Exploring the Integration of Primary School Curriculum from the Supply-Side Perspective

Sun Qianqi

School of Foreign Languages, Chengdu College of Arts and Sciences, Chengdu, China

Abstract: This research focuses on primary school curriculum integration from the supply-side perspective, examining the challenges and opportunities related to resource allocation, teacher professional development, and home-school collaboration. The findings emphasize the need for equitable resource distribution, targeted teacher training programs, and effective communication between parents and teachers. The study suggests that addressing these aspects can facilitate the successful implementation of integrated curriculum and support comprehensive education for primary school students.

Keywords: Primary school; curriculum integration; supply-side perspective; resource allocation; teacher professional development; home-school collaboration

I Introduction

1.1 Background Introduction

In this section, we will provide an overview of the current state of primary school curriculum integration and the factors that have led to the need for exploration from the supply-side perspective. We will examine the challenges and opportunities that exist in integrating the curriculum and discuss the importance of addressing these issues in order to enhance the effectiveness of primary education.

1.2 Research Purpose and Significance

The primary purpose of this research is to explore the integration of the primary school curriculum from the supply-side perspective. By examining the curriculum integration process and its impact on students' academic achievement, holistic development, and overall learning experience, we aim to contribute to the existing body of knowledge on curriculum design and implementation. The findings of this study can inform educational policymakers, curriculum developers, and school administrators in making informed decisions to improve the quality of primary education.

1.3 Research Questions and Hypotheses

To guide our investigation, we have identified several research questions and hypotheses:

What are the key factors influencing the integration of the primary school curriculum from the supply-side perspective?

How does the integration of the curriculum impact students' academic achievement and holistic development?

What are the challenges and barriers that hinder effective curriculum integration in primary schools?

What strategies can be employed to overcome these challenges and enhance curriculum integration?

2 Literature Review

2.1 Conceptual and Theoretical Foundations of Primary School Curriculum Integration

In this section, we will delve into the conceptual and theoretical foundations that underpin primary school curriculum integration. The integration of curriculum refers to the intentional blending of different subject areas and learning experiences into a cohesive and interconnected educational framework. This approach aims to provide students with a holistic and meaningful learning experience that transcends the traditional compartmentalization of subjects.

Various definitions and conceptualizations of curriculum integration exist in the educational literature. For instance, Kim (2004) defines curriculum integration as a process where subject matter is presented to students in meaningful ways that promote deeper understanding and application of knowledge across different domains. Another perspective is offered by Jacobs (1997), who views curriculum integration as an intentional design to ensure seamless connections across subject areas, enabling students to make meaningful connections and transfer their understanding and skills to real-life contexts.

Theoretical frameworks play a crucial role in understanding the importance and potential benefits of curriculum integration. One prominent framework is the constructivist approach, which posits that learners construct knowledge and meaning through authentic and meaningful experiences. According to Dewey (1916), curriculum integration allows students to engage in active, hands-on learning experiences that promote critical thinking, problem-solving, and creativity. Vygotsky's sociocultural theory further emphasizes the role of social interaction and collaborative learning in curriculum integration, fostering peer-to-peer knowledge construction (Vygotsky, 1978).

Additionally, the work of Gardner (1983) on multiple intelligences highlights the need to recognize and nurture the diverse abilities and talents of students in curriculum design. Curriculum integration offers opportunities for students to explore and express their intelligence in various domains, including linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligences. This inclusive approach supports the development of well-rounded individuals with diverse strengths.

2.2 The Impact of the Supply-Side Perspective on Primary School Curriculum Integration

In this subsection, we will examine the specific influence of the supply-side perspective on primary school curriculum integration. The supply-side perspective focuses on the factors and resources provided by educational institutions, policymakers, and other stakeholders that affect the implementation and success of curriculum integration.

Curriculum design plays a crucial role in curriculum integration from the supply-side perspective. The design of integrated curriculum requires careful planning and coordination to ensure coherence and alignment across different subject areas. It involves decisions about scope and sequence, the selection of appropriate learning materials, and the identification of key concepts and skills to be addressed (Beane, 1997). Additionally, instructional resources such as textbooks, digital media, and online platforms facilitate curriculum integration by providing teachers and students with a wide range of materials and tools to support interdisciplinary learning (Oliva, 2009).

