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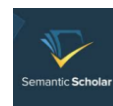


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Holistic Module Learning: A Revolution in Classroom Teaching

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“The freedom to make mistakes provides the best environment for creativity. Education isn’t how much you have committed to memory, or even how much you know. It’s being able to differentiate between what you know and what you don’t.”

— Anatole Franc

Abstract: *Since Comenius invented the classroom teaching mode centuries ago, classroom learning has experienced a succession of dramatic modifications. China’s educational progress is influenced more by traditional classroom teaching methods. Modern teaching methods place a greater emphasis on the role of students, as well as their experiences and lives. The ultimate goal of holistic module learning is to develop students’ abilities to inquire and learn on their own, which necessitates a significant shift in teaching approaches. Teachers’ primary role is to use available resources, establish optimum learning settings, and provide pupils with a variety of exploratory possibilities.*

Keywords: *Holistic Module Learning, Classroom Teaching, Education Reform*

CLASSROOM learning, as a key component of school education, has undergone a series of major reforms since Comenius created the classroom teaching mode centuries ago. These reforms led to existing traditional teaching modes and modern teaching modes, both of which have significant influences on classroom learning, with the former focusing on teachers’ role, teaching materials, and classrooms and the latter on students’ role as well as their experience and life.

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Historically, traditional classroom teaching modes exert greater influences on China's educational development. They emphasize teacher's impartation of curriculum contents and make students passive recipients of knowledge; The teacher dominates the classroom, while students have no opportunity to exercise their creativity; Teachers' role is constrained in classroom and the lack of teacher-student interaction after class leads to the difficulty of establishing emotional bonds between them (Bian, 2014). There is much room for improvement in traditional teaching modes.

In recent 30 years, primary and secondary schools in China have undertaken numerous reforms, pointing to the drawbacks of traditional teaching modes and witnessed some successful cases in this regard. Jiangsu Yangsi Middle School proposed a teaching model named "learning before teaching with more practice in class", in which a time limit is set for teachers' lecturing in class and students' major role in classroom is emphasized. Jiangsu Donglu Middle School integrates teaching and learning plans in their teaching model, asking students to conduct self-directed learning based on the plans before class (Lin & Jia, 2006). Shandong Dulangkou Middle School established a self-directed learning model famous for its "three characteristics, three components and six links," which provide students with abundant opportunities for classroom presentations to strengthen their presentation, interpretation, and commentary skills (Xue, 2019). Shandong 271 Education Group has been implementing a major reform under the holistic module learning model (Zhao, 2019). All these attempts contribute to the improvement of China's basic education, by transforming people's educational outlook and teaching methods at basic education levels.

Among the above reforms, holistic module learning is the most radical one. Many successful cases have emerged in the implementation of this learning model, and the fruitful practice of Shandong 271 Education Group is the most representative. Under the holistic module learning model, students' learning contents are presented in modules based on major concepts of the subjects; There are clear learning objectives and challenging and fascinating learning tasks to accomplish in the reintegrated modules; A switch from fragmental to structured learning takes place to improve students' learning efficiency; According to new curriculum standards and subject requirements for knowledge, skills and values, all relevant resources are integrated to develop students' key competencies.

The supreme goal of holistic module learning is to cultivate students' ability of inquiry and self-directed learning, which induces a great change in teaching methods. From the perspective of student learning, students become the major actors in the classroom; Autonomous learning and cooperative learning in groups are encouraged; Knowledge acquisition is replaced by exploration of problem solutions. Moreover, teachers' role also undergoes fundamental changes under this learning model, from knowledge imparters to classroom organizers and task designers. Teachers' critical function is to make the best of available resources, build ideal learning environments, and

create diverse explorative opportunities for students to help them realize comprehensive development (Zhao, 2021).

Holistic module learning is a highly significant revolution in classroom teaching. In this issue, the theory and practice of the learning model are examined in three articles, Holistic Module Learning: An Experiment in Teaching Reform of Basic Education in China (Zhao, 2022), Effective Design and Implementation of Task-Driven Learning in High School Physics: Citing the Lesson on Composition and Resolution of Forces as a Case Study (Xu et al., 2022), and Application of Educational Technology in Holistic Module Learning: Citing the Practice of Shandong 271 Education Group as a Case Study (Sun, 2022).

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Holistic Module Learning: An Experiment in Teaching Reform of Basic Education in China

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Abstract: *In the context of China's social transformation and educational reform, addressing the problems of fragmented and ineffective learning in traditional teaching modes and enhancing students' academic levels and developing their comprehensive abilities through structured classroom learning have become critical issues in educational reform. The holistic module learning model emerges in this context as the times dictate. It promotes the development of a systematic and holistic view of knowledge for all subjects by teachers and students. Students use major concepts to connect disparate knowledge, skills, and methods in order to develop a persistent and transferable understanding of knowledge and cognitive and noncognitive abilities. The purpose of this paper is to conduct a conceptual analysis of holistic module learning and to discuss its characteristics. The implementation strategies for this model are discussed, as well as the model's significance.*

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Keywords: Major Concepts: Module Learning, Holistic Learning, Self-Directed Learning

Introduction

THE holistic module learning model was developed during China's basic education reform. In the 1980s, the Chinese education community began to focus on the study of holistic module learning, and the model had a significant impact on teaching reform. Recently, as a result of the new curriculum reform, holistic module learning has emerged as a new trend in elementary education. It aims to overcome the shortcomings of traditional fragmented modes of instruction, to structure classroom instruction around major concepts in modules, and to develop students' higher-order skills such as inquiry and self-directed learning. Numerous successful implementation cases have emerged, the most illustrative of which is Shandong 271 Education Group's fruitful practice. Through its years of application, the holistic module learning model has aided in the reform of students' learning contents and methods as well as the enhancement of students' learning efficacy. The purpose of this paper is to define and elaborate on the three fundamental elements of holistic module learning, namely task-driven learning, situational experience, autonomous inquiry, and promotive transfer. The implementation strategies for the classroom procedure, group study, and assessment system are discussed, as is the model's significance in China's educational and teaching reform.

Conceptual Analysis of Holistic Module Learning

Teachers and students must employ major concepts to develop a holistic picture of information in each subject and combine different knowledge, skills, and methodologies in order for students to have a comprehensive and transferable understanding of knowledge. Major concepts, module learning, and holistic learning are the three basic elements.

Major Concepts

According to Ausubel's (1960) notion of "advance organizers," the rapid collection and development of knowledge in the new era demands people carefully pick significant concepts and prioritize them as critical information in their respective fields. They contribute to the development of frameworks for learning and knowledge transmission, hence increasing the efficacy of learning. Major ideas in the holistic module learning model refer to abstracted thoughts or laws derived from tangible information. They



make extensive generalizations about the nature and features of things, as well as the links between concepts. For example, the statement “the composition and structure of matter determine its qualities” is a significant notion concerning the links between the composition, structure, and properties of matter that are characteristic of being broad, abstract, universal, and far-reaching.

To stimulate students’ inquiry and discussion, learning with a focus on major concepts needs the development of basic questions that align with the module’s objectives. The fundamental questions are not intended to be answered by pupils using previously acquired knowledge. On the contrary, they are composed of open structures capable of eliciting prolonged thought about major concepts. With traditional learning methods, questions are so fragmented and limited in scope that students can rapidly locate ready-made or limited responses. This impairs kids’ ability to think critically.

Module Learning

Module learning is a teaching strategy that splits learning materials into broad modules rather than discrete and fragmented courses and integrates learning content and activities into a holistic process. This teaching concept was introduced into China following the May Fourth Movement (an anti-imperialist and anti-feudal movement initiated by patriotic youth in 1919, signifying China’s cultural transition into the Modern Era). Since then, the practice of preparing textbooks per unit (a teaching idea akin to a “module” in China) has continued until the present day. Module learning started to get more attention in the 1980s at all levels of school.

In module learning, a module is a set of related parts organized around a shared major subject or topic that functions as a reasonably self-contained unit inside the textbook. In learning practice, a module is a collection of well-organized learning exercises that serve a specific purpose. Additionally, the relationships between modules are emphasized to assist pupils in digesting learning materials logically and methodically.

Holistic Learning

Being holistic in this learning paradigm entails developing the module’s knowledge framework from a macro perspective and integrating the module’s interrelated knowledge elements. Holistic learning is a method founded on the ideas of mutual relevance between learning content and knowledge integrity and learner engagement. It promotes independent learning and the harmonious development of intelligence, emotion, and spirit through tactics such as situational learning, effective integration of instruction and practice, and the construction of thinking frameworks (Wang, 2019).

Holistic Module Learning

Based on the foregoing research, we conclude that holistic module learning is a student-centered learning paradigm that uses major concepts to re-integrate learning content while emphasizing learning autonomy and integrity. Task-driven learning, situational

experience, autonomous enquiry, and promotive transfer are the four distinguishing features of this learning approach. It aids students' understanding of core ideas, logical structure, and practical value of subject information, as well as cultivates students' thinking capacity through a comprehensive cognitive process that includes self-directed study, conversation, critique, application, and generation.

Characteristics of Holistic Module Learning

Task-Driven Learning

Task-driven learning is a constructivist-inspired method that breaks down learning materials into specific and quantifiable learning tasks in order to help students build problem-solving abilities through exploratory and cooperative learning (Xia & Hu, 2016). The task is a critical component of the holistic learning model because it connects the various stages of the teaching process and successfully addresses the issue of unfocused and fragmented classroom learning. When students acquire module content through specific tasks in situational contexts, their interest in learning is piqued and their self-motivation to study is boosted.

