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UbD + PBL Integrated Model in Junior High School Geography Teaching: A Case Study on Rural Revitalization via Agri-Product Promotion

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Abstract: The UbD+PBL integrated model combines the strengths of UbD and PBL. It uses projects as teaching vehicles, guiding project implementation with preset outcomes and assessment evidence. Integrating projects and evaluation throughout the teaching process, it ensures consistency between learning objectives, assessment evidence, and instructional design. This model enhances students' geographical literacy and practical abilities. Taking "Promoting Rural Revitalization through Agricultural Products" as an example, it demonstrates the teaching process of the UbD + PBL model, providing valuable insights for junior high school geography teaching from the perspective of core literacy.

Keywords: UbD; PBL; Local Cuisine; Natural Environment; Live Broadcast Sales

1. Introduction and Background

Traditional geography instruction in Chinese junior high schools is predominantly oriented towards academic advancement, exhibiting distinct exam-oriented tendencies. This approach is shaped by a variety of factors, including pedagogical philosophies, time constraints, the literacy levels of both educators and students, and the conditions under which teaching is conducted. The characteristics of the conventional teaching model are as follows:

(1) The teaching philosophy and methods are outdated. The traditional geography classroom confines the teaching field to the classroom, the source of knowledge to textbooks, the teaching tools to PPT, and the teaching form is mainly based on lectures, focusing on the teaching and problem-solving training of geographical phenomena, laws, and principles, lacking awareness and practical measures for the cultivation of core literacy in geography.

(2) The teaching evaluation methods and subjects are singular. Teachers occupy an absolute dominant position in traditional teaching evaluations, but the evaluation methods are limited to summative evaluations, that is, the end-of-term quality test. The teaching process lacks effective evaluation supervision means and timely effect feedback, making it difficult for teachers and students to adjust teaching strategies in a targeted manner.

(3) The main body status of students is lacking. The phenomenon of teachers lecturing from beginning to end in the classroom ignores the main body status of students in learning. Students' participation in such classrooms is low, their initiative in learning is poor, and their abilities in cooperative inquiry and innovative practice are weak, making it difficult for their core literacy in geography to develop effectively.

The 2022 iteration of the Compulsory Education Geography Curriculum Standards explicitly advocates for the meticulous construction of educational scenarios by teachers, the enhancement of geography practice activities grounded in authentic experiences, and the employment of student-centered instructional approaches coupled with diverse assessment techniques. These strategies are aimed at developing students' core geographical literacy [1]. Consequently, there is an imperative for a substantial cohort of geography educators to evolve their pedagogical and evaluative methodologies. The objective is to shepherd students towards the enhancement of their core geographical competencies, embracing the integrative concept of "geography in life and life in geography."

Within the ever-evolving landscape of

educational paradigms, the author has discerned two groundbreaking instructional methodologies: Understanding by Design (UbD) and Project-Based Learning (PBL). The UbD methodology stands out for its emphasis on the application of academic principles within authentic, real-life scenarios, fostering a profound comprehension that transcends the confines of the classroom and empowers students to effectively transfer and utilize their knowledge in a myriad of contexts [2]. Conversely, the PBL approach anchors learning around projects, utilizing their successful completion as a yardstick for measuring educational success. This model underscores the significance of autonomous learning and is dedicated to fostering students' cognitive acumen, ingenuity, and collaborative prowess [3]. Both of these methodologies resonate with contemporary pedagogical philosophies and the pragmatic demands of geography education, sharing a myriad of synergies. By meticulously blending the strengths of UbD and PBL, this research endeavors to forge an integrated "UbD + PBL" teaching model. This innovative approach aims to inspire educators to rejuvenate their instructional paradigms, diversify their teaching techniques, and ultimately propel the advancement of students' core competencies within the discipline of geography.

While many educators are aware of the benefits of project-based learning and participatory teaching methods, the integration of UbD and PBL models offers a unique and innovative approach to geography education. This integrated model not only aligns with the constructivist theory but also provides a structured framework for achieving core geographical competencies. By combining backward design with project-based learning, the UbD + PBL model ensures that students are actively engaged in meaningful learning experiences that connect classroom knowledge with real-world applications. This approach is particularly relevant in the context of middle school geography, where fostering critical thinking, collaboration, and geographical literacy is essential.

