



ORIGINAL CONTRIBUTION

The Interaction Structure of Arts and Physical Education Program Operation in Korean Elementary After-School Care Policy: Focusing on the Difference between Policy Values and Actual Operation

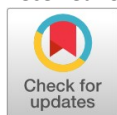
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Abstract— The purpose of this study is to analyze how the policy position of arts and physical education programs is formed within South Korea's elementary school after-school care policy through specific interactions. To this end, the multidimensional educational policy analysis model of Cooper et al. (2004) was applied to comprehensively analyze the relationships between the normative, structural, constitutive, and technical dimensions. The analysis was conducted in the stages of deriving key relationships, analyzing inter-dimensional relationships, and analyzing multidimensional interactions. As a result of the study, first, the norm-structural, norm-technical, and structural- constitutive relationships were identified as key relationships explaining the operation of arts and physical education programs. Second, the difference between policy intent and actual operation was analyzed as not being a single-dimensional issue, but rather emerging within a relationship where various policy dimensions are connected and combined. Third, these interactions were found to form institutional characteristics such as the persistence of a selective program structure, the strengthening of a quantity-centered operational system, and the widening of regional operational disparities. Based on Cooper et al. (2004) multidimensional educational policy analysis model, this study expanded the scope of application of the existing model to include the analysis of interdimensional relationships by analyzing not only the characteristics of the four dimensions but also the relationships between the dimensions. Through this, the characteristics of arts and physical education program operations were analyzed as a phenomenon formed within connections and combinations at various levels, rather than explaining them solely as results at the level of individual policies. In addition, it is significant in that it analyzed the operation of arts and physical education programs from the perspective of interdimensional relationships appearing in the policy process, rather than focusing on educational effects.

Index Terms— Korea after school policy, After school care, Arts and physical education, Four multidimensional

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Introduction

Operation of South Korean elementary after-school care policies and expansion of arts and physical education programs

Korea's elementary school after-school care policy is being expanded into Neulbom Schools, which extend the integrated operation of education and care based on existing after-school programs and elementary care classrooms (hereinafter referred to as care classrooms) (Ministry of Education, 2023). This expansion of policies can be viewed as part of a national effort to bridge the educational gap, alleviate care disparities, and promote the holistic development of children (Ministry of Education, 2023). Amidst this trend, arts and physical education is receiving attention

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as an important field that contributes to children's creativity, emotional development, and social skills (Ministry of Education, 2025a). In addition, experiences with artistic activities are related to emotional development, such as the formation of a child's identity and self-regulation abilities (Holochwost et al., 2021). In particular, with the presentation of policy directions such as 'one person, one arts and physical education,' policy discussions are underway to expand arts and physical education into a universal educational experience (Ministry of Education, 2025b).

Meanwhile, the operational structure of after-school care policies for elementary school students in Korea varies depending on the policy type. After-school programs are organized based on the choice of students and parents and operate on a beneficiary-pays basis (Ministry of Education, 2025a). Although care classrooms are operated based in state financial support, relevant policy documents suggest that personnel and space are key operating conditions (Ministry of Education, 2022) and previous studies on after-school programs have also reported that organizational capabilities, such as personnel, space, and physical resources, are related to program implementation (Smith et al., 2021). The recently introduced Neulbom School is a form of integrated education and care that builds on existing policies, and its program composition and operation are designed to take into account the conditions of individual schools and regions (Ministry of Education, 2025a).

While arts and physical education programs in after-school programs are operated to reflect student demand (Ministry of Education, 2025a), care classrooms support the development of students' creativity through play and arts and physical education programs (Ministry of Education, 2022). At Neulbom School, specifies culture, arts, and physical education programs as presented as major education programs (Ministry of Education, 2025a). As such, while there is a common policy emphasis on arts and physical education programs, it is necessary to examine how these programs are defined and operated within the policies, given that each policy has different operational structures and conditions. Figure 1 shows the current status of arts and physical education program operation in Korea's elementary school after-school care policy.