In this learning module, a task is an activity designed to help students achieve a learning objective. For example, when teaching "similar triangles" in junior secondary mathematics, the assignment is "measuring the height of the teaching building," which requires students to apply their knowledge of similar triangles to conceptualize, implement, and test the measurement method. There are numerous task types. They can be highly intellectual activities, such as giving a speech or mimicking a job fair, hosting a discussion, creating a picture, singing a song, having a concert, or playing a ball game.

The critical component of task design is self-driven, that is, establishing the internal motivation for a student to learn rather than being forced to study. Students' requests for additional knowledge and increased skills increase as they complete the work. The following principles should guide the task design process:

Educational

Open and relevant learning challenges should be created to increase students' competencies in core areas based on their prior knowledge.

Interesting

To create adaptable and appealing learning assignments, task designers should choose and use fascinating and understandable real-world scenarios.

Challenging

Tasks should be of a sufficient level of difficulty to require significant thought and careful execution. They should not be too simple for students to find ready solutions, nor should they be excessively difficult for students to finish.

Relevance

Students can build their own knowledge structure and improve their learning skills by completing assignments that focus on important topics and are clearly linked to the learning elements in the curriculum.

Integrity

In each lesson, there should only be one full task. Teachers should transfer task plans over to students after establishing the technique and instructions for tasks so that they can complete them independently and experience the activities' integrity. Teachers should respect students' intellectual abilities and avoid pursuing one-size-fits-all outcomes.

Situational Experience

Situational learning is a teaching approach that uses real-world situations to create instructional settings. Contextualizing learning encourages students' interest and initiative in the classroom. Teachers can create scenarios using physical items, visuals, activities, language, the linkages and conflicts between established and new concepts, and prior knowledge. The development of learning settings should incorporate a variety of aspects, including personal experience, subject-matter qualities, difficulties, and even emotion (Jia, 2000). Authenticity is the most crucial prerequisite for situation construction. Genuine experience has the potential to make learning both intriguing and effective.

Autonomous Inquiry

Genuine and comprehensive learning entails not only the completion of instructional materials but also self-directed inquiry, which may include questioning, criticism, collaboration, and discovery (Kang, 2017). Autonomous inquiry broadens students' conceptual horizons and piques their interest in the essence of things. Through comprehensive module learning, students develop their own understanding of the world through utilizing previous information. They establish the meaning of existence, discover the order of the world, and develop reasoning autonomously during this process. Teachers guide students' learning rather than limit their knowledge, practice, and imagination.

Promotive Transfer

The core feature of holistic module learning is its emphasis on knowledge transferability. It guides learners via a sequential procedure that results in information transfer. Students first acquire key knowledge for each module, guided by learning objectives; next, they expand their understanding of major concepts in practice through task implementation; and finally, it is transferred to and implemented in new learning scenarios. This learning strategy enables students to build higher-order thinking skills through the constant absorption of knowledge and the development of new knowledge through practice.

Implementation Strategies of Holistic Module Learning

Holistic module learning methodologies encompass not only classroom activities, but also students' self-organized group studies. Additionally, the multi-level evaluation method effectively facilitates the application of holistic module learning.

Creating a Standardized Procedure for Holistic Module Learning in the Classroom

In general, the classroom method for learning about a whole module is broken down into four stages: overall perception, inquiry and construction, application and transfer, and reconstruction and expansion.

Overall Perception

Students' remarkable experiences result in profound education. Teachers should present or create authentic settings for students to experience the context of learning activities and become self-motivated to pursue further investigation. In this first step, learning objectives and tasks are developed around the module's primary ideas.

Inquiry and Construction

Students define the knowledge, methods, and abilities that should be mastered in the current module through self-directed and cooperative learning. They establish critical links between knowledge points and abilities on their own. Students then investigate the logic of knowledge and develop the inquiry challenge.

Application and Transfer

Knowledge and abilities should be applied in relation to real-world demands, and learning challenges should be tailored to solve practical problems. Students constantly examine earlier teachings and renew their understanding, methods, and skills as they complete assignments in order to develop new ones. Additionally, they communicate ideas

based on freshly produced knowledge, methodologies, and abilities and apply them to novel social circumstances and issues. Such cycles of understanding and making can keep giving you new ideas about the subject's major concepts.

Reconstruction and Expansion

Students recall the module's primary concepts, evaluate the module's achievement of learning objectives, and describe problem-solving techniques by focusing on the module's major topics. Students reconstruct their knowledge structures, create mental maps, and optimize their learning methods across all topics by assessing completed activities, solved issues, and new gains.

Encouraging Students' Self-Directed and Cooperative Learning

Because one of the key goals of holistic module learning is to foster students' autonomy and self-regulation in the classroom, study groups are given a high priority. The study group's organization should be based on the principle of homogeneity between groups and heterogeneity within the group, which implies that each group should include people with a range of academic backgrounds, perspectives, learning styles, hobbies, genders, and personalities. Both individuals and groups have the option of determining the group's composition. The study group is the most fundamental organizational structure for implementing holistic module learning, with group study being the most prevalent type of cooperative learning. Additionally, each subject should have a specialty study group comprised of one student from each study group. As a result, each student in the class has the opportunity to join a specialty study group. They help teachers and act as academic leaders for group members in their assigned courses.

Prior to class, the specialty study group leader shall facilitate discussions about the module's learning contents and learning tasks, formulate the module's learning plan, objectives, and strategies with the assistance of the learning program, and then distribute the agreed-upon plan to each study group. Cooperative learning occurs in the classroom through study groups. Self-study, cooperative learning, and inquiry are alternated. Everyone thinks and talks freely, and eventually, the group reaches consensus on a certain question or topic. Following class, the study group uses evening self-study time or any other available time to assess each group member's learning outcome in order to ensure that team support is always available and that no student falls behind.

Establishing a Multi-Dimensional Assessment System

The school assessment system is crucial in influencing student learning. To facilitate students' holistic growth, the holistic module learning model assesses students' performance across multiple dimensions, including academic accomplishment, physical and mental health, personality development, and social skills. This is in contrast to tradi-

tional evaluation, which uses examination results as the sole criterion. Additionally, holistic module learning emphasizes formative evaluation over summative assessment. In a single term, a student's overall assessment consists of a weekly assessment, a monthly performance report, and a terminal assessment. Exam results alone cannot adequately reflect students' attitudes, commitments, learning styles, innovative dispositions, and practical abilities. Educational assessment is a valuable tool for assisting students in their learning. The use of a student-centered and multidimensional scientific evaluation system can make a big difference in competence-based education and the overall development of children (Gardner, 2008).

The Significance of Holistic Module Learning

Advancing Classroom Teaching Reform

The holistic module learning model shifts the emphasis of the teacher's class design away from imparting knowledge and toward developing student subject competence; away from accumulating knowledge and toward searching for the logic behind knowledge; and away from overemphasizing learning results and toward considering both the learning process and results. All of these modifications enable students to engage in deep learning. In typical classroom instruction, learning content is frequently fragmented into unconnected information points that lack organization, resulting in shallow learning and low efficiency (Chen & Tang, 2018). Deep learning, on the other hand, asks students to think about how different topics are linked and gives them a lot of tools for building their own knowledge structures and complex problem-solving skills.

Developing Brand New Teacher-Student Relationships

The classroom is student-centered rather than teacher-centered in holistic module learning. The teacher functions more as a designer of the learning process, integrating diverse curriculum resources and creating appropriate learning environments and engaging learning tasks for students, while students are the primary actors in the classroom, with ample time and space for self-directed learning, cooperation, and inquiry. This does not mean that teachers' workloads are reduced; rather, the teaching requirement that a greater emphasis be placed on the learning process than on the learning outcomes adds to the complexity of teachers' work. Additionally, the holistic module learning approach emphasizes and strengthens the relationship between teachers and students, necessitating increased professional capabilities. Thus, teacher-student connection and exchange contribute to their mutual development.

Prompting the Transformation of the Talent Development Mode

The purpose of conventional education is straightforward: to prepare students for school progression. However, teachers are supposed to place a greater emphasis on pupils' comprehensive and balanced development in terms of intelligence, skills, and personalities under the holistic module learning paradigm. They assist students in developing and implementing their learning objectives and in fostering their self-concept by guiding them through the metamorphosis from poor self-esteem to self-confidence and finally to self-reliance. Additionally, student growth is diverse and tailored depending on each kid's unique abilities and interests. In this learning style, the learner is viewed as an aim rather than a means. The incorporation of educational technology enhances the efficacy of holistic module learning in the development of individualized talent.

In sum, holistic module learning has the potential to not only change traditional learning methodologies but also pave the way for students' healthy and holistic development. It satisfies the core requirements of China's basic education curriculum reform and proves to be an effective experiment in teaching reform.

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Effective Design and Implementation of Task-Driven Learning in High School Physics: Citing the Lesson on Composition and Resolution of Forces as a Case Study

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Abstract: One of the primary characteristics of the holistic module learning model is task-driven learning. In this learning model, a task is a distinct activity or collection of distinct activities designed to assist students in achieving learning objectives. The purpose of this paper is to examine the effective design and implementation of task-driven learning using the composition and resolution of forces lesson as a case study. On the basis of the lesson study, the principles of task-driven learning design are summarized and some recommendations for task-driven learning implementation are made.