2. Overview of the UbD Model and the PBL Model

2.1 The UbD Model: "Understanding First, Backward Design"

UbD, developed by Grant Wiggins and Jay McTighe in 2005, prioritizes meaningful learning through a backward design approach. This model encompasses three stages: clarifying expected learning results, determining reasonable assessment evidence, and planning the corresponding teaching process [4]. By focusing on teaching for understanding and crafting real-life tasks, UbD fosters comprehensive and adaptive knowledge application.

2.2 The PBL Model: "Project-Driven, Outcome-Oriented"

PBL is an innovative framework that integrates project work throughout the instructional continuum. It prioritizes project realization as the educational objective, engaging students in the exploration of complex questions over an extended period. PBL transcends classroom boundaries, enriching evaluation through ongoing performance assessments and fostering student-centered learning. This approach not only facilitates creative problem-solving and the generation of tangible outcomes but also cultivates the ability to apply these competencies in varied contexts [5].

3. Construction of the UbD + PBL Integrated Model

3.1 The Fit Between the UbD Model and the PBL Model

The UbD model prioritizes backward design with an emphasis on understanding, while the PBL model focuses on project-driven, outcome-oriented learning. Both models are designed to learn tasks in real situations around big ideas, emphasizing the deepening of students' understanding of the meaning of core knowledge through practice, and paying attention to process evaluation, which is a practice and extension of "learning by doing" and constructivist theory. The two have a high degree of fit in terms of teaching philosophy, teaching process, and teaching evaluation (see Figure 1), providing strong support for the

construction of the UbD + PBL integrated model.

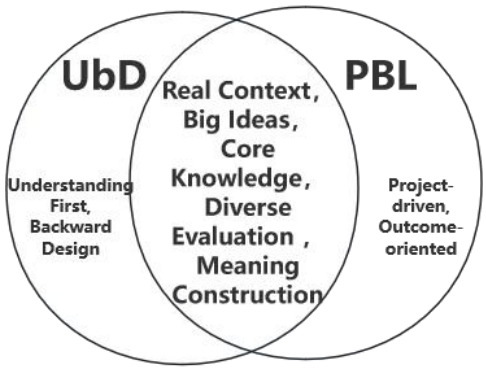

Figure 1. Schematic Diagram of the Relationship Between the UbD Model and the PBL Model

3.2 The Teaching Process of the UbD + PBL Integrated Model

The UbD + PBL integrated model, based on constructivist theory, integrates the six-stage project-based learning process of the PBL model into the three-stage backward teaching design of the UbD model, creating a new model of project-based learning with the characteristics of backward design. This model takes the project as the carrier of teaching, guides the implementation of the project with preset project results and assessment evidence, and implements the project and evaluation throughout the teaching process, reflecting the consistency of learning objectives, assessment evidence, and teaching design. The specific teaching process is shown in Figure 2.

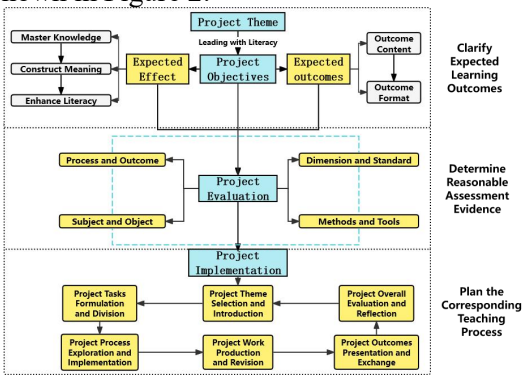

Figure 2. The Teaching Process of the UbD + PBL Integrated Model

As shown in the figure, the UbD + PBL integrated model commences by identifying project themes rooted in core disciplinary knowledge and real-life contexts. It presupposes project outcomes and effects aligned with subject-specific competencies. Subsequently, corresponding evaluation methods and criteria are established to provide concrete evidence for project assessment. Finally, the model designs each project phase based on these predetermined assessment evidences, ensuring a clear, precise, and efficient teaching process.