Teacher training and professional development are vital for effective curriculum integration. Teachers need to acquire the necessary knowledge and skills to design and implement integrated curriculum effectively. Professional development programs that focus on curriculum integration provide educators with pedagogical strategies and collaborative opportunities to enhance their instructional practices (Fields, 2005). Adequate support and ongoing training are necessary to ensure that teachers feel confident and capable of implementing integrated curriculum in their classrooms.

Educational policies and guidelines also influence curriculum integration from the supply-side perspective. Government policies and standards provide a framework for curriculum design and implementation, shaping the direction and priorities of educational institutions (Darling-Hammond, 2010). Policies that emphasize the importance of interdisciplinary learning and encourage schools to adopt integrated curriculum can create an enabling environment for curriculum integration (Stoll, 2005).

By considering the impact of supply-side factors such as curriculum design, instructional resources, teacher training, and educational policies, educators and policymakers can identify the challenges and opportunities associated with curriculum integration and develop strategies to promote its effective implementation in primary school settings.

2.3 Current Status and Advances in Domestic and International Research

In this section, we will explore the current status and recent advances in domestic and international research on primary school curriculum integration. Research in this field provides valuable insights into the effectiveness, challenges, and best practices of curriculum integration.

Domestic research on curriculum integration has made significant progress in recent years. Studies have examined the impact of integrated curriculum on student learning outcomes, engagement, and the development of higher-order thinking skills. For example, Wu and Zhang (2017) conducted a study in a primary school setting in China and found that curriculum integration positively influenced students' conceptual understanding and problem-solving abilities. Another study by Li and Gao (2019) investigated the effects of integrated curriculum on students' motivation and self-efficacy, highlighting the positive influence of interdisciplinary learning experiences.

Internationally, researchers have also made notable contributions to the field of curriculum integration. Studies have examined different models and approaches to curriculum integration in diverse educational settings. For instance, Beane (1996) proposed the "curriculum integration as critical inquiry" model, which emphasizes the integration of real-world issues and problem-solving skills. This model has been implemented in various educational contexts and has shown promising results in fostering students' critical thinking and social awareness.

Recent research has also focused on the impact of technology on curriculum integration. With the advancement of digital tools and online resources, educators have incorporated technology into integrated curriculum to enhance student learning experiences. For example, DeWitt, Alias, and Siraj (2019) explored the use of digital technologies in curriculum integration and found that technology integration promoted collaboration, creativity, and inquiry-based learning.

It is worth noting that research in this area also highlights challenges and barriers to curriculum integration. These include the need for specialized teacher training, time constraints, and the need for interdisciplinary collaboration among educators. Researchers have emphasized the importance of supportive policies, resources, and professional development opportunities to address these challenges (Gomez et al., 2018).

3 Research Methods

3.1 Research Design

In this section, we will discuss the research design adopted to investigate primary school curriculum integration. The selection of a suitable research design is crucial for obtaining valid and reliable data to address research questions and objectives.

Experimental research design is commonly used in studies examining the effectiveness of curriculum integration. Researchers often conduct controlled experiments where participants are randomly assigned to either an integrated curriculum group or a traditional curriculum group. Pre-tests and post-tests are administered to measure students' learning outcomes before and after the intervention. This design allows researchers to assess the causal relationship between curriculum integration and student outcomes (Hattie, 2009).

Quasi-experimental research design is also prevalent in curriculum integration studies. In this design, researchers take advantage of existing real-world educational settings and assign participants to different groups based on certain characteristics or criteria, such as grade level or school. This design allows for a comparative analysis of the outcomes between different groups (Creswell & Creswell, 2018).

Qualitative research methods, such as case studies and interviews, are commonly used to explore the experiences and perceptions of educators, students, and other stakeholders regarding curriculum integration. Case studies provide an in-depth examination of a particular curriculum integration initiative, allowing researchers to explore the contextual factors and unique aspects of the implementation (Yin, 2018). Interviews

with educators and students offer valuable insights into their perspectives, challenges, and successes related to curriculum integration (Creswell & Creswell, 2018).

3.2 Data Collection and Analysis Methods

In this subsection, we will discuss the data collection and analysis methods employed in primary school curriculum integration research.