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Keywords: Task-Driven Learning, Lesson Study, Task Design, Task Implementation, Key Competencies

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Introduction

HOLISTIC module learning, a hot topic of discussion in China's education community, has emerged as a critical model for developing students' critical competencies. The contents of a subject are divided into large modules that correspond to the subject's major concepts, rather than into discrete and fragmented lessons, and the learning contents and activities are integrated into a holistic process that assists students in autonomously constructing their knowledge structure. Task-driven learning is a key characteristic of the holistic module learning model; it is a strategy for transforming abstract learning content into concrete learning tasks in order to increase students' engagement and motivate them to develop problem-solving abilities through exploratory and cooperative learning. The purpose of this lesson study is to investigate the effective design and implementation of task-driven learning in high school physics instruction, using the composition and resolution of forces lesson as a case study. In this paper, we expand on the lesson plan and detail a demonstration lesson on this subject. Based on the lesson study, we conclude several principles of task-driven learning design, including an emphasis on textbook content, connection to practical issues, and appropriate difficulty of tasks. Additionally, we make some recommendations for implementing task-driven learning, including allowing sufficient freedom of inquiry, providing appropriate guidance, emphasizing the trial process, and encouraging student interaction.

Task-Driven Learning Design

The 2017 Edition of the Curriculum Standards for Senior Secondary School Physics (2018) states that the goals of the high school physics curriculum are to reflect the essence of physics, to maximize its educational value in terms of physical concepts, scientific thinking, scientific exploration, scientific attitude, and responsibility, to play a unique role in the development of students' key competencies, and to lay the groundwork for students' lifelong growth in order to meet the challenges of social development in the 21st century. Additionally, the document suggests that diverse teaching methods be developed to assist students in comprehending fundamental physics theories, examining nature holistically, developing scientific thinking, and enhancing their capacity for scientific inquiry and problem solving. To foster students' capacity for

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self-directed learning, it is necessary to create learning environments that encourage active participation, a willingness to explore and experiment, and critical thinking; To foster students' awareness of social participation and responsibility, the curriculum design should emphasize the curriculum's connection to life, society, and scientific and technological development. This will keep students fully informed of significant scientific achievements and new scientific ideas brought about by contemporary scientific and technological advances, as well as the distinctions made by the technological application of physics. Additionally, to maximize the effectiveness of academic assessments in promoting students' learning and development, a diagnostic and incentive curriculum assessment system combining summative and formative assessments should be established. The assessment system should be multidimensional and equipped with scientific tools in order to account for individual differences and help students develop their self-concept and self-confidence.

The learning tasks are determined by the subject-related competency requirements, which are based on curriculum standards and textbook content. The module, "Interaction-Force," in the *Ordinary High School Compulsory Physics Textbook, 2019 Edition Volume 1* (2019), is critical to the theory of interaction and a critical component of the view of motion and interaction. Section 4, Composition and Resolution of Forces, provides a tool for calculating forces and acts as a critical link between the preceding three sections (on gravity and elasticity, friction, and Newton's third law, respectively) and Section 5, Balance of Concurrent Forces.

Composition and Resolution of Forces are divided into two sections in textbooks prior to the 2019 edition, and the experiment on the rule of resultant force is a confirmatory one titled "Verification of the Parallelogram Rule of Force." Nonetheless, in the new textbook (2019 edition), the confirmatory experiment is replaced by an exploratory one titled "Exploration of the Rule of Composition of Forces with a Certain Angle to Each Other," which is intended to fulfill the new curriculum design requirement of developing students' capacity for scientific inquiry. However, many teachers are unable to determine the underlying reason for this change, and as a result, they continue with their previous practice of conducting a confirmatory experiment in the first session and, more problematically, lecturing on second-order inference of force composition and resolution in the second session, addressing questions such as "What is the range of the resultant of two forces?" "How do I solve for multiple solutions, two solutions, non-solutions, and the optimal component force value given the resultant force?" "How is the magnitude of the resultant force related to the magnitude of the component force?" "How is the magnitude of the resultant force (or component force) related to the included angle's size?" Abstract and obtuse, such tedious technical generalizations do little to pique students' interests, much less assist them in meeting learning objectives.

The Composition and Resolution of Forces lesson design aims to maximize students' acquisition of knowledge and skills but also to foster the development of critical competencies such as scientific inquiry, scientific reasoning, scientific demonstration, critical thinking, innovation, and a scientific attitude and responsibility. To accomplish these goals, we designed this lesson around task-driven learning, with the primary

objective being to create a scientific cable-stayed bridge model with a high bearing capacity. Six learning activities comprise the task.

The first activity introduces the experiment and provides students with a fundamental understanding of the relationship between resultant force and component force. The class begins with a small game in which two students are asked to lift a parcel using two long ropes with a large included angle between the two component forces (undoubtedly, lifting the parcel in this manner will require considerable effort), while the teacher can easily lift it with one hand. Students' and teachers' forces have the same effect. Thus, the resultant and component forces concepts are introduced, and students are prompted to consider the relationship between the resultant and component forces: Equivalent substitution Students can easily conclude from experience that the composition of two forces is not equal to the sum of their values, which leads to the topic of study for the current lesson, namely the rule of force composition.

In activity two, the class clarifies and interprets the task's objective.

In activity three, students create experiment plans, organize themselves into experimental groups, and practice the four fundamental components of scientific inquiry: questions, evidence, interpretation, and communication.

Question: *If the composition of two forces at an angle to one another is not equal to the sum of their values, what is the rule?*

Evidence: *The class creates plans, experiments in groups, hypothesizes, and verifies using the equipment provided (wood board, rubber band, spring dynamometer, triangular plate, and pushpins, for example).*

Interpretation: *How will the hypothesis be proven? What can be deduced from the experiment? Can they provide an explanation for the questions posed in the lesson's introduction? Can they account for the composition of forces in other manifestations?*

Communication: *The class analyzes the experimental conclusion and its effectiveness. The teacher should explain to students that the parallelogram rule was not discovered in a single or two experiments and provide a brief overview of the work of Steven in the Netherlands and Newton in the United Kingdom in order for students to develop a scientific attitude and respect for scientific rules and laws.*

Students independently design experiments using the teacher-provided equipment. The questions are open for discussion and do not have predetermined answers, giving students ample opportunity for creativity and innovation. Additionally, hypotheses and verification are unresolved issues. The importance of students as class leaders is emphasized. Self-directed learning, cooperative study groups, and other strategies are used to foster a student-centered classroom environment.

Students are required to study the principle of the cable-stayed bridge in activity four. The teacher demonstrates the structure and benefits of cable-stayed bridges, using the world-famous Hong Kong-Zhuhai-Macao Bridge's channel bridge as an ex-

ample. When students are analyzing the fundamentals of cable-stayed bridge mechanics using the parallelogram rule of force, the teacher can inspire them by asking why such a long and heavy bridge deck does not bend or fall and why the cable tower does not tilt or break under extreme stress.

Students are required to construct a model cable-stayed bridge using wooden strips, cotton thread, and hot glue guns for activity five. Experimental teams will compete to create the most scientifically and visually appealing bridge model with the greatest bearing capacity.

The process of creating a cable-stayed bridge model is one of putting theory into practice. On the other hand, practice serves as a means of determining whether the theory is correct. During the model-building process, theory and practice validate one another.

Activity six provides an opportunity for experimental groups to display their Hong Kong-Zhuhai-Macao Bridge models and analyze the bridge's mechanics. The teacher should not be concerned with the quality of the models created by students, but rather should foster a relaxed and inspiring research environment in which students can express themselves freely and bravely. At this point, students may inquire, "Why isn't the bridge deck falling?" The answer is that the resultant force of multiple steel cables is oriented upward, and the resultant force is substantial. "How come the cable tower does not tilt?" (The answer is that the resultant force is oriented downward.) "Why are the majority of stay cables symmetrical?" (The answer is to ensure that the resultant force is vertical.) "Can the stay cables be asymmetrical?" (The answer is that by adjusting the tension on the steel cables, we can cause the resultant force to be oriented downward.) "How come cable towers are typically so tall?" (The answer is that when cable tensions are held constant, the smaller the included angle between component forces, and the greater the resultant force, and vice versa.) These questions are directly related to the application of force composition or force resolution and are easily understood by all students. Students acquire knowledge and develop skills and competencies while completing the assignment.

A Record of the Demonstration Lesson on Composition and Resolution of Forces

Activity One: A Lesson Introduction-The Relationship between the Resultant Force and the Component Force

Two strong students were chosen to pull up a mysterious parcel using two long ropes at an acute angle to one another, but they were unsuccessful. They could pull it up as they got closer together and the angle between the ropes became smaller. The teacher then approached the parcel and effortlessly picked it up with one hand. At this point, the teacher posed three questions: "How are the two students able to lift the parcel as the

angle between the two ropes narrows?” “Is that because they suddenly became stronger?” What is the composition rule for two forces that are at an angle to one another?

Observers’ Comment: *The teacher was successful in introducing the topic of study to the class – that is, the rule of composition of forces at a certain angle to one another, stimulating students’ desire to explore through self-created teaching aids, generating cognitive conflicts, and exposing students to a specific example.*

Activity Two: Identifying the Objective and Task of the Lesson

Students gained an understanding of the task and objectives of the current lesson by experimenting with the rule of composition of two forces at a certain angle to one another, building a cable-stayed bridge model with excellent bearing capacity based on the rule, and elaborating on the model’s advantages.

Observers’ Comments: *the module’s learning objectives were interpreted in such a way that students could complete the exploratory task within the context of the module as a whole, avoiding fragmented learning. Additionally, students were fully aware of what they needed to accomplish in class after identifying the lesson’s objectives and tasks.*

Activity Three: Exploring the Rule of Composition of Forces at a Certain Angle to Each Other

Students discussed and optimized their experiment plans in groups before conducting the experiment. After the experiment concluded, the experimental group demonstrated the experiment’s process and conclusion to the class.