3.3 Key Features of UbD + PBL Integrated Model

3.3.1 Project-**d**riven **l**earning in **a**uthentic **c**ontexts

Projects are derived from ill-structured problems in real-life situations, characterized by openness, authenticity, and engagement. These projects stimulate students' interest, motivating them to apply their knowledge to solve practical problems and develop their core competencies.

3.3.2 Continuous **e**valuation and **f**eedback

Evaluation is pre-planned at various stages, including pre-class setting of teaching objectives and assessment evidence, in-class assessment through performance tasks, and post-project summative evaluation. This continuous feedback loop enables teachers to monitor students' learning progress and competency development in real-time.

3.3.3 Student-**c**entered **m**eaning **c**onstruction

The project implementation process emphasizes student agency, where students engage in "learning by doing" to construct and deepen their understanding of core knowledge.

3.3.4 Backward **d**esign **a**pproach

Contrary to the traditional "teach then assess" model, the UbD + PBL integrated model adopts a "assess to teach" approach. It begins with predetermined assessment evidence, informing the design of the teaching process, thereby enhancing teaching purpose and effectiveness.

4. Application of UbD + PBL Integrated Model in Junior High School Geography

To evaluate the effectiveness of the UbD + PBL integrated model compared to traditional teaching methods, students were surveyed on their experiences in both the case study and a conventional teaching process. The conventional teaching process included traditional lecture-based instruction, with a focus on textbook content and summative assessments. This comparison provides a

clearer understanding of the impact of the UbD + PBL model on student engagement and learning outcomes.

The discipline of geography is characterized by its comprehensiveness and practicality, with contents such as physical geography, human geography, and regional geography providing a wealth of project resources. This offers a broad practical scope for the integration of the UbD + PBL model. In line with the developmental requirements of middle school students in the new era and the characteristics of the geography discipline, introducing the UbD + PBL integrated model into junior high school geography teaching aligns perfectly with the new curriculum standards' philosophy of cultivating students' core academic competencies.

To fully engage students in understanding the core knowledge of how natural geographical environment characteristics affect production and daily life, the author selected the real-life scenario of regional dietary differences as a driving question. This guided students to explore and present the relationship between the growth habits and environments of Liangshan potatoes, Weining buckwheat crisp, Qinzhou yellow millet, and Golmud tsampa during a virtual live streaming sales process. The following is a teaching case based on the UbD + PBL integrated model titled "Why Do You Eat This? The Geography of Flavor on Our Palate".

4.1 Basic Information of the Teaching Case

Textbook Version: People's Education Press Geography, Grade 8, Volume 2

Lesson Type: Comprehensive Review and Practical Activity

Class Hours: 2

4.2 Defining Desired Learning Outcomes

Curriculum Standard Requirements: First, illustrate with examples the impact of natural geographical environments on production and lifestyle in the four major geographical units. Second, provide examples to explain how natural environments influence the local characteristics of clothing, food, and housing in China.

Learning Transfer Goals: Investigate the growth habits and local natural environments of tartary buckwheat, potatoes, yellow millet, and highland barley, and compare them with wheat and rice. Explain the mutual influence between natural environmental features and human activities to strengthen the concept of human-environment coordination.

Meaning Construction Goals: Students will understand that the characteristics of the natural environment determine the type of local agricultural production and crops, and agricultural production affects people's diet. They will also recognize that regional development imbalances include disparities between the eastern, central, and western regions, as well as between urban and rural areas.

Knowledge and Skill Mastery Goals: Students should know that in the southern region, the staple food crop is rice, and the main food is rice dishes; in the northern region, the staple food crop is wheat, and the main food is noodles and other wheat-based foods; in the northwest and Xizang regions, animal husbandry is predominant, and people prefer beef and mutton. They should master the climatic differences among the four major regions, be familiar with the characteristics of clothing and the reasons for them, be able to consult literature to explain the relationship between the growth habits of a certain crop and the local natural environment, create courseware or posters to display the relationship between crops and the local natural environment, and use a geographical perspective for live broadcasting to promote and sell local agricultural products.

