

Regional study tours 4.0 development model design and cultural innovation research based on data analysis

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ABSTRACT

In recent years, study travel has become a popular way to expand teaching outside the classroom. Based on the trajectory of the development of study travel, the article conducts an in-depth study of the current development of study travel in the context of the new era, and explores the 4.0 model of regional study travel development. Introducing big data and new technologies into study travel and designing a digital platform for study travel. Construct the evaluation index system of study travel, and evaluate the study travel 4.0 mode through questionnaires. Detect the study effect of the study travel 4.0 mode by comparing the impact of the study travel 4.0 mode and the traditional study travel mode on students' disciplinary literacy. The comprehensive score of the evaluation of the study trip was 4.17, and the study trip 4.0 mode achieved excellent evaluation results. The experimental group and the control group did not show significant differences before the experiment, and significant differences were produced after the experiment. The experimental group's scores on each dimension of geographic literacy increased by 6.35, 5.56, 7.57, 5.01, 7.89, 5.75, and 38.13 points after the experiment, showing significant differences ($p < 0.05$), while none of the control group's scores increased by more than 1.5 points, with p -values of greater than 0.05. The research and study trip 4.0 model has a significant positive effect on improving students' disciplinary literacy. At the same time, under the background of regional study tours, the cultural innovation strategy is put forward.

Keywords: data analysis; study tour; independent sample t-test; study effect

1. Introduction

Study tours have become an important part of primary and secondary education, and have an irreplaceable role in the growth of young people. With the rapid development of modern study tours, schools at all levels and many students have put forward new requirements for study tours, and intelligent modern study tours have become the development trend [1-4]. Based on the market

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demand, building mobile IOT intelligent study, building information network platform, serving modern study travel by information technology means, integrating regional resources, optimizing the learning mode, constructing a new study travel mode, and enhancing the efficacy of study travel practice and educate people [5-8].

Study travel refers to the school organization, student participation, in order to learn knowledge, understanding of society, cultivate personality as the main purpose of off-campus study activities, students have an important role in promoting the growth of success, has become an effective way of modern education [9-12]. The rapid development of modern study tours, various types of study tours continue to emerge, while study tours present new trends, such as the increasing level of intelligence, information technology convenience requirements continue to improve [13-15]. The rapid development of research and study travel intelligence at the same time, the hardware and software also put forward higher requirements, the traditional sense of research and study travel activities innovation and development has become an inevitable trend. Through the mobile IOT intelligent study platform, it can integrate many resources in the study [16-19], forming a convenient intelligent study service platform, which can fully display the resource information to the upper students, and at the same time, enrich the teaching methods, improve the teaching program, and solve the problems encountered in teaching in a timely manner [20-22].

This paper combs through the development of study travel and explores the 4.0 mode of regional study travel development by comprehensively utilizing new technologies such as multimedia technology, cloud computing, big data, AI, VR, AR, MR, XR and other new technologies under the background of informatization and knowledge economy. Build a digital platform for study travel through in-depth research on the 4.0 model of study travel. Construct the evaluation index system of study and learning travel, and obtain the evaluation results of study and learning travel 4.0 mode through questionnaires. Design relevant experiments to compare the study teaching before and after the experiment between the experimental group that adopts the study travel 4.0 mode and the control group that adopts the traditional study travel mode, so as to test the effectiveness of the study travel 4.0 mode in enhancing students' disciplinary literacy.

2. Exploration of a 4.0 model for the development of regional study tours

2.1. Innovations in Regional Study Tour 4.0 Models

2.1.1. Study tours. In 2013, China's State Council issued the National Leisure Tourism Outline, and the term "study travel" appeared for the first time in China. In 2016, the Ministry of Education and other 11 departments issued the Opinions on study travel, which defined study travel as a planned organization and arrangement by education departments and schools, through collective travel, centralized accommodation and food. The combination of research study and travel experience is an out-of-school educational activity [23-24]. The "norms of study travel services" also defined, that is, study travel is the main object of primary and secondary school students, collective travel life as a carrier, to enhance the quality of students for the purpose of teaching, relying on social resources such as tourist attractions, experiential education and research learning of a kind of educational tourism activities. The two definitions respectively reflect the educational nature of study travel and tourism characteristics, and for the narrow definition of study travel. Research travel in the broad sense refers to the cultural investigation activities carried out by travelers out of the need to satisfy their own cultural knowledge, leaving their place of residence to a specific location either independently or in a group. It can be seen that the difference between research travel in the broad sense and the narrow sense is that the subject of research travel in the broad sense includes various groups in society, while the subject of research travel in the narrow sense mainly refers to primary and secondary school students.