Students: *Experiment plans were developed following extensive group discussion. Then, students attempted to exchange their responses to the three questions posed by the teacher in activity one.*

The Teacher: *The teacher guided the students in reflecting on their incorrect responses to his three questions and then having them discuss their experimental plans in groups to finalize them.*

Students: *Using equipment provided by the teachers (wood board, rubber band, spring dynamometer, triangular plate, pushpins, etc.), group members shared the work and collaborated to conduct the experiment, record the data,*

draw diagrams, and conduct analysis. Three groups were invited to the classroom podium to present their experiments.

Group Two's Presentation: Their experimental results confirmed that the parallelogram rule applies to the composition of forces. This group connected the two component and resultant forces, forming what appeared to be a parallelogram, and then verified their connection by translating the triangular plate.

Group Seven's Presentation: Their experimental results confirmed that the parallelogram rule applies to the composition of forces. This group constructed a parallelogram with two component forces as adjacent sides, with the parallelogram's diagonal essentially corresponding to the resultant force.

Group Nine's Presentation: Their experimental results demonstrated that the parallelogram rule does not apply to the composition of forces. Three trials were conducted by this group. They drew diagrams from the experiment data, but none were parallelograms.

The Teacher: after conducting at least three trials, the other teams reported the same experimental result as group two and group seven. This indicated that the experiment was successful in convincing students that the parallelogram rule governs the composition of forces. Students were prompted to consider the possible causes of Group Nine's incorrect result. Finally, the teacher informed students about the history of the rule of force composition, which was fraught with twists and turns, in order to emphasize to students that deriving a rule is never simple and requires a commitment to science.

Observers' Comments: Due to their cognitive limitations, tenth graders require guidance during exploratory experiments to ensure a controlled outcome. As a result, prior to the experiment, the teacher needed to guide students in locating answers to the following three questions: How can we ensure that the resultant force and component force are substituted in an equivalent manner? How do you calculate the magnitude of a force? How can the direction of force be determined? Additionally, students must discuss and optimize their experiment plans in groups prior to conducting the experiment. Students' natural engagement in the exploration indicated that they had received some pre-class instruction, but at a level appropriate for their age. The teacher was extremely concerned with the students' exploration process and allowed ample time for independent inquiry. Most importantly, the group presentation of results allowed students to express themselves freely and aided in the development of students' communication skills. Finally, students were introduced to the history of physics.

Activity Four: Examining the Mechanical Theory of Cables Stayed Bridge

This activity occurred following students' exploration of the rule of force composition. The teacher introduced the cable-stayed bridge structure briefly through pictures, and students used their prior knowledge of the rule of force composition to analyze the cable-stayed bridge's mechanical theory. In activity five, students would further their understanding of the theory by building the model. To maintain the integrity of the investigation, the transition from activity 4 to activity 5 was seamless.

Activities Five and Six: Making a Scientific Cable-Stayed Bridge Model with Perfect Bearing Capacity, as well as Discussing the Benefits of the Hong Kong-Zhuhai-Macao Bridge's Channel Bridge

The Teacher: The cable-stayed bridge structure was briefly explained through photographs, and students were provided with materials (wood strips, connecting wire, hot glue gun, knife, and thread) for building the models.

Students: Students first analyzed the mechanical characteristics of cable-stayed bridges before creating group models of cable-stayed bridges. All groups were invested in and fully engaged in the creation of models, which took on a variety of forms. Following that, four groups presented in turn their cable-stayed bridge models and discussed their advantages using the knowledge gained in this class. The other groups posed questions and justified their inquiries.

The Model by Group One: It possessed the greatest number of stay cables and thus the greatest bearing capacity. This is because the resultant force generated by each group of stay cables is determined by the stay cable's bearing capacity. The more stayed cable groups there are, the greater the bearing capacity.

The Model by Group Three: The height of the cable tower model resulted in a high bearing capacity because when the bearing capacity of the stay cable is fixed, the smaller the included angle between the stay cables, the greater the resultant force according to the parallelogram rule of force, resulting in a higher bearing capacity.

The model by Group Five: The cable tower model's stability is due to the symmetrical distribution of stay cables. The reason for this was that the angles between the stay cables and the cable tower were maintained consistently, and the resulting force was oriented downward on the cable tower.

The Model by Group Nine: Despite the asymmetry of the stay cables, the cable tower did not collapse. The reason for this was that the cable force could be adjusted by fine-tuning the bolts. As long as the cable tower's force is directed downward, it will not topple over.

The Teacher: The teacher then led a discussion with the class about why it took the two students so long to lift the parcel in activity one. Finally, students were asked to summarize what they learned in class and assess their achievement of learning objectives during the final ten minutes.

Observers' Comments: The assignment to design and construct a cable-stayed bridge model aided in the development of students' practical abilities. Their enthusiasm for learning was piqued by the situational experience. Apart from the acquisition of knowledge through model making, the teacher emphasized students' exchange and interaction. Additionally, some groups incorporated information from the classroom presentation and interaction into their bridge models after all class activities were completed. The teacher was wise not to interrupt their discussions and attempts to improve, but to allow them sufficient time to continue.

All students actively participated in class and focused on the task at hand, demonstrating the effectiveness of task-driven learning. While completing the task, students met their learning objectives in terms of knowledge acquisition and the development of scientific thinking. It was a student-centered class in which students were fully empowered and trusted, with ample time for discussion, exploration, and exchange.

Reflections on the Demonstration Lesson

Analysis of Data from Observations of the Demonstration Lesson

Table 1, a summary of data from observations of the demonstration lesson on composition and resolution of forces, shows that task-driven learning is effective in the overall implementation of the lesson (**Figure 1**). However, there is still potential for development in terms of learning objectives; students' critical thinking and autonomous knowledge production require more valuable questions.

The Teacher's Reflections on Task-Driven Learning

- (i) The key to achieving task-driven learning is to link activities to students' prior experience, practice, current societal challenges, or cutting-edge research and technology. Tasks should be useful and entertaining to increase student participation, which are two aspects of the task in this demonstration lesson.
- (ii) Task effectiveness is measured by whether or not learning objectives are met. Designing a task is not a mechanical process. All activities should be required to complete a task in order to achieve learning objectives.
- (iii) In competence-oriented task activities, teachers' trust in pupils frequently leads to unexpected outcomes. Students' successful learning can be aided by their interest in science, as well as their investigation of methodology and major topics in the discipline.

Table 1. Summary of Observations.

Time	November 23 rd , 2021						
School	Weifang Experimental High School						
Class/Grade	Class 32, Grade 10						
Teacher	Cheng Jin						
Lesson	Composition and resolution of forces						
Subject	Physics						
Observers' Assessment Scoring (0-5)							
Perspectives	Observation Record	Observer 1	Observer 2	Observer 3	Observer 4	Average Scores	Average Scores of Each Activity
Lesson Introduction	1. Does the introduction help motivate students' active learning?	5	5	4	5	4.75	4.75
	2. Is the introduction closely related to learning contents?	5	5	4	4	4.5	
	3. Are the questions raised in the introduction reviewed and answered in the end?	4	4	4	4	4	
Learning Objectives	1. Are learning objectives scientifically appropriate?	5	4	5	4	4.5	4.5
	2. Do learning objectives follow the principle of knowledge internalization and generation in practice?	5	5	4	4	4.5	
	3. Are learning objectives assessable?	5	5	5	5	5	
	4. Are learning objectives student-centered?	5	5	5	5	5	
Situation Setting in the task	1. Is situation setting related to life, society, and scientific and technological development?	5	5	5	4	4.75	4.875
	2. Is the situation experienced by students?	5	5	5	5	5	
Task-driven	1. Is everyone involved in the task?	5	5	4	5	4.75	4.8125
	2. Are students involved throughout the lesson?	5	5	5	5	5	
	3. Do students have the freedom of choosing their own ways of implementing the task?	5	5	5	5	5	
	4. Is students' learning self-directed?	4	5	5	5	4.75	
Effectiveness of Task	1. Are exploration activities centered on the actualization of learning objectives?	5	5	5	5	5	4.875
	2. Achievement of objectives after the task fulfilled?	5	5	5	5	5	
	3. Does students' newly-generated questioning point to learning objectives?	4	5	5	5	4.75	
	4. Is the task informative, cooperative, and educational?	4	5	5	5	4.75	
Teaching Efficacy	1. Does the teacher put balanced weight on knowledge imparting, methodology, results and learning process?	5	5	5	5	5	4.6875
	2. Does the teacher have enough confidence in students and give them enough freedom in exploration?	5	4	5	5	4.75	
	3. Scientific errors avoided?	5	5	5	4	4.75	
	4. Any valuable questions posed to induce students' reflection & construction?	5	4	4	4	4.25	

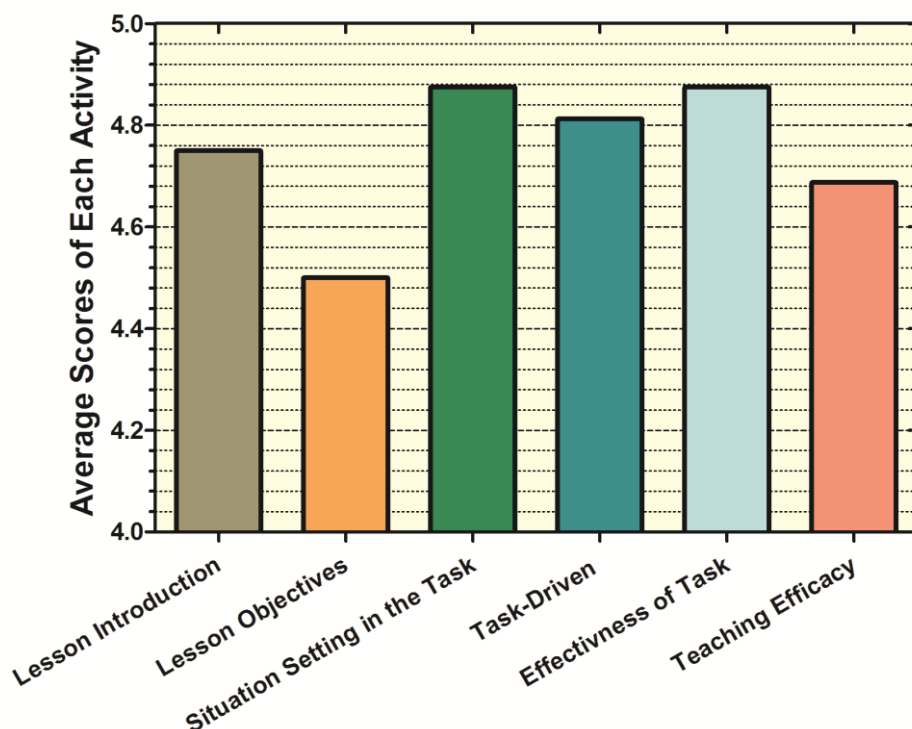


Figure 1. Result of Observations.