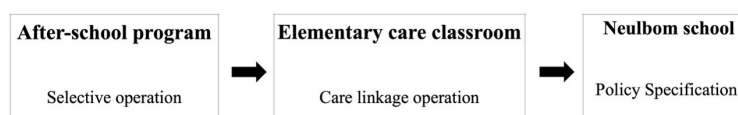


Fig. 1 Current status of arts and physical education program operation in Korean elementary after-school care policy (Source: Author's own elaboration)

Previous Studies

After-school care operation and arts & physical education programs

Previous studies have focused on the operational structure and program effects of after-school care policies (Carpenter Estrada et al., 2023; Kim, 2024; Ko et al., 2025). Similarly, research on arts and physical education programs has analyzed educational value focusing on emotional development, learning effects, and satisfaction (Bae, 2017; KACES, 2023; Yoon, 2023). In addition, the study on the adaptation effects of care and learning activities Lim (2017) analyzed the effects of activity adaptation on users through care education. These studies are significant in that they presented the educational meaning and necessity of arts and physical education programs. However, analysis of how arts and physical education programs operate in relation to policy direction and operational structure has been relatively limited.

Operational structure and institutional environment

Previous studies have viewed securing budget, space, and personnel as conditions for the stable operation of after-school programs (Lee et al., 2023; Ministry of Education, 2023). In particular, it has been suggested that there may be differences in the operation methods and program composition of arts and sports programs depending on factors such as space, equipment, and the availability of professional personnel (Bae, 2017; Yoon, 2023).

Even in international examples, the operational structure of after-school programs and the methods of running arts and physical education programs vary by country. The 21st Century Community Learning Centers (21st CCLC) in the United States provide various cultural and artistic activities based on cooperation between the federal government and the local community (U.S. Department of Education, 2024; Williams, 2021). Ontario, Canada, presents arts education as a domain for creative thinking and expression skills (Ontario Ministry of Education, 2016). Japan operates after-school children's clubs, a program centered on cultural arts and experiential activities, in collaboration with the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Health, Labour and Welfare (Ministry of Education, Culture, Sports, Science and Technology, n.d.).

These studies suggest that the operation of arts and physical education programs may vary depending on the operational structure and institutional conditions (Halverson et al., 2024; Smith et al., 2021). However, existing studies have primarily focused on individual operational conditions or program implementation elements, and approaches that have analyzed the relationship in an integrated manner environment have been relatively limited (Shaw & Bernard, 2023; Smith et al., 2021).

Program operation results and educational limitations

Previous studies have pointed out the tendency for programs to be evaluated based on participation rates or satisfaction in a performance-oriented operational environment (KACES, 2023; Yoon, 2023). It has also been pointed out that short-term activity-centered operation is difficult to lead to a continuous learning experience (Bae, 2017). In particular, for educational activities centered on emotional and creative experiences, such as arts and physical education programs, there is a possibility that the scope of the educational experience and the method of operation may vary depending on the operating environment (Bae, 2017). In addition, it was pointed out that while creative experiential activities are emphasized as educational activities for fostering creativity and character, various limitations may arise in the actual school operation process (Jho & Lee, 2012).

However, these studies tended to focus on individual operational cases or program experiences. Furthermore, there has been insufficient analysis of how the relationship between policy direction, operational structure, and implementation process is formed.

Limitations of prior research

As such, existing studies have focused on the structural characteristics of after-school care operations, the educational value and effectiveness of arts and physical education programs, and operational conditions and implementation experiences (Halverson et al., 2024; Holochwost et al., 2021; Shaw & Bernard, 2023; Smith et al., 2021). However, most studies have tended to focus on program effects or individual operational elements, and there were limitations in comprehensively analyzing the relationship between policy direction, operational structure, and implementation processes (Halverson et al., 2024; Shaw & Bernard, 2023; Smith et al., 2021).

In particular, there has been a relative lack of multidimensional analysis regarding how the value of arts and physical education, emphasized in policy documents, manifests and forms relationships within actual operational structures and implementation processes in school settings. Furthermore, the analysis of how operational conditions such as budget, space, and personnel, actor relationships, and implementation methods form relationships and are connected to program operation was also conducted on a limited basis.

Meanwhile, existing studies utilizing the multidimensional educational policy analysis model by Cooper et al. (2004) used normative, structural, constitutive, and technical dimensions as models to analyze various aspects of policy (Jun-seo, 2024; Song & Kim, 2024; Woo & Kim, 2024). While some studies have discussed the relationships between policy structure, actors, and implementation conditions (Kim, 2024), there have been limited papers that established the relationships between each dimension as the unit of analysis and analyzed the combination patterns of those relationships.