In this paper, we study the study trip in the narrow sense, which is defined as a comprehensive out-of-school educational activity for primary and secondary school students, organized by schools, relying on the resources in nature and society, and cultivating students' ability to explore and practice and improving their quality through collective travel and concentrated life.

2.1.2. Study Tour 4.0 Model Creation. The 4.0 model refers to a business model arising in the context of the information society and the knowledge economy era, the core of which includes intelligence, networking, data and collaboration. This model emphasizes the development direction of ecology, personalization and platform, and focuses on maximizing business value and improving core competitiveness through innovation in technology, management and culture.

The rapid development of science and technology has brought unprecedented opportunities and challenges to study travel. The application of multimedia technology, cloud computing, big data, AI, VR, AR, MR, XR and other emerging technologies in the field of study travel will not only broaden the space for teaching, but also provide new ideas and methods for educational activities. Empowered by innovative technology, study travel can not only realize the integration between online and offline, virtual and real, synchronous and asynchronous, but also promote the continuous deepening of the development of the online-offline hybrid study travel mode on the level of technology. The technology-enabled online-offline hybrid study travel mode will realize the integration of online and offline full scenes, use the data generated in learning to analyze the learning situation of students and improve the teaching management of study travel, use the mutual transmission of information in online and offline hybrid teaching to build a knowledge and semantic cyberspace, and use the teaching services for all individuals and all scenes to support the whole process of study travel, in order to Achieve the interweaving of virtual and real in learning, borderless sharing and seamless integration. The schematic diagram of the new technical support environment for research and study travel is shown in Figure 1.