4.3 Determining Reasonable Assessment Evidence

Performative Tasks: Research relevant materials and accurately describe the relationship between Liangshan potatoes, Weining buckwheat crisp, Golmud tsampa, and Qinzhou millet and the local natural environmental characteristics in precise geographical language. Develop a live broadcast sales plan and conduct a virtual live broadcast sales event using vivid language and visual aids such as posters, physical products, courseware, and performances, integrating a geographical perspective into the live broadcast.

Other Evidence: Write an investigation report to survey the growth habits and environments of Liangshan potatoes, Weining buckwheat crisp, Golmud tsampa, and Qinzhou millet.

Hold a special lecture by researching and organizing relevant materials online, and making a PPT to conduct a geographical special lecture on "A Bite of China". Conduct observation and communication to understand students' concepts of human-environment interaction. Organize a classroom test on typical agricultural products in the four major geographical regions.

4.4 Planning the Corresponding Teaching Process

Entrance Activity: Show a segment from the video "A Bite of China" about Liangshan's Wuyang Potatoes and display images related to Weining Buckwheat Pastry, Golmud Tsampa, and Qinzhou Millet. Then, raise the driving question: How do you eat this? What is the relationship between local diet and local agricultural production and natural environment?

Knowledge and Skill Construction: Research materials to understand the growth habits and natural environmental characteristics of Liangshan potatoes, Weining buckwheat crisp, Golmud tsampa, and Qinzhou millet. Conduct group presentations on the relationship between the growth habits of the four crops and the local natural environment characteristics. Bridge the gap by reviewing the challenges faced in China's development, the imbalance of regional (urban-rural) development, and introducing live broadcasting to help rural revitalization.

Exploration and Outcome Formation: Each project group clarifies its live broadcast sales plan through brainstorming. The judge group sets scoring standards and designs awards and certificates. Members of the project group write scripts, draw pictures, shoot videos, make courseware, and purchase physical items according to the sales plan. Integrate and select materials to form a preliminary live broadcast plan and rehearse the presentation within the group.

Comment and Revision: Teachers participate in group evaluations and offer suggestions for revision. The group comprehensively considers and revises the feasibility of the plan, expected results, and broadcasting methods to form a final plan that can participate in the virtual live broadcast sales conference of the class.

Figure 3. Virtual Live Broadcast Scene of "I Bring Agricultural Products for Rural Revitalization"

Public Results: Hold a "I Help Rural Revitalization with Agricultural Products" virtual live broadcast conference, inviting school leaders, parent representatives, and subject teachers to participate. Each group promotes four types of agricultural products such as Liangshan potatoes through live broadcasting using videos, physical items, models, and PPT(see Figure 3). Invited guests evaluate each sales team, and student judges score and award self-designed certificates.

Reflection and Transfer: Write reflection notes, thinking about what has been learned from the project "Why Do You Eat This?". Teachers provide agricultural products such as Hami melon and Hainan coconut, and students choose one to explore its growth habits and environment.

4.5 Classroom Evaluation

The teaching content covered the eighth-grade curriculum, with selected points based on but exceeding the textbook, originating from life and returning to life. Students showed a strong and sustained interest in the project activities. From exploring the relationship between the growth habits of crops and the natural environment to designing the live broadcast, they demonstrated a strong desire for active exploration. The construction of the live broadcast team effectively implemented group cooperation and inquiry. Although some anchors were slightly nervous, they still tried hard to promote. Most live broadcast teams balanced form and content, reflecting a strong sense of geography. Student judges independently scored, designed awards and certificates, and student hosts contacted each team to write scripts. The abilities of students exceeded the teacher's expectations.

4.6 Teaching Reflection

The selection of projects should meet both the training objectives and the students' interests and needs. Ideally, it should be perfectly integrated with large units or core concepts as carriers. This form of teaching requires a very high level of classroom control from the teacher. The teacher must ensure that all parts proceed in an orderly manner while also giving students the initiative and guiding them to maintain direction and immersion. This also places high demands on the design of the project. After the project is completed, students should be encouraged to organize their results and gains, summarize experiences, and make suggestions for the project and the teaching process.