Furthermore, existing studies have identified differences and problems between policy direction and field operations, and recent research on educational policy implementation has also discussed that policy execution takes place within the relationships between school organizational conditions, policy actors, the institutional environment, and implementation conditions (Butler et al., 2024; Gavin & Stacey, 2023; Gravel & Puckett, 2023). Additionally, it has been suggested that policies may be interpreted and implemented differently depending on the school context and existing institutional conditions as they move from the national level to the school level (Choi, 2022). However, it has not been sufficiently explained how these differences are formed within the relationships of various policy dimensions. Therefore, beyond individually analyzing the relationships between policy values, institutional structures, actors, and implementation processes, it is necessary to analyze how these elements form relationships and how they are connected to the operational aspects of arts and physical education programs. Arts education can be positioned differently within the priorities of school improvement policies and education policies, and this policy context can also be linked to school-level operations (Gabriel, 2024). In this study, the 'policy positions' define how arts and physical education programs are defined and operated in relation to policy values and goals, operational structures, actors, and implementation processes within this context.

Therefore, this study aims to analyze the characteristics of the policy position of arts and physical education programs in Korean elementary after-school care policies within the relationships between the dimensions of norms, structure, constitutive, and technical by applying the multidimensional educational policy analysis model of Cooper et al. (2004). We also examine what kind of interaction structures the relationships between key dimensions form, and analyze how this structure is related to the difference between policy intention and operation the institutional characteristics of arts and physical education program operation.

The research questions of this study are as follows.

RQ 1. In South Korea's elementary after-school care policy, what are the characteristics of arts and physical education programs within the relationships between normative, structural, constitutive, and technical dimensions?

RQ 2. What kind of interaction structure do key dimensional relationships form in the operation of arts and physical education programs?

RQ 3. In what way does the interaction structure between key dimensions shape the institutional characteristics of arts and physical education program operations?

Theoretical Framework and Methodology

Theoretical framework

In elementary school after-school care policies, arts and physical education programs are an area where not only the educational values pursued by the policy but also the operational structure, policy actors, and implementation conditions interact in a complex manner (Gavin & Stacey, 2023; Halverson et al., 2024; Waslander et al., 2023). Therefore, to analyze the policy position of arts and physical education programs, it is necessary to comprehensively analyze the interactions between policy values, institutional structures, actor relationships, and implementation processes, rather than examining individual elements independently. Therefore, this study utilizes Cooper et al. (2004) multidimensional educational policy analysis model as a theoretical framework, which enables the multifaceted analyze of policy phenomena in normative, structural, constitutive, and technical dimensions.

Cooper et al. (2004) presented a multidimensional education policy analysis model that analyzes educational policy into normative, structural, constitutive, and descriptive dimensions to understand educational policy from various perspectives.

The normative dimension refers to the educational values and goals pursued by the policy, while the structural dimension relates to the institutional and organizational structures in which the policy is operated. Furthermore, the constitutive dimension includes the relationships and roles among actors participating in the policy process, while the technical dimension includes the actual processes of policy implementation and operation, execution conditions, and evaluation methods.

This study applied the four dimensions mentioned above as basic analysis categories, but went beyond analyzing the individual characteristics of each dimension to set the relationships between dimensions as the subject of analysis. In this study, interdimensional interaction refers to the analytical relationship between operational patterns and institutional characteristics formed as the characteristics of different dimensions are connected or combined. Therefore, this study analyzes the characteristics of policy values, operational structures, actor relationships, and implementation processes related to the operation of arts and physical education programs, and examines how interdimensional relationships are connected to the operational patterns of these programs. Figure 2 is a multidimensional educational policy analysis model presented by Cooper et al. (2004).