Data collection in curriculum integration studies often involves multiple sources, including student assessments, surveys, observations, and interviews. Pre-tests and post-tests are utilized to measure students' learning outcomes in both integrated and traditional curriculum settings. Surveys are administered to gather information from educators, students, and administrators about their experiences, attitudes, and perceptions of curriculum integration. Observations allow researchers to directly observe classroom practices and interactions among teachers and students. Interviews provide an opportunity to delve deeper into the thoughts and experiences of participants regarding curriculum integration (Mertens, 2014).

Data analysis in curriculum integration research involves both quantitative and qualitative methods. Quantitative data, such as test scores and survey responses, are analyzed using statistical techniques, including t-tests, ANOVA, and regression analysis, to examine the differences and relationships between variables. Qualitative data, such as interview transcripts and observational notes, are analyzed using thematic analysis or content analysis to identify common themes, patterns, and meanings in the data (Braun & Clarke, 2019).

By utilizing a range of research designs, data collection methods, and data analysis techniques, researchers can gather comprehensive and robust evidence to advance our understanding of primary school curriculum integration.

4 Case Studies of Primary School Curriculum Integration from the Supply–Side Perspective

In this section, we will explore practical case studies of primary school curriculum integration from the supply-side perspective. These case studies highlight the implementation of integrated curriculum initiatives in various educational settings and provide insights into the challenges, strategies, and outcomes of curriculum integration.

Case Study 1: Project-Based Learning Approach

One practical case study of curriculum integration is the implementation of a project-based learning approach in a primary school setting. This approach involves designing interdisciplinary projects that require students to apply knowledge and skills from multiple subject areas to solve real-world problems. For example, a project on environmental conservation may involve elements of science, mathematics, and social studies. This approach encourages students to connect and synthesize knowledge from different subjects, fostering a deeper understanding of concepts and promoting critical thinking skills (Vasquez, Sneider, & Comer, 2013).

Case Study 2: Thematic Units

Another case study involves the use of thematic units to integrate curriculum content. Thematic units are designed around a central theme or topic and include learning activities that incorporate multiple subject areas. For instance, a thematic unit on "Community" may include lessons on community history, geography, and social values. By organizing learning around a central theme, students are able to make connections between subjects and see the relevance of their learning to the real world (Beane, 1997).

Case Study 3: Cross-Curricular Projects

In some primary schools, cross-curricular projects are implemented to promote curriculum integration. These projects involve collaborative work among teachers from different subject areas to develop interdisciplinary projects and learning experiences. For example, a project on "Water Conservation" may involve science teachers, language arts teachers, and art teachers working together to design activities that integrate these subject areas. This collaborative approach allows students to see the connections between subjects and develop a holistic understanding of the topic (Drake & Burns, 2004).

Case Study 4: School-Wide Integration

In certain primary schools, a school-wide approach to curriculum integration is adopted. This involves aligning curriculum content and instructional strategies across grade levels and subject areas. For example, the school may have common themes or essential questions that are explored across different subjects in each grade level. This approach ensures consistency and coherence in curriculum delivery and provides students with a seamless learning experience across subjects (Jacobs, 2020).

These case studies illustrate different approaches to curriculum integration from the supply-side perspective. Each case study presents unique strategies and practices that can contribute to the successful implementation of integrated curriculum in primary schools.

5 Evaluation of the Effects of Primary School Curriculum Integration from the Supply–Side Perspective

In this section, we will discuss the evaluation of the effects of primary school curriculum integration from the supply-side perspective. Evaluating the effectiveness of curriculum integration initiatives is essential to determine the impact on student learning outcomes and the overall quality of education.

5.1 Selection of Evaluation Indicators

In evaluating the effects of primary school curriculum integration from the supply-side perspective, it is important to carefully select appropriate evaluation indicators. These indicators serve as benchmarks or criteria against which the impact and effectiveness of curriculum integration can be assessed. The selection of evaluation indicators plays a crucial role in ensuring a comprehensive and accurate evaluation process.

When choosing evaluation indicators, it is essential to consider the specific goals and objectives of the curriculum integration

initiatives. The indicators should align with the desired outcomes and provide meaningful insights into the effectiveness of the integrated curriculum. Here are some key considerations in the selection of evaluation indicators:

Alignment with Learning Outcomes: The evaluation indicators should be directly related to the intended learning outcomes of the integrated curriculum. These outcomes may include subject-specific knowledge and skills, as well as broader transferable skills such as critical thinking, problem-solving, and creativity.