- (iv) Prior to the class, assignment design requires an understanding of the students' knowledge background. For example, in this situation, tenth graders are not yet proficient in trigonometric functions, so students received suitable trigonometric function training prior to class to better address physics challenges.

Conclusions of the Lesson Investigation

The results of this lesson show that task-driven learning can inspire students' enthusiasm for investigation, equip students with a broad vision of inquiry, and help them build higher-order thinking skills. Students are completely involved in classroom activities and acquire a pro-active learning attitude through task-driven learning. It has become a necessary step in achieving crucial competencies.

(i) Task-Driven Learning Design Principles.

Effective task-driven learning, according to Xia (2018) of the Shanghai Academy of Educational Sciences, can offer learners a broad vision of exploration. It can help stu-

dents not just become more self-motivated but also engage in more persistent and in-depth thinking and inquiry. Based on the summary of data from the observations of the demonstration lesson on composition and resolution of forces, we conclude the principles of task-driven learning design as follows:

(ii) The importance of textbooks in task design should be emphasized.

Experts undertake extensive analysis and demonstration of the chosen cases when compiling textbooks, so the contents of textbooks are worth studying before planning the work. To avoid the impact of teachers' arbitrary selections, curriculum criteria should be reviewed to ensure that the job is founded on a realistic foundation.

(iii) The tasks should be goal-oriented.

In task design, the teacher must specify the learning objectives, concrete requirements, and basic procedures so that students may concentrate on task implementation and know how to proceed smoothly. As a result, even when students are performing independent exploration, the lesson can proceed in a structured manner.

(iv) Tasks should be linked to real-world concerns.

One of the most important reasons for studying physics is to find solutions to difficulties that arise in everyday life and at work. Only when the work is linked to reality can children develop a great drive to investigate and feel a powerful feeling of accomplishment when they attain the desired outcomes. Students can engage in a more in-depth learning process by using a reality-based assignment that takes them from phenomenon to questioning, analysis, experimentation, transfer, and transformation.

(v) The tasks should be hard while also being appropriate for the pupils' academic level.

Teachers must include a certain amount of difficulty in activities so that students will try to make the most of what they already know and collaborate with their classmates. Students improve their communication and teamwork abilities as they complete activities. The task's difficulty, on the other hand, should not exceed the students' existing academic level. Their enthusiasm for studying will wane if they feel overwhelming frustration and futility.

Suggestions for Task-Driven Learning Implementation

Task-driven learning requires effective implementation to ensure that learning objectives are met. As a result, we offer some recommendations for maximizing the benefits of task-driven learning for students.

(i) Providing Pupils with the Ability to do Independent Research.

Students are motivated to achieve a clear and precise goal through self-directed inquiry and group cooperation in task-driven learning. The teacher should have complete faith

in their ability and knowledge. Students would have simply followed the teacher's conduct in the current lesson study if the teacher had directly instructed the students on how to do the experiment by playing videos or personally demonstrating it, and the experiment would have turned out to be a confirmatory rather than an exploratory one, which did not help cultivate students' ability to divergent think, inquire, and cooperate. As a result, teachers must use extreme caution when interfering with pupils' independent activities.

(ii) Providing Suitable Guidance to Students.

Showing faith in kids, on the other hand, does not excuse teachers' inaction. The teacher should be involved in the students' group work as an advisor and observer while they complete the task. They may run into a variety of issues during their exploration, some of which they will be unable to address on their own. Rather than providing students with ready solutions, teachers should give them some indications ahead of time and help them think about what to do next.

(iii) Paying Attention to the Job Fulfillment Exploration Process.

The exploratory process of completing the job is crucial in the development of pupils' overall competency. In class, the teacher should give pupils enough time to complete their work. Some groups and students may not be able to complete the activity within the allotted time. The teacher should not pressure students to finish the assignment by telling them what to do in these situations. Instead, the teacher should emphasize to them that the work they put in during the learning process is more important than the outcome. Even if pupils do not complete the job to the required standard, their competence has increased, and their curiosity about the subject has remained.

(iv) Encouraging Collaboration and Sharing Among Study Groups.

When students complete exploratory tasks successfully, they are eager to share their findings. The group responds to questions from the rest of the class, explains how they apply the theory to group work, and listens to comments and ideas from the other groups during their presentation of their work results. Following the debate and communication, the group members will be motivated to make improvements to their work. This is a good example of using freshly gained knowledge to solve new difficulties.

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Application of Educational Technology in Holistic Module Learning: Citing the Practice of Shandong 271 Education Group as a Case Study

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Abstract: With the rapid development of the Internet and other related technologies, the educational community has come to accept the use of educational technology in the classroom. Its innovation not only transforms teaching techniques but also expands students' channels and resources for learning. This article explores the use of educational technology in front-line teaching using 271BAY, an online educational platform developed by Shandong 271 Education Group. The use of 271BAY in the holistic module learning approach is discussed in detail.

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Introduction

WITHIN the context of the Internet's rapid expansion, modern educational technology has emerged as a critical vehicle for student autonomy, school teaching, and management digitalization. Modern educational technology may significantly improve learning efficacy, assist in correctly tracking students' progress through their learning activities, and give critical support for tailored learning. This article demonstrates the effective implementation of 271BAY technology in holistic module learning at Shandong 271 Education Group in China. The purpose of this paper is to describe the components and functions of 271BAY and to discuss its supportive roles in holistic module learning, using the teaching plan for Module 4, the Kingdom of the Rule of Law, in Morality and Rule of Law (a junior secondary school course) as an example.

A Profile of 271BAY

What is 271BAY?

271BAY is a 271 Education Group-developed open, autonomous, and intelligent online learning community. It is a learning ecosystem guided by Internet thinking and supported by information technology that satisfies students' need for personalized and self-directed study. As a product of the new era, 271BAY is always evolving, with each user serving as its producer and sharer.

By integrating Internet and information technology technologies into curriculum development, 271BAY enhances, enriches, and renovates the curricula of schools in the Shandong 271 Education Group. It effectively improves students' IT literacy and technological application skills by emphasizing comprehensive IT practical courses and AI courses. Educational practices such as maker education, interdisciplinary study, and project-based learning all contribute to the development of students' abilities to integrate resources, problem solve, and innovate.

271BAY's Fundamental Components

271BAY is a critical component of the intelligent cloud platform for schools, offering a strong technological foundation for students' self-regulated learning. The 271BAY learning community is made up of three components: a task system (courses, homework, and exams); a measurement system (rules, tools, and so on); and an assessment output system (review, feedback, comments, etc.). Numerous subjects such as national culture, classroom learning, scientific and technological newsletters, physical and mental well-being, creative aesthetics, social practice, and self-regulation are covered.

Teachers and students can access both external teaching resources from the Internet and high-quality teaching materials posted by teachers from Shandong 271 Education Group schools via the 271BAY platform. 271BAY's multilayered resource drive

promotes layered teaching and student autonomy. 271BAY facilitates students' individual search for and integration of learning resources, stimulates their autonomous learning and inquiry, and encourages them to collaborate with like-minded peers and share learning outcomes willingly.

Nan Zhao, Xinyi Zhou, Bo Liu, and Wei Liu (2020) report in their study that modern educational technology can accurately record any data in all teaching activities according to educators' and students' needs and conduct in-depth analysis of teaching practice to help educators make more scientific teaching decisions. 271BAY maintains a comprehensive record of pupils' learning and growth. It assists students in developing a growth model based on data analysis by gathering classroom data, after-class learning data, and life and health data.

The growth of students is dynamically shown through various digital records, and real-time outcome assessment is provided via the network. Throughout this process, parents can monitor their children's development in real time, getting statistics on their growth that they can use to guide their children's development.

271BAY's Fundamental Functions

Supporting Students' Personalized Development

Existing research demonstrates that educational technology is critical for raising students' academic levels. It has the potential to successfully reorganize and combine fragmented educational data, diversify instructional practices, and establish classroom patterns that better fit students' individual requirements (Xia & Li, 2020). 271BAY's ultimate mission is to make individualized learning accessible to every student. It strives to accommodate the diverse learning needs of all students, to enhance the learning experience, and to provide a more equitable and effective quality education system. 271BAY enhances the learning environment and transforming student learning processes, 271BAY enhances the mobile Internet and information technologies. As a result, children can learn independently and effectively, and instruction can be made more engaging and effective.