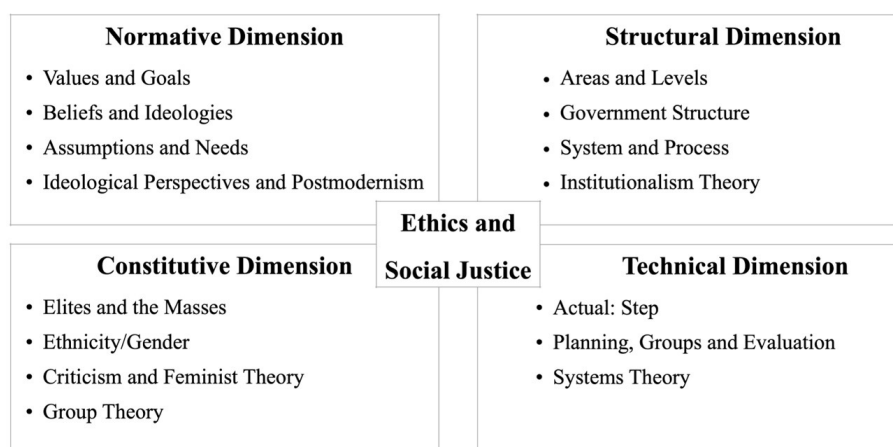


Fig. 2 Coopers et al. multidimensional education policy analysis model Source: Adapted from Cooper et al. (2004)

Methodology

Data collection

This study conducted a literature analyzes by collecting data based on policy documents and prior research to analyze how arts and physical education programs are operated within South Korea's elementary school after-school care policies. The analysis data consisted of documents related to after-school program policies, operational guidelines and policy materials for elementary school after-school care classes, and Neulbom School policies and operational plans, government and research institute reports, and prior studies related to the operation of arts and physical education programs. The temporal range of the data is from 2004, when care classrooms was introduced, to the present day in 2025. The analysis data consists of a total of 54 items, including 12 policy documents, 8 government and research institute reports, and 34 academic studies.

The criteria for selecting analysis data are as follows. First, the data were directly related to the operation of policies regarding elementary school after-school programs, care classrooms, and Neulbom Schools in Korea. Second, the data contained details regarding the goals, organization, operational structure, actors, and implementation process of arts and physical education programs in the relevant policy. On the other hand, research on general arts and physical education that is not directly related to elementary after-school care policies, as well as data where it is

difficult to verify the policy and operational characteristics of arts and physical education programs for research purposes, were excluded from the analysis.

Data search was conducted focusing on Ministry of Education, KEDI, KACES, RISS, and relevant data was identified using the search term 'Korean elementary after-school care policy'. Among the retrieved data, subjects for analysis were selected after reviewing their relevance to the purpose of the study, and the selected data were utilized for the four-dimensional analysis of this study.

Analysis procedure

This study extracted key expressions and operational contents related to the operation of arts and physical education programs from policy documents and prior studies by referring to Owen (2014)'s document analysis procedure. Subsequently, coding was performed focusing on recurring expressions and operational elements, and these were classified into normative, structural, constitutive, and technical dimensions according to the multidimensional educational policy analysis model of Cooper et al. (2004). The analysis procedure is as shown in Table I.

Table I
Analysis procedure

No.	Procedure
1	Data collection and Analysis Data Selection
2	Extraction of Key Representations and Operational Elements
3	Analysis of inter-dimensional relationships
4	Derivation of key and auxiliary relationships
5	Multidimensional interaction structure analysis
6	Derivation of institutional characteristics

In the coding process, the analysis focused on key expressions and operational elements that appear repeatedly in policy documents and prior research, such as 'holistic education', 'creativity', 'cultural and artistic experiences', 'elective programs', and 'school discretion'. The normative dimension was classified based on the values and goals pursued by the policy, the structural dimension based on the institutional and organizational structures in which the policy is operated, the constitutive dimension based on the roles and relationships of actors and stakeholders participating in the policy process, and the technical dimension based on content related to the planning, implementation, operation, and evaluation of the policy.

After classification by dimension, the relationships formed between the characteristics of each dimension were analyzed. In this process, rather than simply listing possible combinations of dimensions, the focus was on examining how the characteristics of different dimensions are connected to or combined with the operational aspects and institutional features of arts and physical education programs. First, the relationship between two dimensions was analyzed, and then the interaction structure formed when this relationship combines with three or more dimensions was analyzed step-by-step.

The importance of relationships between dimensions was examined based on four criteria: first, the degree of recurrence across various data; second, direct relevance to the research problem; third, the degree of explanation regarding the difference between policy values and operations; and fourth, the connection with the institutional characteristics of arts and physical education program operations. Considering these criteria, relationships that are repeatedly identified across various data and directly linked to the research problem and institutional characteristics were classified as key relationships. Conversely, relationships that meet some criteria but complement key relationships or explain specific operational characteristics were classified as auxiliary relationships.