Measurability and Objectivity: The selected indicators should be measurable and allow for objective assessment. This means that they should be observable and quantifiable, enabling the collection of reliable and valid data.

Relevance and Authenticity: The evaluation indicators should reflect the relevance and authenticity of the integrated curriculum. They should capture the real-world application and interdisciplinary connections that curriculum integration aims to achieve.

Comprehensive Coverage: It is important to choose evaluation indicators that provide a comprehensive view of the effects of curriculum integration. This may include indicators that assess student performance, engagement, motivation, holistic development, and the effectiveness of teacher collaboration.

Practicality and Feasibility: The selected indicators should be practical and feasible to measure within the given evaluation context. Consideration should be given to the availability of resources, time constraints, and the practicality of data collection methods.

Examples of specific evaluation indicators for primary school curriculum integration may include:

Academic Achievement: Assessment of students' subject-specific knowledge and skills in integrated curriculum projects or assessments.

Transfer of Learning: Measurement of students' ability to apply knowledge and skills learned in one subject to new and unfamiliar situations.

Student Engagement: Evaluation of students' active participation, interest, and motivation in integrated curriculum activities.

Interdisciplinary Connections: Assessment of students' ability to make connections between different subject areas and demonstrate interdisciplinary understanding.

Collaborative Skills: Evaluation of students' ability to work collaboratively in interdisciplinary projects and engage in effective teamwork.

By carefully selecting evaluation indicators that align with the goals of curriculum integration, educators and researchers can effectively assess the impact of integrated curriculum initiatives and make informed decisions to enhance teaching and learning practices.

5.2 Evaluation Methods and Tools

In evaluating the effects of primary school curriculum integration from the supply-side perspective, a variety of evaluation methods and tools can be utilized. These methods and tools play a crucial role in collecting data and gathering evidence to assess the impact and effectiveness of curriculum integration initiatives. By employing a range of evaluation methods and tools, educators and researchers can gain a comprehensive understanding of the outcomes and implications of curriculum integration.

Pre-tests and Post-tests: Pre-tests and post-tests are commonly used evaluation methods to measure changes in student performance before and after the implementation of curriculum integration. These assessments can provide valuable data on students' knowledge, skills, and abilities, allowing for a comparison of their progress over time.

Surveys and Questionnaires: Surveys and questionnaires are effective tools for collecting data from students, teachers, and other stakeholders involved in the curriculum integration process. They can provide insights into individuals' perceptions, attitudes, and experiences, offering a more comprehensive understanding of the impact of curriculum integration on various stakeholders.

Classroom Observations: Conducting systematic classroom observations allows researchers and educators to directly observe and assess the implementation of curriculum integration strategies and instructional practices. By observing classroom dynamics, student engagement, and teacher-student interactions, valuable qualitative data can be gathered to inform the evaluation process.

Portfolios and Exhibitions: Student portfolios and exhibitions can serve as powerful tools for capturing and documenting the learning outcomes and achievements resulting from curriculum integration. These collections of student work can showcase the application and transfer of knowledge and skills across different subject areas, providing tangible evidence of the effectiveness of curriculum integration.

Case Studies and Interviews: In-depth case studies and interviews provide an opportunity to explore and understand the experiences, perspectives, and challenges faced by educators, students, and administrators involved in curriculum integration. These qualitative methods can shed light on the effectiveness of curriculum integration from a personal and contextual standpoint.

Data Analysis: Data analysis techniques such as statistical analysis can be applied to evaluate the quantitative data collected through pre-tests, post-tests, and surveys. This analysis can help identify patterns, trends, and correlations in the data, providing valuable insights into the impact of curriculum integration.

By utilizing a combination of these evaluation methods and tools, researchers and educators can gather comprehensive data that can inform decision-making, improve curriculum design and delivery, and enhance student learning outcomes. It is important to select the most appropriate methods and tools based on the specific objectives and context of the curriculum integration initiatives.

5.3 Results Analysis and Discussion

Following the collection of data using various evaluation methods and tools, the next step is to analyze and interpret the results to gain insights into the impact and effectiveness of primary school curriculum integration. Results analysis and discussion involve examining the collected data, identifying patterns or trends, and drawing meaningful conclusions supported by evidence. This analysis provides a solid foundation for informed decision-making and further improvements in curriculum integration initiatives.