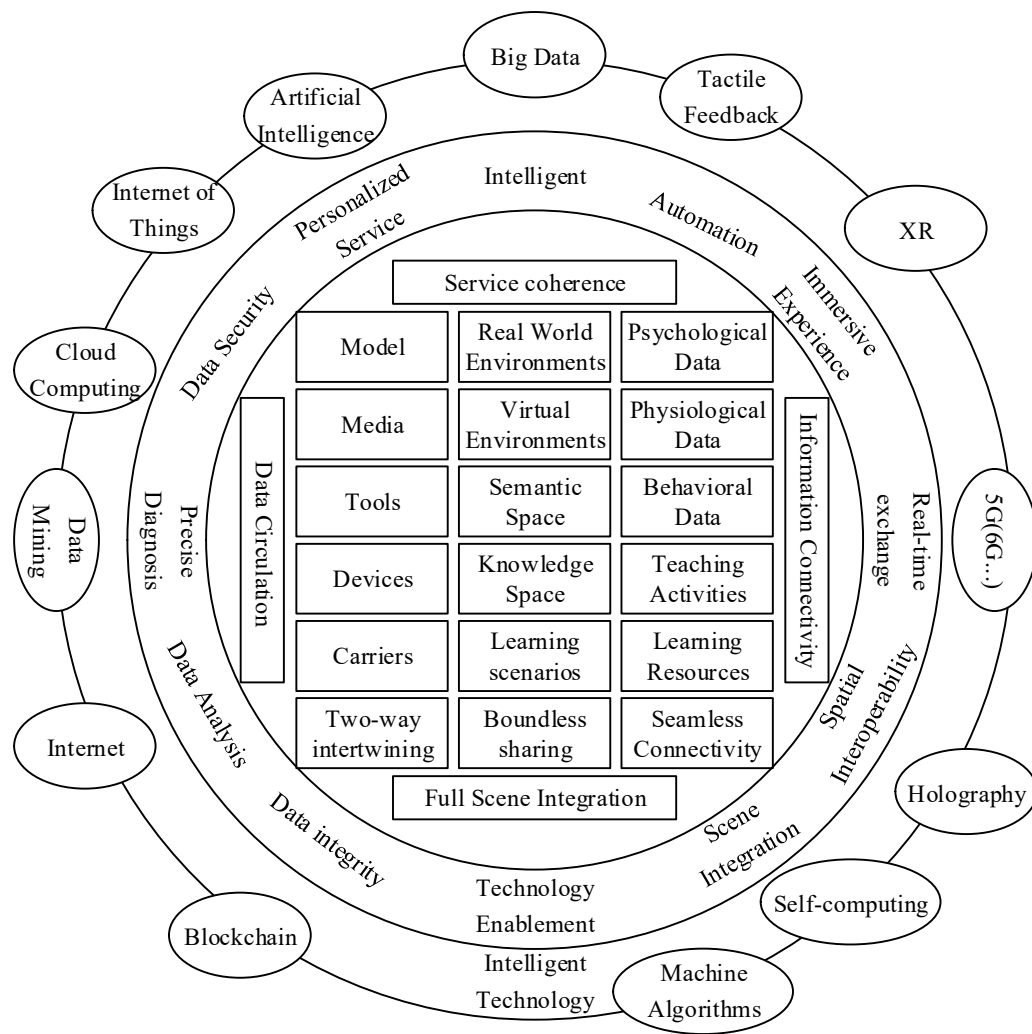


Fig. 1. New technical support environment diagram for research and development

The application of new technology can innovate the modern study travel mode, presenting students in a way that is more in line with the development needs of the times, and constructing a “wisdom study”. Innovative study travel mode, to introduce the Internet of Things, cloud computing, blockchain and other information technology, based on the physical resources of the school, to build a smart study information platform, through the platform of information query, resource integration, collaborative sharing, etc., to realize the whole process of study travel, all-round, full information management, so as to form a mechanism for information sharing. In the new study travel mode, usually rely on a core study base, and at the same time rely on the surrounding study resources for study travel innovation. In this integration process, the need for mobile Internet of Things as a technical guarantee, through the intelligent study platform for the effective transmission of information between the participating subjects, timely communication between each other, to realize the study travel service capacity enhancement.

The new study travel model can not only promote the development of the local study travel industry, but also has very important practical significance for promoting the economic and social development of local enterprises, and is an effective participant and implementer of economic and social development.

2.2. Construction of a digital platform for study tours

2.2.1. Technology application program for a digital platform for study tours. On the basis of understanding the needs of young users, analyzing excellent cases and integrating research resources, we explore the digital design of the research process, the digital translation of the research content and the situational interaction of the research platform, and provide implementable digital technology application solutions.

1) Information processing of study content resources. Pre-processing of the summarized diversified research resources information, i.e., sorting and screening, scanning and identification, digital translation, adjusting and editing of research resources originally divided into different forms, and then filing them into a functional system to establish a research knowledge base for subsequent design and use.

2) Presentation of information on the study platform:

(1) The information presentation mode of the study process. Take the youth as the center to carry out the information design and planning of the study process. The study course completes the specific content of offline field study for teenagers, and the online digital linkage integration part still needs to be carried out from the three parts of pre-study, study and post-study to complete the goal of teenagers' deep understanding of the history, culture and protection of the study.

The information presentation mode of the overall study process is interrelated, and the information presentation mode of the study before, during and after the study is shown in Figure 2. When designing the information architecture of the digital study travel platform, it is necessary to do a good job of the overall information presentation planning under the premise of coordinating with the whole process of the study travel and closely combining the needs of young people in the pre-study, study and after-study periods, so as to improve the efficiency of the information service of the study platform.

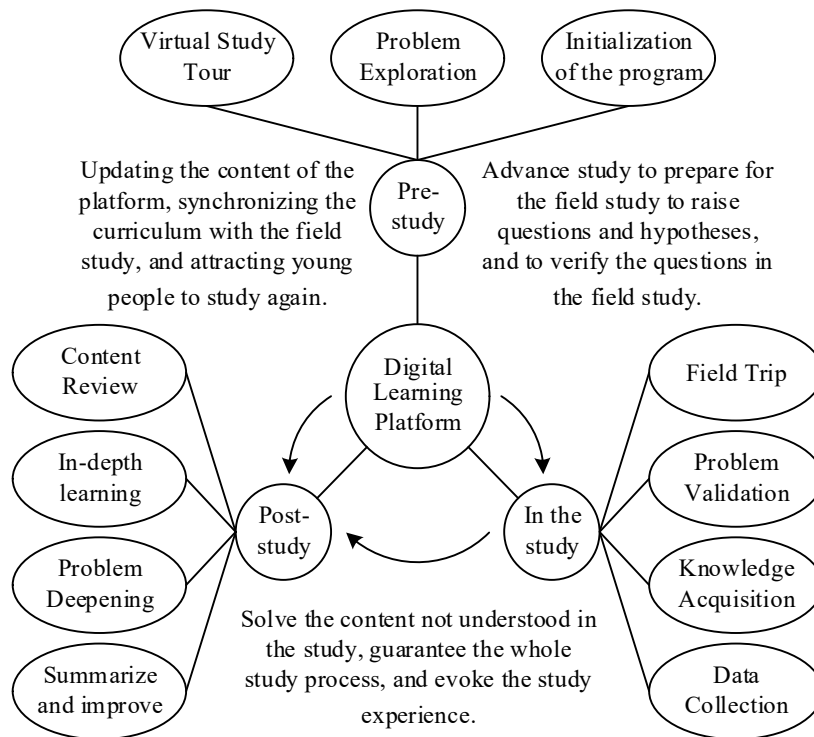


Fig. 2. The information rendering model

(2) Digital visual translation of research content resources. Firstly, the basic information of the study content is digitally translated, including the major events in the development of history, the main classifications of the materials, and the content of the materials corresponding to the main classifications, combined with the explanation of the illustrations and the guidance of the virtual study partners to enhance understanding.

