengthen teachers' training and improve their information teaching ability. Improve teachers' information literacy and enhance their ability to develop teaching materials under the online and offline mixed teaching mode.
(3) A stable and efficient network platform is the key to the successful implementation of blended teaching, and the construction and maintenance of the platform need to be strengthened.
(4) Strengthen the research of teaching material evaluation systems to evaluate the actual effect of online and offline mixed teaching materials.

DATA AVAILABILITY

The figures and tables used to support the findings of this study are included in the article.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

FUNDING STATEMENT

PROCESS DATES

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ACKNOWLEDGMENT

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