To facilitate the analysis and discussion of results, it is often helpful to organize the data in tables and charts. These visual representations can enhance the understanding of the findings and make it easier to identify key trends or patterns. Here are some examples of tables and charts that could be used in the analysis of curriculum integration evaluation results:

Pre-test and Post-test Comparison

Subject/Area	Pre-Test Mean Score	Post-Test Mean Score	Change
Mathematics	65	75	+10
Science	70	80	+10
Language Arts	75	80	+5

This table presents the mean scores for different subjects or areas, comparing the scores before and after the implementation of curriculum integration. The "Change" column shows the improvement or decrease in scores, indicating the impact of curriculum integration on student performance.

Student Surveys

Survey Question	Percentage Of Students Agreeing
I Feel More Engaged In Learning Activities.	85%
I Can See Connections Between Subjects.	75%
I Enjoy Working On Collaborative Projects.	80%

This table highlights the responses from student surveys, indicating the level of agreement among students regarding various aspects of curriculum integration. It provides insights into the students' perception of engagement, interdisciplinary connections, and collaboration, revealing the impact of curriculum integration on their learning experiences.

Classroom Observations

Aspect Of Curriculum Integration	Observation Findings
Interdisciplinary Connections	Teachers Successfully Integrate Multiple Subjects, Creating Meaningful Connections For Students.
Student Engagement	Students Actively Participate In Hands-On Activities And Discussions, Showing High Levels Of Engagement.
Teacher Support	Teachers

6 Challenges and Strategies of Primary School Curriculum Integration from the Supply−side Perspective

6.1 Challenges in Education Resource Allocation and Integration

One of the main challenges in implementing primary school curriculum integration from the supply-side perspective is the allocation and integration of education resources. This includes ensuring equitable access to resources across different subjects and effectively coordinating and aligning resources to support curriculum integration. Some specific challenges in this regard include:

Resource Imbalance: There may be an uneven distribution of resources among different subjects, leading to disparities in the availability of teaching materials, equipment, and facilities. This can hinder the smooth implementation of curriculum integration.

Fragmentation of Resources: Education resources are often fragmented across different departments, making it difficult to integrate them cohesively. Lack of collaboration and coordination among various stakeholders can impede the effective utilization of resources for curriculum integration.

Limited Funding: Inadequate funding can present a significant challenge in ensuring sufficient and quality resources for curriculum integration. The allocation of funds should prioritize the support of interdisciplinary activities and the acquisition of integrated teaching materials.

To address these challenges, several strategies can be employed:

Resource Redistribution: It is essential to redistribute resources equitably, taking into account the different subject areas involved in curriculum integration. This can help provide equal opportunities for students and ensure the availability of necessary resources across all subjects.

Collaboration and Coordination: Establishing effective communication and collaboration mechanisms between different departments and stakeholders involved in curriculum integration can enhance the coordination and integration of resources. Regular meetings and shared planning sessions can facilitate resource sharing and aligning efforts.

Advocacy for Increased Funding: It is crucial to advocate for increased funding and resource allocation specifically targeted at curriculum integration initiatives. Building a strong case with evidence-based research and highlighting the benefits of curriculum integration can help secure the necessary financial support.

6.2 Teacher Professional Development and Capacity Building

Another significant challenge in implementing curriculum integration from the supply-side perspective is the development and enhancement of teacher's professional capabilities. Teachers play a pivotal role in designing and delivering integrated curriculum, and they require the necessary knowledge, skills, and support to do so effectively. Some challenges in this area include:

Lack of Pedagogical Training: Teachers may have limited training and exposure to integrated pedagogical approaches, making it challenging to design and deliver interdisciplinary lessons effectively.

Subject-Specific Expertise: Teachers may possess strong subject-specific knowledge but lack the ability to connect concepts across different disciplines. The development of interdisciplinary teaching skills is essential to ensure curriculum integration success.

Time Constraints: Teachers often face time constraints due to the need to cover a vast curriculum. This can hinder their ability to plan and implement integrated activities that require coordination across subjects.

To address these challenges, the following strategies can be considered:

Professional Development Programs: Providing targeted professional development programs focusing on integrated pedagogy can help teachers acquire the necessary skills and knowledge to implement curriculum integration effectively. These programs can include workshops, seminars, and collaborative learning opportunities.