Secondly, we digitally translate the study resources covered by the study content. The visual representations make the historical information clearer and more intelligible to young people.

Finally, the research content of the research resources involved in the formation process of science and technology for digital translation. By transforming the textual content of the popular science into the expression form of illustrations and embedding it in the digital research platform, it assists young people in understanding the process and method of the formation of research materials.

3) Scenario Interaction Forms of the Research and Learning Platform. In the field study, there are peer study partners and accompanying experts to guide the youth to participate in the study, while the digital study platform needs to be used independently by the youth, combined with the user needs to carry out effective study activity design can make the youth in the use of digital study platform can be more immersive and interesting, independent exploration and learning.

(1) Virtual characters lead the study. Interesting and cute virtual characters can attract the eyes of teenage users and make teenagers more willing to understand and use the research platform. By giving the virtual character personality and characteristics, it can make young users feel more friendly and have a sense of belonging, thus enhancing the goodwill and experience of the research platform. In the process of using the research platform, the interaction between users and virtual characters can increase the sense of participation and fun of teenagers, thus improving the retention rate and user stickiness. By creating a unique and distinctive virtual character image, the brand image and popularity of the study platform can be enhanced, making it easier for teenage users to remember and recognize.

(2) Story linking research and study content. In the process of promoting research content, designing interesting, compact and logical storylines to create an immersive space where teenagers can independently explore the art of Mogao Cave murals can present the cultural background and scientific knowledge of research resources more vividly, and help teenage users learn and understand relevant research content more efficiently. In the storyline setting should be in line with the cognitive rules of the youth population, and the story setting should be centered on the theme of research.

(3) Games enhance the understanding of the study. Teenagers love games and enjoy new and interesting things. In the field study, they can participate in hands-on activities such as clay modeling, painting, etc. In the digital study platform, they can enhance their comprehension of the study content through interactive games.

2.2.2. Digital platform design for study tours:

1) System Architecture Design. In this section, the architecture design of the system will be carried out with the aim of analyzing the complexity of the software system and finally get the method of platform implementation. Secondly, through the system architecture design, it can be better planned and ensure the scalability of the system. The system architecture diagram of the research and study travel education platform is shown in Figure 3. The overall architecture of the system is divided into representation layer, business logic layer and data layer, in which the storage layer includes cache, Mybatis-plus and MySQL database.

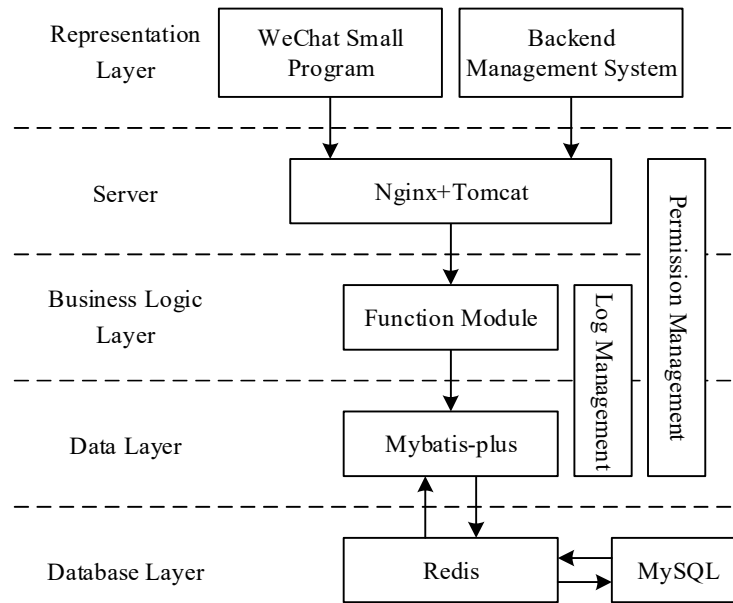


Fig. 3. System architecture diagram

2) Design of System Functional Modules. The functional modules of the research and study trip education platform are divided into the functions of the mobile terminal and the functions of the PC terminal, in which the functions of the mobile terminal are used by students and tutors, while the functions of the PC terminal are used by tutors and administrators.