The initial coding of this study was performed by the first author, and the coding results, classification by dimension, and the process of deriving key relationships between dimensions were reviewed by co-authors. During the analysis process, the classification results were reviewed based on the conceptual definitions of each dimension by Cooper et al. (2004). In addition, the consistency of the analysis was checked through co-author reviews regarding the interpretation of relationships between dimensions and key and auxiliary relationships.

Classification criteria by dimension

Table II summarizes the key analysis elements and interpretation criteria by dimension used in the analysis of arts and physical education program operations.

Table II
Classification criteria by dimension for arts and physical education programs

Dimension	Key Analysis Factors	Analysis
Normative Dimension	Holistic education, creativity, cultural and artistic experiences, one art/sports activity per person	The Educational Value and Policy Direction of Arts and Physical Education Programs
Structural Dimension	Elective programs, special talents and aptitudes, supplementary activities, customized and elective programs	Operation method of arts and physical education programs within the operational structure
Constitutive Dimension	School discretion, instructor supply, Office of Education support, parental demand	Relationships and operational processes among policy actors
Technical Dimensions	Differences in program scheduling, time allocation, budget, space, participation rate	Actual operating conditions and execution methods

Results

Analysis of relationships between dimensions

As a result of analyzing the operation of arts and physical education programs from the perspective of multidimensional relationships, a total of six relationships between the dimensions were derived. All six relationships explained the characteristics of arts and physical education program operations, but showed differences in repeatability in the data, direct relevance to the research question, the degree of explanation regarding the difference between policy values and operations and the connection with institutional characteristics. Accordingly, the relationships between the six dimensions were classified into key relationships and auxiliary relationships based on the analysis criteria presented earlier. In this section, auxiliary relationships were analyzed after the key relationships were analyzed. The following is the analysis of the key relationships.

Analysis of key relationships

Table III
Key relationship analysis results

Relationship Types	Interdimensional relationships	Analysis
Key Relationships	Norm-Structural	Relationship between policy values and operational structure
	Norm-Technical	Relationship between policy values and operational processes
	Structural- Constitutive	The relationship between the operational structure and the operating entities

As a result of the analysis, the key relationships were derived as norm-structural, norm-technical, and structural-constitutive relationships. These three key relationships were identified as key relationships explaining the operational characteristics of arts and physical education programs, focusing on the relationships between policy values, operational structure, operational process, and operating entities.

In the norm-structural relationships, while policy emphasizes the universal operation of arts and physical education programs and the expansion of cultural and artistic experiences, actual operation was characterized by school autonomy and a selective curriculum system. In particular, arts and physical education programs in after-school education are organized and operated autonomously, reflecting the school's educational environment and the demands of students and parents, and are characterized by not being institutionalized as a mandatory operational area. Accordingly, program operation may vary depending on the operating conditions and educational priorities of each school. These results suggest that there may be a discrepancy between the values pursued by the policy and the operational structure.

Next, in the norm-technical relationship, the values of creativity, expansion of cultural and artistic experiences, and holistic education pursued by the policy appeared alongside management-oriented operational elements such as participation rates, safety management, and program performance during the actual operation process. This shows a tendency for the qualitative educational value at the policy level to combine with a management-centered operational method in the actual operation process.

Meanwhile, in the structure- constitutive relationship, differences in the autonomous operation structure of schools and the capabilities of operating entities appeared together, revealing patterns related to differences in program operation between schools and regions. Relevant policy documents and prior research have suggested that program operation may be related not only to physical conditions such as school-specific budget, space, and personnel, but also to the expertise and operational experience of administrators and instructors (White et al., 2022). Based on these findings, this study interpreted that differences in operational structure and operating entities are likely related to differences in program operation.

The comprehensive results showed that key relationships explain the key characteristics of arts and physical education program operations, centering on policy values, operational structure, implementation processes, and relationships among operating entities. These key relationships were subsequently utilized as a basis for analyzing the structure of interdimensional interaction and interpreting the institutional characteristics of arts and physical education program operations.

Analysis of auxiliary relationships

Table IV
Results of auxiliary relationship analysis

Relationship Types	Interdimensional Relationships	Analysis
Auxiliary Relationship	Norm-Constitutive	Policy Values and Operating Entities
	Structural-Technical	Operational structure and operational process
	Constitutive -Technical	Operating entity and operation process

As a result of the analysis, auxiliary relationships were identified as norm-constitutive, structural-technical, and constitutive-technical. These three auxiliary relationships were found to complement the key relationships and explain the detailed characteristics that appear during the operation of arts and physical education programs.