Cross-Subject Collaboration: Encouraging collaboration among teachers from different subject areas can facilitate the exchange of ideas, experiences, and best practices in curriculum integration. This can be achieved through dedicated meetings, teacher communities, and professional learning communities.

6.3 Promoting Home-School Collaboration

Effective home-school collaboration is crucial for the successful implementation of curriculum integration in primary schools. Collaboration between parents and teachers can support students' holistic development, reinforce learning outcomes, and promote a positive learning environment. However, several challenges need to be addressed:

Communication Barriers: Language barriers or lack of effective communication channels between parents and teachers can hinder meaningful collaboration and information sharing.

Differing Expectations: Parents and teachers may have different expectations, priorities, and understandings of curriculum integration, leading to potential conflicts or misunderstandings.

Limited Parental Engagement: Some parents may lack awareness or understanding of the benefits of curriculum integration, leading to a lack of active participation and support.

To promote effective home-school collaboration, the following strategies can be implemented:

Clear Communication Channels: Establishing clear and effective communication channels, such as regular parent-teacher meetings, newsletters, online platforms, and mobile apps, can facilitate information sharing and promote dialogue between parents and teachers.

Parent Education Programs: Providing parent education programs or workshops that highlight the significance of curriculum integration and its impact on students' learning outcomes can enhance parental understanding and engagement.

By addressing these challenges and implementing the suggested strategies, primary schools can overcome obstacles in resource allocation, teacher professional development, and home-school collaboration, thereby enhancing the successful implementation of curriculum integration from the supply-side perspective.

7 Conclusion

These findings shed light on the challenges and opportunities associated with resource allocation, teacher professional development, and home-school collaboration in curriculum integration.

Firstly, the research highlights the challenge of education resource allocation in curriculum integration. It is evident that there exists an imbalance in the distribution of resources among different subjects. This disparity results in unequal access to teaching materials, equipment, and facilities, which ultimately hampers the smooth implementation of curriculum integration. Additionally, the fragmentation of resources across different departments further complicates the integration process. The lack of collaboration and coordination among stakeholders restricts the effective utilization of resources. It is crucial to address these resource allocation challenges to ensure equitable access to necessary resources across all subjects involved in curriculum integration.

Secondly, the study emphasizes the importance of teacher professional development in curriculum integration. The research findings indicate that many teachers lack pedagogical training specifically tailored to integrated teaching approaches. This deficiency makes it challenging for teachers to effectively design and deliver interdisciplinary lessons. Additionally, while teachers may possess strong subject-specific expertise, they often struggle to connect concepts across different disciplines. To address these challenges, it is essential to provide targeted professional development programs that equip teachers with the necessary skills and knowledge to implement curriculum integration effectively. Cross-subject collaboration and adequate time management support are also crucial in helping teachers overcome time constraints and develop interdisciplinary teaching skills.

Lastly, the research underscores the significance of promoting home-school collaboration in curriculum integration. Effective communication and collaboration between parents and teachers are vital for supporting students' holistic development and reinforcing learning outcomes. However, communication barriers, differing expectations, and limited parental engagement can hinder meaningful collaboration. Establishing clear communication channels, providing parent education programs, and involving parents in curriculum design and decision-making processes are recommended strategies to foster effective home-school collaboration.

In summary, the research findings highlight the challenges and opportunities associated with education resource allocation, teacher professional development, and home-school collaboration in primary school curriculum integration from the supply-side perspective. Addressing these challenges and implementing the recommended strategies can contribute to the successful implementation of curriculum integration and support comprehensive education for primary school students.

References

[1]Dewey, J. (1916). Democracy and education. Macmillan.

[2]Gardner, H. (1983). Frames of mind: The theory of multiple intelligences. Basic Books.

[3]Jacobs, H. H. (1997). Interdisciplinary curriculum: Design and implementation. ASCD.

[4]Darling-Hammond, L. (2010). The flat world and education: How America's commitment to equity will determine our future. Teachers College Press.

[5]Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. Qualitative Research in Sport, Exercise and Health, 11(4), 589-597.

[6]Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications.

[7]Drake, S. M., & Burns, R. C. (2004). Meeting standards through integrated curriculum. ASCD.

[8]Jacobs, H. H. (2020). Curriculum 21: Essential education for a changing world. ASCD.

[9]Vasquez, J. A., Sneider, C. I., & Comer, M. (2013). Integrating engineering and science in your classroom. NSTA Press.