(1) Functional module design of mobile terminal. The mobile terminal adopts WeChat applet as the application for accessing the research and practice education platform, in which WeChat applet is divided into two types: the tutor side and the student side, to realize the purpose of independent use.

(2) PC terminal function module design. The background management system of the PC terminal is operated and used by tutors and administrators, and the functions specific to different roles are given through the allocation of different permissions. Tutors can use the functions of homework management, student management and information management, while the background administrator has the functions of data management, financial management, organization management, tutor management, faculty management and permission control.

3) System database design. Standardized data storage can not only improve the operation speed of the system, but also improve the stability and reliability of the system. This system utilizes the relational database MySQL and the non-relational database Redis to jointly build the database storage system of the study tour education platform. Among them, MySQL database is used as the main storage, and Redis is used for storing user information and facilitating permission authentication queries.

In this section, the conceptual model of the system is designed by analyzing the functional modules of the system, including the entities, attributes, and connections involved in the system. After that, the database logical structure design is completed through the conceptual model, the main database tables are constructed, and the meanings of the database tables, data types in the tables, and constraints are explained.

For the study travel education platform, the basic E-R diagram has been determined in the conceptual structure design stage, so the next stage will be to complete the design of database tables based on database entities, entity attributes, and inter-entity relationships, and ultimately get a logical structure that complies with MySQL support. In the process of database table design, the basic principles of database design should be strictly adhered to, and the requirements of the third paradigm need to be met in order to eliminate redundancy and improve efficiency. In addition, the database

design should reasonably deal with the relationship between tables, and for the many-to-many relationship, it is necessary to increase the correlation table to convert it into a one-to-many relationship, so as to ensure the rationality of the database design. The system database mainly contains student table, tutor table, role table, class table, research place table, homework table, research theme table, organization table, answer table, course table, scheduling table and so on.

3. Results of the data analysis of the Study Tour 4.0 model

This chapter analyzes the results of participant evaluations and the effectiveness of the study trips using a geography study trip class using the Study Trip 4.0 model at W Middle School as an experiment.

3.1. Evaluation results of study tours

3.1.1. Construction of evaluation indicator system. This study constructed a regional study tour evaluation index system as shown in Table 1, specifically established four evaluation content layers of physical space, knowledge space, interpersonal space and experience space, and refined 10 evaluation items such as study task point inquiry environment, study knowledge characteristics, individual student behavior performance, study task experience, and related 33 evaluation indexes.

Table 1. Regional study tour evaluation index system

Evaluation content layer	Evaluation project layer	Evaluation index layer
Physical space (A)	Task point environment (A1)	Infrastructure condition (A11)
		Security level (A12)
		Resource feature (A13)
		Environment condition (A14)
		Educational value (A15)
		Entertainment value (A16)
Knowledge space (B)	Study tour knowledge feature (B1)	Cognitive adaptability (B11)
		Knowledge connectedness (B12)
		Content extensibility (B13)
		Discipline convergence (B14)
		Future guidance (B15)
	Study tour knowledge carrier (B2)	Course orientation (B21)
		Course content & structure (B22)
	Study tour knowledge construction (B3)	Knowledge structure (B31)
		Knowledge migration application (B32)
Interpersonal space (C)	Student behavior (C1)	Get discipline information (C11)
		Explore discipline problem (C12)
		Use scientific methods (C13)
		Communicate quality (C14)
	Teacher guidance (C2)	Teaching attitude (C21)
		Teaching method (C22)
		Teaching content (C23)
		Practical operation (C24)
	Student cooperation (C3)	Cooperation process (C31)
		Cooperation method (C32)
Experience space (D)	Study tour task experience (D1)	The relationship between research task and student (D11)
		The internal logic of task (D12)
	Study tour situational experience (D2)	Physical experience (D21)
		Interpersonal experience (D22)
		Cultural experience (D23)
	Study tour result experience (D3)	Knowledge system enrichment (D31)
		Overall ability improvement (D32)
		Emotional value enrichment (D33)

Using the hierarchical analysis method to calculate the weights of the regional study tour evaluation index system, the weight summary results are shown in Table 2.