In the norm-constitutive relationship, an aspect emerged in which the educational goals presented by the policy could be reconfigured depending on the role of the operating entity and the school's operating method. This suggests that even with the same policy objective, the method of operation can vary depending on the interpretation of the school and the operating entity.

In the structural-technical relationship, operational conditions such as budget, space, and time were found to be related to the program's scope of execution and operational methods. In other words, program operation tended to be carried out within the scope of the resources and operating conditions secured by the school.

In the constitutive -technical relationship, the roles, expertise, and operational experience of school administrators and instructors were found to be related to the implementation of the program. This suggests that even with an identical or similar operating environment, differences in program operation methods may arise depending on the role and experience of the operating entity.

As a comprehensive result, it was found that auxiliary relationships complement the operational characteristics observed in key relationships and explain the detailed characteristics that appear in the operation of arts and physical education programs.

Analysis of interaction structures between key dimensions

In the previous section, key and auxiliary relationships related to the operation of arts and physical education programs were derived. The relationships between the derived dimensions were analyzed to not merely independently, but to connect and combine with one other, forming an interactive structure for the operation of arts and physical education programs. Accordingly, in this section, based on the multidimensional analysis framework of Figure 3, we analyzed how the interaction between dimensions appears in the structure on key relationships. Figure 3 presents a multidimensional analytical framework for analyzing the operation of arts and physical education programs in normative, structural, constitutive, and technical dimensions.

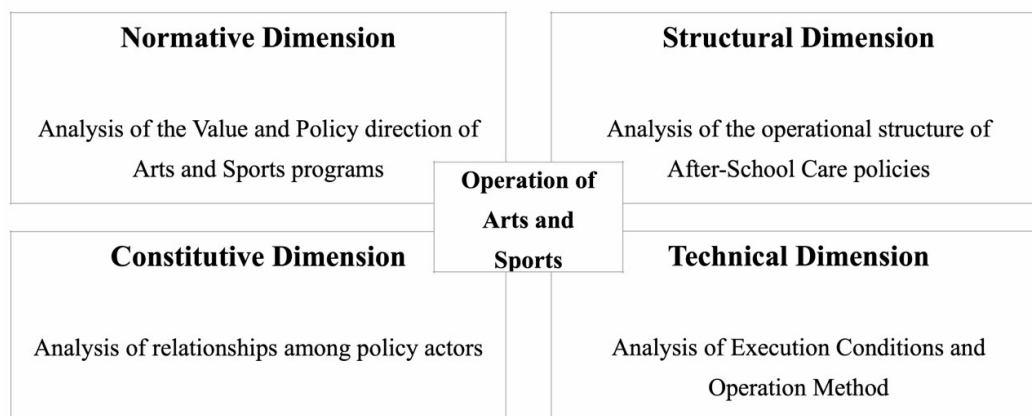


Fig. 3 Multidimensional analytical framework for the operation of arts and physical education programs Source: Author's own elaboration

Interaction of key relationships

In the norm-structural, norm-technical, and structural-constitutive relationships derived the previous section emerged as key relationships explaining the operation of arts and physical education programs. In this section, the basic structure of inter-dimensional interactions was analyzed focusing on these key relationships.

In the norm-structural relationship, a connection was observed between the educational values pursued by the policy and the autonomous operational structure of the school, while in the norm-technical relationship, the policy values and actual operational processes combined to materialize into operational methods. Furthermore, in the structural-constitutive relationship, it was found that the school's autonomous operation structure and the role of the operating entity are combined and related to the program operation.

These results indicate that key relationships do not appear independently but rather form the basic interaction structure of arts and physical education program operation within interdimensional relationships. These key relationships serve as a foundation for analyzing core complex interaction structures in the future.

Complex interaction structure

The key relationships derived earlier were found to form a more complex interaction structure when combined with other dimensions. Policy values were found to be linked to the actual operational process through the relationship between the operational structure and operating entity, and the operational structure was also found to form a complex relational structure of arts and physical education program operation by combining with the operating entity and the operational process.

These results suggest that relationships between individual dimensions can become interconnected and combined, emerging as more complex interaction structures. This structure serves as the foundation for analyzing an interaction structure that considers normative, structural, constitutive, and technical dimensions together in the following section.