Using the Internet, the Internet of things, mixed reality, and artificial intelligence, 271BAY collects instantaneous academic, behavioral, and emotional data from students in order to create a thorough picture of their evolution. Additionally, it may be used to develop a self-adaptive learning system based on large data and extensive curriculum resources, as well as generate individualized learning environments and evaluation systems.

Facilitating Teachers' Development

Teachers are the pioneers and architects of 271BAY's growth. They learn and benefit from it, as well as contribute to its creation. Teachers can enhance their self-management abilities, innovative capacity, and information technology literacy by en-

gaging in 271BAY research and development and by implementing 271BAY technology. Teachers may construct an online learning community with the support of 271BAY, develop a new data-driven teaching and research model, and become explorers and practitioners of competence-based education and teaching.

Tian et al. (2021) argue in their study that educational technology can aid in the development of a comprehensive and objective assessment model by continually stimulating teachers' enthusiasm for their work, encouraging teachers to improve the quality of their teaching and research, and cultivating teachers' dispositions toward self-discipline and introspection. With the assistance of 271BAY, a profile of teachers' development can be established based on data on teachers' educational and teaching practices and outcomes, as well as teachers' research and training, thereby assisting in the improvement of teacher performance assessment and upgrading mechanisms, as well as cultivating teachers' willingness and abilities for lifelong learning in their professional development.

Promoting Intelligent School Administration

271BAY integrates "intelligent education" into the school administration's overall planning and provides extensive and effective links between educational and social databases, thereby expanding the space and time available for education. It accelerates the development of digital campuses in Shandong 271 Education Group schools and promotes the adoption of digital applications on campus.

The school administration system can be improved based on Internet attitudes and information technology. Networks and intelligent terminals are used to manage the office. All evaluations of project management are created automatically, resulting in significantly increased administrative efficiency.

271BAY advances the educational management system in the Shandong 271 Education Group, raises the group's level of modernity, and provides the groundwork for a large-scale worldwide education group.

271BAY and Holistic Module Learning

Holistic module learning is a student-centered instructional methodology that divides learning materials into big modules rather than discrete and fragmented courses and integrates learning content and activities into a holistic process. It is characterized by task-based learning, situational experience, autonomous inquiry, and promotive transfer. Its objective is to cultivate students' capacity for self-directed learning and inquiry through an integrated cognitive process that includes self-directed study, dialogue, criticism, application, and generation. In general, the classroom technique for holistic module learning consists of four stages: overall perception, inquiry and construction, application and transfer, and reconstruction and expansion.

In practice, combining 271BAY with holistic module learning boosts students' learning autonomy even further. 271BAY is a coordinated, open, autonomous, and in-

telligent learning community that exists both online and offline. With teachers uploading module learning programs to an online platform, the traditional mode of instruction in which teachers assist students in constructing the knowledge structure is replaced by one in which students construct the structure independently, and the teacher-controlled learning process is transformed into self-regulated progress. Students can now tailor their resources and learning progress to their individual needs.

A Case of 271BAY Supporting Holistic Module Learning

Using module four, the Kingdom of the Rule of Law, from Morality and the Rule of Law (Volume 2 in Grade 7), we demonstrate how Shandong 271 Education Group, with the support of 271BAY, implements holistic module learning to promote students' self-directed learning and inquiry competencies.

Learning Situation Analysis and Contents of the Module

Analyze the Learning Situation

Grade 7 is a critical stage in the development of students' moral and legal consciousness. Students in junior middle school have heard about the country's rule of law but have had limited opportunity to practice and participate in it. They have a limited understanding of how the law is formulated and how it functions. Teachers should respect students' prior life experiences, establish a good classroom learning environment, and assist them in constructing new ones based on their qualities and cognitive abilities.

Module four begins with the recently enacted Civil Code of 2021 in order to evaluate the genesis, function, and application of the law. Students are prompted to examine topics that are directly relevant to reality, such as objects hurled from high buildings or whether or not to assist a fallen elderly person, using Civil Code regulations as a guide. Consideration and comprehension of the means by which laws are implemented contribute to their increasing knowledge of morality and the rule of law and to the formation of moral and legal habits. This enables students to develop into competent citizens in the future. In this way, the whole module design is used to accomplish educational objectives within the overarching concept of the rule of law.

Contents of the Module

The Kingdom of the Rule of Law module covers the qualities of law, its role, the importance of the rule of law, the specific legal protection afforded to minors, and the imperative that pupils have an awareness of the rule of law. As a result, the module's central idea is the rule of law, from which all other concepts in this course are derived, including patriotism, equality, freedom, justice, and harmony.

The following four learning objectives are underlined for students in this module:

- Create a mind map focused on the Kingdom of the Rule of Law, summarize fundamental concepts such as the nature and purposes of law, legal protection for children, and the prerequisites of the rule of law, and explain a rudimentary grasp of law using real-world examples.
- Using 271BAY materials, investigate and summarize the importance of the rule of law in personal, societal, and national development, as well as the unique requirements for people and nations in terms of the rule of law.
- Make some fair proposals for the rule of law in order to aid in the establishment of the rule of law in China.
- Reconstruct the Kingdom of the Rule of Law's mental map from three perspectives: what, why, and how to do, and be able to apply the law to real-world problems.

After establishing objectives, this module's learning proceeds through the procedural stages of overall perception, inquiry and construction, application and transfer, and reconstruction and expansion. Each step has a distinct objective. We focus on overall perception in this paper in order to demonstrate how students learn about the qualities and functions of law, as well as the significance and requirements of the rule of law, and to construct a knowledge structure for this module using 271BAY technology.

Learning Procedure

At the stage of overall perception, students begin by learning that the law is inextricably linked to our daily lives and then gradually delve deeper into the sources, characteristics, functions, and requirements of the law. Through the use of concrete examples, it is vital to assist pupils toward an understanding of the significance and value of the law to people, society, and the nation. By analyzing specific legal provisions and situations, students gain a better understanding of the importance of the law and the rule of law, thus increasing their awareness of the rule of law and their engagement in public affairs.

Preparation before Class with the Aid of 271BAY

- Students are asked to undertake advance research on legal topics on weekends using the provided 271BAY materials, which include films of Civil Code legal provisions and their interpretation and execution. They can submit questions via the 271BAY platform's "My Questions" option, which will be collected by teachers prior to class.
- Before class, students are divided into study groups, and the course monitor and group leaders are instructed. The course monitor's responsibility is to remind classmates to prepare for class by reading the assigned texts and other 271BAY materials distributed by teachers. The specialist study group leader

is responsible for collecting questions and issues of interest for teachers regarding this module and communicating them to group members.

Classroom Activities Supported by 271BAY

According to constructivist learning theory, the purpose of education is to aid students in constructing new experiences from previous ones. Teachers develop learning settings for the module of Kingdom of Rule of Law in the light of the new Civil Code's promulgation and supplement classroom activities with extensive resources from 271BAY.

- Activity number one is a competition of legal knowledge in real life.
- Each student gathers at least five existing laws and two well-known cases over the course of a weekend through internet research, visits, and interviews.
- Students present and explain their understanding of the efforts made in recent years to promote the rule of law in China.

Students attempt to comprehend the role of the law through the examination of individual legal instances and legal provisions. For example, the Law on the Protection of Minors and the Law on the Prevention of Juvenile Delinquency are two unique laws aimed at protecting minors, demonstrating the intimate connection between laws and life. The study group leader organizes group members to show gathered legal provisions, rule of law stories, pertinent instances, and their interpretations on the 271BAY platform, which students use to develop an initial impression of the function of law in their lives.

- ***Activity two: Literature review and intensive reading***

A preliminary understanding of the entire module is achieved through rigorous reading of the textbook and resources from 271BAY, as well as through group discussion, inter-group interchange, and teacher commentary. Students identify critical and difficult aspects and establish their own judgments during this process. Their capacity for self-directed learning is significantly enhanced. By now, students should be able to comprehend the major concept of "rule of law" in this module using their own examples and terminology, as well as identify the characteristics and roles of law, the requirements and relevance of the rule of law, and the specific protection for minors in China.

- ***Construction of a Mind Map Is the Third Activity.***

Due to students' difficulty in articulating the relationships between law and the rule of law, personal behavior and the rule of law, and the rule of law and the rule of virtue, teachers designed activity three to guide students through the processes of independent review, group cooperation, display and sharing, and exchange and supplementation. The mind map should be centered on the major concept of the rule of law, with examples and a knowledge structure of at least three levels, preferably included.

During this procedure, the study group leader will lead the group in discussing, exchanging, supplementing, and improving the mind map, as well as photographing and

uploading the enhanced mind map to the 271BAY platform. Thus, the mind map can be compared to those of other groups and adjusted as a result of group discussion. Students obtain a general understanding of the curriculum with this task.

- ***Passing the preliminary examination***

Teachers recommend that students complete the 271BAY-sponsored test and check their scores online to measure their understanding of basic topics in this module. Passing the test indicates that you have a firm grasp of the fundamental concepts and are prepared to go on to the next stage of study.

Conclusions and Prospective

In the case study, the importance of 271BAY in holistic module learning is well demonstrated: 271BAY enhances students' learning interests and diversifies learning activities, resulting in the substitution of active inquiry for passive learning. 271BAY's extensive learning tools extend students' horizons, allowing them to construct a holistic knowledge structure. The use of 271BAY allows for more efficient interactions between students and teachers, as teachers can always provide students with timely feedback.