The introduction of the UbD + PBL integrated model has transformed geography into a distinctive and popular course among students. As indicated by the survey results (see Table 1), students' preference for the UbD + PBL integrated model far exceeds that of conventional teaching methods. They perceive this model as a novel learning approach centered on projects and student autonomy. By emphasizing process evaluation and timely feedback, this model enables students to continuously engage and immerse themselves in project-based learning. In the process of completing projects, students develop a profound understanding and mastery of geographical knowledge, fostering their abilities in autonomous learning, collaborative inquiry, and innovative creation.

Table 1. Results of the Student Questionnaire Survey

Evaluation Content	UbD + PBL Integrated Model (n=51)		Conventional Teaching Model (n=52)	
	N	%	N	%
Focus on Process Evaluation and Timely Feedback	45	88.24	21	40.38
Sustained Engagement and Immersion in Learning	36	70.59	13	25
Strong Willingness for Autonomous Learning	42	82.35	33	63.46
Cultivation of Cooperation Skills and Team Spirit	40	78.43	19	36.54
Stimulation of Innovation and Creativity Potential	39	76.47	15	28.85
Deep Understanding of Geographic Knowledge	42	82.35	27	51.92
Improvement of Classroom Teaching Efficiency	31	60.78	36	69.23
Preference for the Teaching Model	47	92.16	27	51.92

The application of the UbD + PBL integrated model in the case study of "I Promote Rural Revitalization with Agricultural Products" demonstrates several key advantages of this approach. By integrating project-based learning with backward design, the model ensures that students are actively engaged in constructing their own understanding of geographical concepts through real-world projects. This approach not only enhances their geographical literacy but also fosters critical thinking, collaboration, and creativity. The continuous evaluation and feedback loop embedded in the model provide teachers with valuable insights into students' learning progress, allowing for timely adjustments to teaching strategies. These elements are crucial for achieving the core competencies outlined in the middle school geography curriculum.

5. Implications for Teachers

To implement the UbD + PBL integrated model, teachers should:

Familiarize themselves with UbD and PBL methodologies and their integration.

Develop projects that align with curriculum standards and foster real-world connections.

Adopt diverse assessment methods to evaluate students' comprehension and competencies.

Foster student engagement, collaboration, and independent inquiry.

Regularly reflect on the model's effectiveness and make necessary adjustments.

By adopting the UbD + PBL integrated model, teachers can transform traditional geography classrooms into dynamic learning environments that foster students' core competencies and engagement. This model serves as a practical example for educators seeking to enhance their instructional practices and student outcomes.

6. Conclusion

Constructivism posits that knowledge is acquired by learners through the process of meaning construction within a certain context.

Traditional middle school geography classes, which are primarily lecture-based, lack situational meaning construction, leading to low student engagement and poor initiative, making it difficult to enhance core literacy. The
UbD + PBL integrated model combines the advantages of "teaching for understanding" and project-based learning. This model uses projects as the teaching vehicle, guiding the implementation of the project with predefined exit outcomes and assessment evidence, and integrates the project and evaluation throughout the teaching process. Through backward design, it strengthens the consistency of learning objectives, assessment evidence, and instructional design. This paper presents the application of the UbD + PBL integrated model in middle school geography classes with the teaching case of "I Promote Rural Revitalization with Agricultural Products," allowing students to deeply understand and master the impact of natural environmental characteristics on agricultural growth and local diet during the process of "I Promote Rural Revitalization with Agricultural Products," and to enhance their regional cognition and human-environment coordination views, and other core geographical literacies.
The UbD + PBL integrated model aligns with the teaching philosophy of the new curriculum standards and provides a new approach for the practice of middle school geography teaching from the perspective of core literacy. However, it cannot completely replace conventional classroom teaching. How to better integrate the UbD + PBL integrated model with geography teaching requires a further transformation of teaching concepts and improvement of professional literacy among geography teachers, who should continuously test and improve it in teaching practice.

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