Integrated interaction structure

An analysis considering the dimensions of norm, structural, constitutive, and technical together revealed that each dimension is interconnected, forming an integrated interaction structure for the operation of arts and physical education programs. The key relationships and complex interaction structures derived earlier emerged as a single integrated relationship structure when the four dimensions were considered together.

Policy values were linked to the operational processes through the operational structure, and the operational structure showed aspects related to the program operation method within the relationship with the operating entity. Furthermore, the execution patterns observed during the operation process were analyzed to be related to the operational structure and the method of implementing policy values, that each dimension appearing within an interdependent relationship rather than being interdependent.

These results can be interpreted as the normative, structural, constitutive, and technical dimensions forming an integrated interactional structure of arts and physical education program operation by connecting and combining with each other rather than operating individually.

Integrated interaction structure and institutional characteristics

Table IV Synthesizes the inter-dimensional interaction structures analyzed earlier and summarizes the relationship between these relational structures and the institutional characteristics of arts and physical education program operations.

Table V
Integrated interaction structure and institutional characteristics of arts and physical education program operation

Key Steps	Dimensional relationship	Operation details
Presenting policy values	Normative	Presentation of policy objectives and educational values
Relationship between policy values and operational structure	Norm-Structural	Difference between policy values and school operational structure
Relationship between operational structure and execution conditions	Structural- Constitutive- Technical	Differences in implementation methods based on operating entities and conditions
Integrated interaction structure	Norms-Structural- Constitutive-Technical	The way policy values, operational structure, operating entities, and implementation processes are interconnected
Institutional characteristics	Norms-Structural- Constitutive-Technical	Institutional characteristics of arts and physical education program operation in relation to integrated interaction structure

As shown in Table IV, policy values, operational structure, operating entities, and implementation processes appeared in interconnected relationships. In particular, differences in policy values and operational structure, as well as differences in implementation methods based on

operating conditions and operating entities, were analyzed to be related to the institutional characteristics of arts and physical education program operation.

Figure 4 is a diagram that synthesizes the relationships between the dimensions of norms, structural, constitutive, and technical observed in the operation of arts and physical education programs. It presents the interaction structure of arts and physical education program operations as each dimension is interconnected, focusing on key and auxiliary relationships.

Dimension	N	S	C	T
Main Contents	Universal operational goals • Emphasis on creativity and holistic education • Pursuit of equity and public interest	Operating system and Conditions • School autonomy and Choice-centered • Resource allocation and support structure	Characteristics of the operating entity • School, teachers, students • Competencies, roles, awareness, etc	Operation methods and evaluation • Programs content and Methods • Operational evaluation system, tools
Interdimensional interaction	N - S ↔ N - T ↔ S - C ↔ C - T			
	• Difference between policy values and operational structure	• The relationship between policy values and operational process • Combination of educational values and management and operational indicators	• Differences based on operating conditions • Differences in autonomous operational structures and operating entities are related to operational differences between schools and regions	• Difference in Operating methods • Possibility that the implementation method will after depending on the role and experience of the operating entity
	N - C Relationship between policy objectives and operating entities		S - T Relationship between operating conditions and program execution scope and method	

Fig. 4 Interdimensional Relationships and Interaction Structures in Arts and Physical Education Program Operation Source: Author's own elaboration

Integrated interaction structure and institutional Characteristics of arts and physical education program Operation

This section analyzed the institutional characteristics observed in the operation of arts and physical education programs. The analysis revealed four distinct institutional features: the persistence of a selective program structure, the strengthening of a quantity-centered operational system, deepening operational disparities and regional imbalances, and the persistence of institutional limitations.

Sustaining optional program structure

The analysis revealed that arts and physical education programs are characterized by autonomous organization and selective operation within schools, rather than being institutionalized as independent, mandatory curriculum areas. Consequently, the inclusion of programs and their scope of operation may vary depending on individual school conditions and priorities, this characteristic suggests that arts and physical education programs are continuously operated within a selective program structure.

Strengthening the quantity-oriented operating system

The operation of arts and physical education programs was characterized by a quantity-oriented operational system, as policy values centered on creativity and holistic education combined with an evaluation framework focused on participation rates, satisfaction, and safety management during actual implementation. In particular, there was a tendency to relatively emphasize operational efficiency and management-oriented elements over the quality of educational experience or artistic growth during the program operation process. This characteristic suggests that

the operation of arts and physical education programs is characterized by being managed within a quantitative operational system alongside a structure centered on qualitative educational activities.