The addition of technology to classroom teaching does not constitute a merger of online and offline education. 271BAY supports holistic module learning by maximizing the benefits of online resources and mobilizing students' initiative to make learning more efficient and lively.

Nonetheless, we continue to value the benefits of traditional learning techniques characterized by instructor guidance, motivation, and oversight. In the future, when designing and implementing 271BAY technologies, we will stick to the philosophy of combining the strengths of both traditional and digitalized learning modes. Although there is a strong movement toward transitioning to a student-centered class, the teacher-dominated class is still prevalent in Shandong 271 Education Group. We're still looking into how well the two modes can work together. The creation of the 271BAY learning community was a successful attempt to find a balance between these two types of instruction. Shandong 271 Education Group is dedicated to helping kids improve their self-control in school and in life. On the other hand, absolute autonomy in learning may impede pupils' systemic mastery of knowledge. In this context, educational technology can be used to regulate and change the degree of autonomy of students and teachers, as well as assign different control powers to students and teachers based on certain learning activities. Shandong 271 Education Group schools will do additional research in this area.

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Optimizing Assignment Design for Primary and Secondary School Students

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Abstract: One of the most essential connections among all assignment tasks is assignment design. The design of high-quality assignments is critical to achieving successful homework outcomes. This study explores the existing research on the roles of assignment design and highlights the current state of assignment design in China's primary and secondary schools. In terms of assignment loads, content, formats, and stratification, suggestions are made.

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SCHOOL assignments are an integral part of educational activities. They supplement classroom instruction. They are an integral part of student learning and assignments that students must do independently. The quality of an assignment's design is a significant factor in determining how well it is completed. Enhancing assignment design involves both theoretical underpinnings and effective design techniques. This paper examines existing issues with assignment design in primary and secondary schools in China and makes recommendations for improving assignment design. These include limiting uniform assignment loads and increasing student discretionary study time, diversifying assignment content and forms, and utilizing educational technology to adjust and personalize assignments.

Connotations and Functions of Student Assignments

Assignments serve as extensions of classroom learning, consolidating memorization and stimulating information application through various methods such as recalls and linkages. Teachers receive feedback on their instruction via assignment scores and adjust their instruction accordingly (Zhang, 2017). There are preparation assignments prior to class, in-class assignments, and post-class assignments to review. There are three types of assignments: in-class tasks, homework, and social practical exercises. Additionally, school tasks can be spoken or written. Each assignment has a distinct purpose.

Consolidating classroom knowledge is the most widely acknowledged function of school assignments. According to researchers, assignments are extensions of classroom learning, systematizing what is learned in class and enhancing students' comprehension and memory of the material (Hu, 2019). Following a learning activity with a specified number of exercises enables students to apply basic knowledge, transform it into components of their knowledge structure, and build their thinking capacity.

Assignments, like examinations, serve as assessment instruments. This function bestows the tester role on assignments. Tulving's experiment established the usefulness of testing in retaining knowledge memory (Tulving, 1985). Based on Tulving's experiment, researchers evaluated a variety of exams (assignments included) and discovered that people who had encountered the tests had a higher level of memory retention than those who had learned without encountering any tests (Kang, 2007; Zhang et al., 2008). As with any other test, assignments show a student's level of understanding. By assessing students' assignments, teachers can determine students' understanding of content, analyze the root causes of issues, and assist students in identifying solutions.

Assignments also have an effect on students' development of different abilities and family relationships. Ramdass and Zimmerman (2011) concluded from their research that homework can help students develop self-management skills. They thought that homework stimulates students to continue their learning efforts, assists them in developing learning techniques, and strengthens their ability to concentrate, self-regulate, and manage their time effectively. Additionally, schoolwork strengthens family ties. Students can perceive a strong bond between their families and schools as a result of their parents' interest in and attention to their academic work (Cooper, 1989).

Currently, there Exist Issues with Assignment Design

Assignment activity is comprised of five primary components: assignment design, assignment completion, assignment marking, comment on assignment results, and assignment review. Among them, assignment design takes the lead, as well-designed assignments can alleviate excessive schoolwork and boost students' overall growth. A detailed assessment of the assignment design status quo in China's primary and secondary schools reveals the following difficulties:

Unreasonably High Assignment Loads

Student assignment loads are often quantified in terms of the total amount of time spent on homework each week, a method widely recognized by researchers due to the difficulty of quantifying assignment loads in terms of pieces of work, word count, or pages (Li & Xu, 2012; Hu, 2019). Additionally, some studies quantify assignment load using two additional terms: frequency (how frequently the teacher offers homework) and duration (how long it takes to complete each assignment) (Cooper, 1989). According to the 2015 results of the Program of International Student Assessment (PISA), each Chinese student spends an average of three hours a day on homework, twice the global average and three, four, and six times that of their French, Japanese, and Korean counterparts, respectively (OECD, 2016). According to PISA 2018 results, the average amount of time spent studying by Chinese students is likewise the highest in the world, at 57 hours per week, 44 hours more than the OECD average (OECD, 2019).

Monotonic Assignment Contents and Forms

Current tasks are typically limited to exercises from textbooks and additional materials. Wang (2012) discovered that teachers frequently provide repetitive activities as homework and that there are few assignments with expanded substance. However, mindless replication of textbook exercises and teaching materials detracts not only from students' motivation to complete assigned work, but also from their development of divergent thinking, which is detrimental to growing students' innovative consciousness and practical ability.

Additionally, homework can consist of both practical tasks and written assignments; it can be assigned individually or in groups. Nonetheless, the majority of schoolwork is now required to be done independently and in writing. Wang (2012) observed that the majority of students complete their schoolwork independently, with little assistance from others. According to a survey of five Chinese provinces, elementary school pupils in China today receive the majority of their homework in the form of written assignments, with no oral presentations, appreciations, or practical tasks (Ren, 2015).

The Uniform Difficulty of Student Assignments without Stratification

Assignments are classified according to their relevance to different students and to the assignment options available to students at various academic levels. Given the academic foundations and learning abilities of pupils, assignments of uniform difficulty cannot suit the learning demands of all students. However, due to the large class sizes prevalent in the majority of Chinese institutions, the teacher frequently assigns the same homework to the entire class. As a result, advantaged students' learning abilities cannot be fully developed through assignment completion, while underprivileged pupils are forced to battle with homework that is excessively difficult for them (Chen, 2021).

Suggestions for Increasing the Efficiency of Student Assignments

Create Manageable Assignment Loads

A time restriction for uniform assignments must be established for pupils in different grades. According to data research, there is an appropriate assignment load for pupils in each grade. Cooper (2001) discovered that homework has varying effects on academic performance among kids of various ages, with the biggest influence on senior high school students, the smallest effect on junior high school students, and no effect on primary school pupils. Cooper and Valentine's (2001) findings showing there is minimal association between the amount of homework completed by pupils of young ages and their academic progress bolstered this conclusion. For older student groups, the effect of homework burdens increases with age. At X School in Jiangsu Province, a strict policy is in place to control assignment loads. For first and second graders, there are no written assignments; for children in third through sixth grades, there are no more than 60 minutes of assignments. Tasks for students in grades 7-9 are limited to 90 minutes; all assignments must be completed in a self-study class.

Additionally, teachers must ensure that students have adequate study time. It is widely known that each grade level has an appropriate period of assignment time. Another point worth noting is that each student's requirement for assignment time is unique (Wang, 2015). Apart from establishing an appropriate load of uniform tasks, we must also consider students' requirements for discretionary assignment time, or time for students to complete academic work at their leisure. Therefore, teachers should not just cram their planned assignments into students' after-class time, but rather actively help students in making the most use of their homework time and completing their own after-class chores in accordance with their learning settings. In this manner, students may fine-tune their study techniques and learn to manage their time more effectively.

Enhance the Content of Assignments and Diversify their Formats

Another point worth exploring is how assignment design can assist in piquing students' interest in studying. Wang and Zhang (2016) concluded, after examining 33,000 homework records, that student interest in homework has a greater impact on academic progress than homework load. As a result, assignment design should prioritize piquing students' enthusiasm for studying. Enhancing the substance of assignments and incorporating new formats might help students maintain a proactive and enduring learning attitude.

Appropriate assignment contents guarantee that students achieve the assignment's objectives. The assignment's content should closely correspond to the learning objectives and be relevant to real life. When students make the connection between assignments and life, assignments become more relevant to them, and they devote more attention to completing academics (Wang & Zhang, 2014). Additionally, diversification of materials contributes to the enrichment of assignment content. Teachers should broaden the scope of assignment materials in accordance with existing instructional objectives and content. Any readily available materials that contribute to the achievement of the objectives can be incorporated into the assignment design, including students' prior life experiences, community events, social and environmental phenomena, and so on (Lu, 2012).

Not only can a variety of assignment types increase students' interest in homework, but it also helps lessen students' feelings of academic stress. Apart from conventional assignments that emphasize knowledge comprehension and memorization, other engaging and difficult kinds of assignment design, such as projects and inquiries, should be incorporated to help students enhance their thinking talents, skills, and competence. A diverse range of assignments stimulates students' enthusiasm for learning, broadens their vision, and develops their capacities for inquiry and innovation.

Improve Learning Efficiency by Utilizing Data Collection and Analysis Technology

Prompt feedback on assignment results is critical for academic performance improvement. According to several studies, online assignments with prompt feedback are more efficient and successful than traditional assignments (Mendicino et al., 2009; Singh, et al., 2011; Zhao, 2017). Due to their detrimental effect on student development, the majority of primary and secondary schools in China have begun to phase out the use of intelligent devices such as iPads and smart phones for assignment fulfillment. How can we enhance the timeliness of assignment feedback without altering the current practice of students answering questions on paper and teachers' marking with red pens? The solution may lie in data acquisition technology.