Table 2. Regional study tour evaluation index weight

Evaluation content layer	Weight	Evaluation project layer	Weight	Evaluation index layer	Weight
A	0.128	A1	1.000	A11	0.058
				A12	0.183
				A13	0.137
				A14	0.253
				A15	0.316
				A16	0.053
B	0.347	B1	0.321	B11	0.244
				B12	0.158
				B13	0.152
				B14	0.216
				B15	0.230
		B2	0.327	B21	0.615
				B22	0.385
		B3	0.352	B31	0.326
				B32	0.674
C	0.202	C1	0.324	C11	0.245
				C12	0.255
				C13	0.291
				C14	0.209
		C2	0.256	C21	0.268
				C22	0.278
				C23	0.159
				C24	0.295
		C3	0.420	C31	0.668
				C32	0.332
D	0.323	D1	0.285	D11	0.726
				D12	0.274
		D2	0.213	D21	0.326
				D22	0.314
				D23	0.360
		D3	0.502	D31	0.161
				D32	0.598
				D33	0.241

3.1.2. Analysis of evaluation results. In this study, a questionnaire was designed on the basis of the evaluation index system of study tours constructed in the previous section and distributed to the students who participated in study tours, using a five-point Likert scale [25], from “strongly disagree” to “strongly agree”. A total of 53 questionnaires were distributed and 53 were recovered, excluding 3 invalid questionnaires that had not been answered, and 3 invalid questionnaires that had the same answers to all or most of the questions, the final valid questionnaires totaled 50, and the validity rate of the questionnaires was 94.3%.

In this study, the linear weighted synthesis method was used for the calculation of the composite score of the questionnaire evaluation results. Firstly, the Likert five-point scale scoring method was used to assign the evaluation levels of the questionnaire items to 1, 2, 3, 4 and 5 in turn, then the numerical statistics of the recovered data were used to derive the mean value of the scores of each item, and finally the mean value of the scores of each level and the corresponding weights of the

indexes were linearly weighted to arrive at the final scores of the evaluation of the study trip. The criteria for judging the study trip are set as follows: a total score of 4-5 is excellent, 3.5-4 is good, 3-3.5 is moderate, 2-3 is average, and less than 2 is unqualified.

The evaluation scores of the research trip are shown in Table 3, and the overall score of the research trip evaluation is 4.17, with a score range between 4-5, so the overall evaluation grade of the research trip is excellent, which indicates that the research trip has achieved certain results, but there is still room for improvement.

Table 3. Overall evaluation score for the study tour

Primary index weighted score	Secondary index weighted score	Tertiary index	Questionnaire score	Weighted score
A (4.17)	A1 (4.17)	A11	4.86	0.28
		A12	4.39	0.80
		A13	4.31	0.59
		A14	3.67	0.93
		A15	4.17	1.32
		A16	4.76	0.25
B (4.22)	B1 (4.21)	B11	4.42	1.08
		B12	4.9	0.77
		B13	4.9	0.74
		B14	3.56	0.77
		B15	3.68	0.85
	B2 (4.07)	B21	4.07	2.50
		B22	4.08	1.57
	B3 (4.37)	B31	4.93	1.61
		B32	4.09	2.76
C (4.10)	C1 (4.28)	C11	4.11	1.01
		C12	4.17	1.06
		C13	4.55	1.32
		C14	4.28	0.89
	C2 (4.30)	C21	4.31	1.16
		C22	4.05	1.13
		C23	4.45	0.71
		C24	4.39	1.3
	C3 (3.84)	C31	3.53	2.36
		C32	4.46	1.48
D (4.17)	D1 (4.03)	D11	4.03	2.93
		D12	4.02	1.10
	D2 (4.32)	D21	4.23	1.38
		D22	4.08	1.28
		D23	4.61	1.66
	D3 (4.18)	D31	4.22	0.68
		D32	4.13	2.47
		D33	4.28	1.03

3.2. Analysis of the effectiveness of the study

The study effects of the experimental group participating in the Geography Study Tour 4.0 model at W Middle School were compared with the control group participating in the traditional Geography Study Tour to investigate whether the Regional Study Tour Development 4.0 model is effective.

3.2.1. Differences in Teaching Effectiveness Before the Research Travel Experiment. Before the research trip experiment was carried out, the researcher and relevant frontline teachers conducted an initial test on the geographic literacy of the two groups of students. The level of students' geographic literacy was assessed based on what was learned from the test. The test results are shown in Table 4.

From the pre-test indicators, the geographic literacy indicators of the students in the experimental group and the control group are relatively similar to each other, and the p-value is greater than 0.05. Further, through the independent samples t-test conducted by the Spss statistical software, it is obtained that there is no significant difference in the geographic literacy of the students in the experimental group and the control group [26], and it can be regarded as a homogeneous group.