Operational disparities and regional imbalances

The simultaneous appearance of differences in school autonomous management structures and the capabilities of operating revealed characteristics related to operational disparities between schools and regions. In particular, it was analyzed that program operation can vary depending not only-specific school's budget, space, and personnel conditions but also on the expertise and operational experience of the operating entities. Furthermore, it was found that these differences are potentially related not only to the level of program operation but also to differences in students' cultural and artistic experiences and learning experiences (Mak & Fancourt, 2021; Wei & Broome, 2022). Consequently, the operation of arts and physical education programs exhibited institutional characteristics in which operation patterns can vary depending on differences in the operating environments of schools and regions.

Institutional limitations

The analysis revealed that despite the continuous policy emphasis on the importance of operating arts and physical education programs, there are limitations to the institutional foundation for their stable operation. In particular, the operational structure relying on school autonomy, differences in operating conditions between schools and regions, and limitations in the operational evaluation system were identified as limiting factors related to the stability and sustainability of arts and physical education program operations. This may be related to differences in the level of operation among schools and suggests that there may be limitations in the consistently realizing the educational values pursued by the policy.

Conclusion

This study applied Cooper et al. (2004)'s multidimensional educational policy analysis model to analyze how the operation of arts and physical education programs in Korea's elementary after-school care policy manifests as an institutional characteristic within the interdimensional relationships and interaction structures. The analysis revealed that the operation of arts and physical education programs manifests within a relationship where the dimensions of normative, structural, constitutive, and technical are interconnected and combined, rather than operating independently. This interaction structure was found to be related to the gap between the educational values pursued by policy and actual operation, and was connected to characteristics such as the persistence of a selective program structure, the strengthening of a quantity-centered operational system, operational differences between schools and regions, and institutional limitations.

Unlike existing studies that analyzed the operation of arts and physical education programs based on policy effects or individual operational elements, this study analyzed the difference between policy values and actual operation from the perspective of multidimensional relationships. In particular, by utilizing Cooper et al. (2004)'s multidimensional educational policy analysis model to derive key and auxiliary relationships and analyzing how these relationships are connected and combined, this study systematically presented the interaction structure of arts and physical education program operations. This differs from existing research in that it extends the application of Cooper et al. (2004)'s model beyond the analysis of individual dimensions to the analysis of relationships between dimensions.

Furthermore, this study suggests that, from a policy perspective, improving the operation of arts and physical education programs requires an approach that comprehensively considers policy values, operational structures, and operational evaluation and systems, rather than merely limiting it to program expansion or performance enhancement. In particular, along with institutional support to mitigate operational disparities between schools and regions, there is a need to supplement the operational evaluation system to reflect qualitative educational values, such as cultural and artistic experiences.

Although this study was conducted on South Korea's elementary after-school care policies, it holds international implications in that it analyzed the implementation process of educational policies from the perspective of multidimensional relationships and interactions. This analytical perspective can be applied to analyze the relationship between policy values and actual operations in other countries implementing after-school programs and arts and culture education policies. In addition, it has the potential to be utilized in subsequent research on the comparison of education policies between countries and the policy implementation process.

On the other hand, this study has limitations in that it was a literature analysis conducted primarily based on policy documents and prior research, as it failed to directly reflect the actual operational experiences of schools and the perceptions of various stakeholders. Furthermore, it was not possible to compare operational cases by school and region, or to empirically verify differences in the actual program operation process. Therefore, subsequent research needs to analyze how policies are implemented in actual operations through school field case studies and in-depth interviews, and studies are required to empirically verify the impact of differences in operating conditions between schools and regions on the level of program operation and students' cultural and artistic experiences.

Author Contributions

Chae Lin Kim: Conceptualization, Methodology, research, data collection and organization, format analysis, visualization, and manuscript writing.
Seungyon-Seny Lee: Supervision, verification, and review/editing. All authors read and approved the final manuscript.

Data Availability Statement

In this study, a literature analysis was conducted based on the Ministry of Education's guidelines and official documents.

Declaration of AI-Assisted Language Editing

AI-assisted tools were used solely for proofreading and improving the grammar and readability of the authors' original text. They were not used to generate research content, conduct data analysis, interpret the findings, or draw conclusions.

Conflict of Interest

The authors declare no conflict of interest.

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