As with the answer collection technology that has been widely employed in large-scale examinations, assignment data collection employs scanning technology, but at a greater frequency (regular data collection of daily, weekly, or unit assignments), a faster collection speed, and a higher recognition rate. After students have completed the written responses to the questions, they spend a few minutes (2-5 minutes) filling out

the weekly or unit assignment data gathering cards. Similarly, scanning the acquisition cards takes teachers only a few minutes (no more than five minutes). They are obligated to provide timely feedback on the findings of data collection.

The collected data can be used to tailor assignments to students' academic levels. The stratification of assignments according to age groups has been studied in detail. However, there is no indication that these research findings apply to individual members of the organization. For example, Cooper (1989) established a guideline for assignment design in which the assignment load for each grade equals 10 minutes multiplied by the grade number. According to this guideline, grade 3 pupils are allotted 30 minutes for assignments. This assignment load can be completed in less than ten minutes for advantaged students, while it may take up to sixty minutes for disadvantaged students. This also holds true for the assignment's difficulty. Certain individuals believe that failures (which typically refer to extremely difficult questions) push students to exert greater effort. Nonetheless, it is correct only for those kids who are persistent. Analyses of the collected data can assist teachers in determining each student's actual learning condition. It entails analyzing the questions and responses provided by students in specific assignments as well as analyzing the student's aggregated data in order to generate an overall picture of his task fulfillment. Additionally, assignment outcomes should be compared to examination results in order to identify implicit teaching errors. According to the analysis above, incorrect responses will be identified as uniform or personal, allowing teachers to change the difficulty of tasks and create stratified assignments for students with varying academic levels.

In sum, high-quality assignment design is critical for increasing student academic accomplishment, reducing unnecessary workload, and promoting students' holistic growth in a variety of abilities. To optimize assignment design, the total workload of the assignment should be kept to a manageable level and students should be given sufficient discretionary study time; assignment content and forms should be varied to maintain students' interest in learning; and educational technology should be used appropriately for assignment adjustment and stratification. All of these suggestions are meant to serve as a guide and reference for designing primary and secondary school assignments with the goal of increasing the efficiency and effectiveness of teaching and learning.

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The Long-Term Mechanism of Extracurricular Activities in Primary and Secondary Schools: Using the Four Festivals and One Party in Huai'an No.1 Mountain Middle School as a Case Study

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Abstract: Extracurricular activities play a significant part in students' overall development, and the long-term mechanism is critical to extracurricular activities' educational efficiency. This paper describes Huai'an No. 1 Mountain Middle School's regular extracurricular events, which include four festivals and one party, as well as the tactics used to create a long-term mechanism for the school's extracurricular activities.

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Introduction

EXTRACURRICULAR activities are critical for the achievement of a well-rounded education. They contribute significantly to the development of school culture, the enhancement of students' overall competency, and their adaptation to society. The use of long-term mechanisms in extracurricular activities is a novel experiment in the new curriculum reform, with the goal of resolving issues with current extracurricular activities such as short length, lack of aims, and arbitrariness (Feng, 2016). In this context, Huai'an No.1 Mountain Middle School of the 271 Education Group establishes a long-term mechanism for its regularized extracurricular activities, which include a sports festival, a science and technological festival, a reading festival, an art festival, and a New Year party (collectively, the four festivals and one party), which serve as theoretical and practical references for the school and its peers. The purpose of this article is to provide a quick overview of the four festivals and one party, as well as to analyze the tactics used by the school to develop a long-term mechanism for extracurricular events.

A Conceptual Examination of the Long-Term Mechanism by which Extracurricular Activities Operate

Connotations

The phrase "long-term mechanism" refers to the structure that supports a system's regular operation and functional performance over an extended period of time. The long-term mechanism of extracurricular activities is a school management system that organizes and standardizes extracurricular practical activities in order to accomplish particular goals. Long-term relates to the system's permanence and longevity, whereas mechanism refers to the system's integration of extracurricular activities. That is not to say that the long-term mechanism is unchangeable; rather, it will be refined and developed through time and in response to changing circumstances.

Extracurricular Activities that have Long-Term Mechanisms

Persistent and vital extracurricular activities are those that have long-term mechanisms. Persistent activity is defined as activity that continues in terms of time and effect. For



instance, the reading festival at Huai'an No.1 Mountain Middle School is not time-bound. Reading is encouraged at all times to augment classroom instruction and help students widen their horizons of knowledge. Through flexible time management, extracurricular activities can be extended and their impacts amplified. Extracurricular activities with long-term processes are vital since they are integral to kids' holistic education and have specific purposes.

An Investigation of the Long-Term Process by which Extracurricular Activities Operate

Huai'an No.1 Mountain Middle School, a member of the 271 Education Group, has a long history of organizing significant extracurricular activities that encourage students' overall development. It has been dedicated to optimizing the long-term mechanism for extracurricular events, particularly the four festivals and one party, over the years.

The Four Festivals and One Party are Summarized

Preparation for the sports festival takes six weeks, during which students select sports, prepare essential equipment, write competition regulations, and arrange for the sports field. The entire exercise necessitates a variety of management abilities, including goal formulation and progress tracking.

The science and technology festival is divided into four sections: popularization of science, experimentation, model construction, and competition. The substance of activities varies according to the stage of learning. The activities in scientific popularization and experimentation are designed to match the knowledge students acquire in mathematics, physics, biology, and chemistry, allowing students to apply classroom knowledge to campus activities. Each segment is assigned a significant theme by the teacher. For example, they introduce junior secondary students to the application of block robot building and artificial intelligence in education so that students gain a basic understanding of how cutting-edge science is applied; senior secondary students work on projects involving more sophisticated subjects such as cloud computing.

The Reading Festival strives to broaden students' reading lists, encourage their enthusiasm for reading, and foster a knowledge-based campus culture conducive to reading. This practice broadens students' knowledge of books and introduces them to a vibrant world represented by books, which encourages students' independent reading and exploration.

Through the spiritual value of art, the art festival aims to modify, improve, and grow students' spiritual lives. It lasts six weeks. The primary components are music and art. This practice helps students develop their aesthetic ability, artistic vision, and ability to express themselves uniquely.

The purpose of the New Year's Eve celebration is to commemorate New Year's Day and usher in the New Year. Additionally, it aims to encourage cultural and creative events at the school, enrich the campus's cultural life, and offer students a plat-

form to showcase their abilities. The activity will last four weeks. Initially, the school held the party on the evening of December 31, but gradually expanded the festival to include pre-party preparation, performance selection for the talent show, and rehearsal preparations, among other things.

Strategies for Building the Long-Term Mechanism of Extracurricular Activities

Combining Extracurricular Activities with Curricular Content

The content of activities is critical in establishing a long-term mechanism for extracurricular activities. To maintain the sustainability of extracurricular activities, Huai'an No.1 Mountain Middle School uses a close correlation between extracurricular activities and curriculum material as a selection criterion. For example, in the reading festival, integrating after-class reading with textbook content is critical for maintaining students' extensive reading and cultivating their passion for reading. Additionally, the reading festival's activities extend beyond book reading to include calligraphy production and appreciation of cinema and television adaptations of literary masterpieces. Students read not only Chinese books but also those written in English. Students gain an appreciation for the diversity of the book world and develop a lifelong habit of reading as a result of their exposure to a wide variety of works.

Standardizing Patterns for Extracurricular Activities

In most schools today, extracurricular activities include procedures such as objective setting, post-activity summaries, and reporting on individual results. They lack, however, specification of activity design and implementation, resulting in the absence of activity uniqueness and haphazard process structure. Huai'an No. 1 Mountain Middle School addresses this issue by defining patterns for extracurricular activities in terms of duration, content, and processes. A structure of different extracurricular activities, including four festivals and one party, is in place to help students develop holistically.

Encourage Students' Autonomous Participation

In traditional education, students typically participate passively in teacher-designed extracurricular activities. Nonetheless, a genuine educational activity places a premium on students' autonomy. At Huai'an No.1 Mountain Middle School, students are actively involved in all aspects of extracurricular activity design and implementation, from aim setting to topic selection and organization. The activities are designed with the students' interests and internal needs in mind. Extracurricular activities are also designed to help kids improve their ability to self-regulate, their knowledge of their responsibilities, and

their problem-solving abilities. Proactive participation in an activity with self-identified goals helps children develop their creativity and initiative.

Optimizing Collaborative Mechanisms for Extracurricular Activities

At Huai'an No. 1 Mountain Middle School, assessments are conducted at the school and grade levels to determine the effectiveness of extracurricular activities. Planners and organizers maintain adequate communication with classroom teachers to ensure that extracurricular events are designed in such a way that all students are engaged and accomplish the objectives (Wang, 2011).

Reflection and Prospective

We discovered several issues during our study of extracurricular activities at Huai'an No.1 Mountain Middle School. In terms of actual application, students' organizational skills must be strengthened. At the moment, the school organizes extracurricular activities using a regular schedule of four festivals and one party. Teachers and students alike lack the capacity to create additional activities. Additionally, effective extracurricular education requires supportive activity venues. Currently, the educational facilities of institutions chosen by the school for off-campus activities require improvement. The school should use greater caution in selecting locations for extracurricular activities. Collaboration with other schools to establish permanent locations for extracurricular activities is an option worth investigating. Thus, there is still potential for development in the long-term mechanism of the school's extracurricular activities, and instructors and students are expected to do further research on this subject.

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