Table 4. Geographic literacy comparison of two groups before the experiment

Content	Experimental group	Control group	t	p
Regional cognition	9.91±3.50	10.02±3.75	-0.845	0.546
Humanistic geography thinking	11.50±6.01	11.61±5.36	-0.526	0.536
Human-geography coordination view	10.77±3.80	11.03±4.30	-1.035	0.634
Geographic practical ability	12.43±3.01	12.62±3.53	-0.612	0.695
Geographic knowledge application	11.53±5.40	11.96±5.53	-1.586	0.712
Geographical judgment ability	11.11±5.22	11.60±5.23	-1.472	0.711
Overall literacy	67.25±11.55	68.84±12.46	-2.485	0.498

3.2.2. Differences in Teaching Effectiveness after Research Travel Experiments. After the study trip experiment, the researcher and the frontline teachers tested the geographic literacy of the students in both groups again. Based on the tests, the changes in the geographic literacy levels of the students in the experimental group and the control group after different modes of study tours were assessed. As shown in Table 5, both the experimental group and the control group showed different degrees of improvement in their respective levels of geographic literacy, but there was a large difference between the experimental group and the control group.

From the data in Table 5, it can be seen that the experimental group scored 5.74, 4.29, 5.74, 4.59, 6.86, 5.11, and 32.33 points higher than the control group in regional cognition, human geography thinking, human-land coordination view, geography practicality, geography knowledge application, and comprehensive literacy, respectively, and the p-value of the seven aspects was 0.000 (less than 0.05), which shows that the experimental group's geography literacy significantly exceeds the control group.

Table 5. Geographic literacy comparison of two groups after the experiment

Content	Experimental group	Control group	t	p
Regional cognition	16.26±7.30	10.52±3.85	6.451	0.000
Humanistic geography thinking	17.06±7.69	12.77±4.59	5.124	0.000
Human-geography coordination view	18.34±6.55	12.60±5.46	5.845	0.000
Geographic practical ability	17.44±7.34	12.85±4.99	5.354	0.000
Geographic knowledge application	19.42±7.36	12.56±5.84	8.624	0.000
Geographical judgment ability	16.86±6.14	11.75±4.95	5.426	0.000
Overall literacy	105.38±20.48	73.05±12.68	32.456	0.000

3.2.3. Difference in teaching effectiveness before and after research trip 4.0 in the experimental group. The t-test was used to analyze the differences in geographic literacy of the experimental group before and after the study trip experiment, and the test results are shown in Table 6. As can be seen from Table 6, compared with before conducting the study trip experiment, the experimental group after the experiment got 6.35, 5.56, 7.57, 5.01, 7.89, 5.75, and 38.13 points of improvement in regional cognition, human geography thinking, human-land coordination view, geography practicality, geography knowledge application, and comprehensive literacy, respectively, and p-value of each dimension is less than 0.05, which shows that the regional study trip 4.0 model has a significant positive effect on improving students' geographic literacy.

Table 6. Geographic literacy comparison of experimental group before and after the experiment

Content	Before	After	t	p
Regional cognition	9.91±3.50	16.26±7.30	-7.546	0.000
Humanistic geography thinking	11.50±6.01	17.06±7.69	-6.498	0.000
Human-geography coordination view	10.77±3.80	18.34±6.55	-8.769	0.000
Geographic practical ability	12.43±3.01	17.44±7.34	-5.151	0.000
Geographic knowledge application	11.53±5.40	19.42±7.36	-8.188	0.000
Geographical judgment ability	11.11±5.22	16.86±6.14	-4.526	0.000
Overall literacy	67.25±11.55	105.38±20.48	-35.488	0.000

3.2.4. Differences in teaching effectiveness before and after the traditional research trip in the control group. The t-test results of the differences in geographic literacy before and after the study trip experiment in the control group are shown in Table 7. As can be seen from Table 7, the control group's geographic literacy was improved in all dimensions after the traditional study trip, and the difference between the pre- and post-test scores was 0.50, 1.16, 1.57, 0.23, 0.60, 0.15, and 4.21, respectively, but the enhancement was small and the p-value of all dimensions was greater than 0.05, which was not a significant difference. Therefore, it was concluded that the traditional study tour model did not produce much positive effect on students' geographic literacy.

Table 7. Geographic literacy comparison of control group before and after the experiment

Content	Before	After	t	p
Regional cognition	10.02±3.75	10.52±3.85	-0.846	0.684
Humanistic geography thinking	11.61±5.36	12.77±4.59	-1.568	0.642
Human-geography coordination view	11.03±4.30	12.60±5.46	-1.849	0.587
Geographic practical ability	12.62±3.53	12.85±4.99	-0.425	0.897
Geographic knowledge application	11.96±5.53	12.56±5.84	-0.947	0.744
Geographical judgment ability	11.60±5.23	11.75±4.95	-0.328	0.984
Overall literacy	68.84±12.46	73.05±12.68	-4.628	0.379

4. Cultural innovation strategies under regional study tours

4.1. Strengthen the depth of the course and enrich the content of activities

The study tours base should carefully design the research courses and improve the richness of the courses. From the previous analysis, we can see that most students have a high evaluation of the regional study tours, which indicates that they have a high quality of course experience. At the same time, a small number of students have low satisfaction with the course. It can be seen that the different grades of students will directly affect the different requirements of students for curriculum experience. Therefore, according to the findings of this study, the following strategies are proposed to enhance the quality of travel experience in regional study tours.

First, identify the course positioning.

In the development of new curriculum, it is necessary to comprehensively predict the research subjects such as students, parents, schools, and teachers. The expectation of Cheng is to have a deep understanding of the influencing factors that may affect each research subject's choice of courses, make use of the cultural resources of the research base according to local conditions, find the correct positioning, and carry out the research courses suitable for the same grade.

Secondly, improve the curriculum richness.

The curriculum of regional research base should be extended and expanded by combining agricultural culture and rural culture, integrating regional characteristics, so that the research course can reach a certain depth and breadth.

Finally, set the course stratification.

The ability to accept is one of the factors that affect the quality of students' experience of research courses. Stratification of curriculum Settings can effectively avoid students' different cognition of courses. The curriculum Settings of lower grade students should be simple and easy to understand, while those of higher grade students should be vivid and interesting, which can not only satisfy students' differentiated demands, but also improve the quality of tourism experience of research bases.

4.2. Create a cultural atmosphere and dig deep into cultural characteristics

The construction of regional research and travel base should rely on its own different cultural support, and digging deeply into the cultural characteristics of the base is the key factor to improve the satisfaction of the tourism experience quality of the research and travel base. According to the survey results, students have a high evaluation of tourism activities, but the cultural atmosphere of regional research and travel base is not strong. Therefore, the base needs to create a cultural atmosphere and dig deeply into the cultural characteristics.

First, cultural elements should be incorporated into the service places.

The buildings, infrastructure and exhibits provided are as possible integrated into the pastoral character and agricultural culture. As far as restaurant architecture is concerned, the architectural

style should be combined with pastoral culture, and the architectural appearance can be designed into the shape of pastoral harvest species, showing the cultural connotation and elegance.

Secondly, service provision is interspersed with cultural elements.

The embodiment of cultural elements is not only in the architecture, but also in the clothing and reception style of the relevant service personnel of the base, which can intersperse traditional cultural elements, on the one hand, highlight cultural characteristics, and on the other hand, cultivate students' cultural confidence.

Finally, carry out cultural competition activities.

Centering on the characteristics of experience-oriented research and travel base, themed cultural competitions will be carried out. Parents are encouraged to participate in cultural competitions with their children, which can not only enrich the content of curriculum activities, but also improve students' sense of value of rural culture and farming culture, and undermine the mission of Chinese cultural inheritance and innovation.

5. Conclusion

The article explores the 4.0 model of regional study travel development, building a digital platform for study travel while innovating the study travel model. The utility of the 4.0 model of regional study travel development is explored through the participants' evaluation of the 4.0 model of study travel and the analysis of study effects.

The comprehensive score of the study travel evaluation is 4.17, and the evaluation grade is excellent. The 4.0 model of study and learning travel scored more than 4 points in the four primary indicators of physical space, knowledge space, interpersonal space and experience space, and only "student-student cooperation" scored less than 4 points (3.84) in the secondary indicators.

Comparing the teaching effect of the study tour 4.0 mode with that of the traditional study tour mode, there was no significant difference between the experimental group and the control group before the experiment ($p > 0.05$), but there was a significant difference after the experiment ($p < 0.05$). The experimental group's geography literacy scores increased by more than 5 points in all dimensions after the experiment, showing significant differences in all dimensions ($p < 0.05$), while the control group's scores increased by about 1 point, with little effect, and the p-values were all greater than 0.05. Thus, it can be seen that the study tour 4.0 mode has significant advantages in improving students' subject literacy.

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