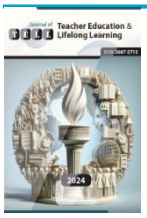

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Examination of Science and Art Center Course Materials According to Maker Differentiation Principles

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ABSTRACT

The main factor in the emergence of this research is that the current educational materials prepared for gifted students are not based on a theoretical basis, curriculum differentiation and models are not taken into consideration in the preparation of activities for gifted students, gifted education principles are not reflected in the curricula, and applications related to gifted students are not monitored and evaluated. This study aims to examine the activities included in the supplementary course materials prepared for Science and Technology in Science and Art Centers according to the Maker-Banks Differentiated Instruction Assessment Model. In line with the research objective, a total of 31 activities in the field of science and technology were examined for students included in the support education program prepared in 2022 by the Directorate General of Special Education and Guidance Services. The "Instruction Program Evaluation Form According to the Maker-Banks Model" was used as the data collection tool. It was concluded that the activities included in the supplementary course materials prepared for Science and Technology in Science and Art Centers do not meet the content and process conditions according to the Maker-Banks Differentiated Instruction Assessment Model. It was found that the activities met the conditions of economy, reasoning, teaching pace, openness, exploratory learning, higher-order thinking, real-life problems, and product evaluation. When new activities and materials are prepared for gifted students, the criteria that were weak in the Maker-Banks Model in this study can be strengthened. The qualities of the prepared activities can be evaluated according to the criteria in the Maker-Banks Model. It is believed that this study will pave the way for new studies by evaluating activities prepared for areas other than science and technology and for different grade levels according to the criteria in the Maker-Banks Model.

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INTRODUCTION

When considering the cognitive, affective, and personal characteristics, needs, and potentials of gifted and talented children, it is evident that they require special education. Due to the fact that the current educational programs implemented in today's education system are prepared considering the learning characteristics and needs of typical students, the areas and subjects covered by the program do not meet the needs of gifted students. Therefore, gifted students may experience various disadvantages in a regular classroom environment if certain measures are not taken (Özbay, 2013). Currently, in Turkey, the only out-of-school support education model implemented for gifted students is the Science and Art Centers (BİLSEM) model. BİLSEM aims to respond to the needs of students with leadership spirit and creativity, to provide project-based learning through hands-on experience, and to integrate the social and emotional development of students into their education (Ministry of National Education [MEB], 2019). Academically, gifted students need to have a good general education; they need to be intellectually challenged and therefore motivated; and they need to be independent in their studies, thinking, and learning (Altıntaş & Özdemir, 2015; Lubinski & Benbow, 2006; Willey & Phillips, 2001; Tomlinson & Allan, 2000; Tomlinson, Brimijoin & Narvaez, 2008). Gifted students require challenging activities and content, differentiated lesson plans and programs, active learning processes, a learning environment with adequate physical infrastructure, and legal regulations to meet their needs (Davis, Rimm & Siegle, 2014). One of the strategies used to meet these needs is differentiation.

Changes made to meet students' different readiness levels, interests, and needs are explained by the term "differentiation" in the literature. The curriculum and teaching materials prepared for gifted students should adhere to the principles of differentiation used in gifted education. The main reason why regular curricula are inadequate for gifted students' education is the lack of challenge they provide, necessitating a different approach to their education from mainstream education. Adapting the curriculum to the learner's nature, i.e., differentiation, has long been an accepted approach in the education of gifted individuals (Tomlinson & Jarvis, 2000). At the core of differentiation lies the preparation of an educational program that addresses the needs of individuals in different learning domains by emphasizing their educational requirements and enhancing their learning capacity. For this purpose, teachers can resort to content, process, and product differentiation processes based on students' readiness levels, interests, and learning styles. The curriculum and instructional arrangements should be comprehensive in terms of gifted students' learning styles, interests, and readiness levels. Differentiation can be applied in all or some elements of the curriculum—content, process, and product—based on differences in readiness levels during the planning of the educational process. Similarly, the same practice can be applied based on differences in student interests and learning profiles. Before commencing instruction, it is essential to identify differences in individuals' learning styles, rates, interests, and readiness levels (Heacox, 2002). Various differentiated instructional strategies are observed for gifted individuals. The reason why a standard education and training program cannot be established for gifted individuals is that each of these individuals possesses different talents when their abilities are examined. Therefore, it is crucial to prepare individualized education programs for gifted individuals in a way that enhances their interests and talents (Van Tassel-Baska & Stambaugh, 2005). Enrichment models are generally implemented in every developed country today (Ataman, 1998). Gifted individuals need to conduct in-depth research on subjects they are interested in. This is because these individuals are highly skilled at making connections between topics and understanding the relationships between them. The instructional program implemented in the learning environment should be designed to meet the needs of gifted students while also addressing the needs of other individuals (Walker, Hafenstein & Enslow, 1999). One of the models applied for curriculum differentiation is the Maker Curriculum Differentiation Model. Maker (1982), known for his proposal for differentiated curriculum, has put forth a model bearing his name.

Maker Curriculum Differentiation Model discusses how the instructional program can be

differentiated into four main categories: content, product, process, and learning environment. The general purpose of these sub-dimensions is to ensure that the program is designed within specific guidelines and that the characteristics of gifted and talented individuals are taken into account during the design process. According to Maker (1982), both qualitative and quantitative differentiation of curriculum elements is necessary in the education of gifted students. Maker also argues that differentiated instruction should be provided to gifted students and elaborates on how this instruction can be differentiated into four different sub-dimensions in his work.

The content dimension of the instructional program encompasses the concepts, approaches, theories, ideas, and other types of knowledge intended to be acquired by students. Content can take various forms such as figurative forms like objects, shapes, pictures, and graphics; symbolic forms like letters, numbers, and mathematical symbols; semantic forms like words and ideas, and behavioral forms like information related to emotions, perceptions, and behaviors. When developing the instructional program tailored to the characteristics of gifted students, the content of the program should be enriched to a greater extent than regular instructional programs in terms of abstraction, complexity, and diversity. It should cover the lives of gifted individuals, scientific research methods, and discipline-specific generalizations.

The process dimension of the instructional program encompasses the ways in which the content of the instructional program is taught and the ways in which students learn and use knowledge. Process differentiation includes the learning and thinking types used by students in learning activities, the pace of instruction, students' logical approach styles, reasoning, learning through exploration, research methods, and the variety of instructional methods. In education programs targeting gifted students, particular emphasis is placed on process differentiation. This trend can be attributed to the advanced thinking skills of gifted students and their recognition as the creative adults of the future.

The product dimension of the instructional program should not be considered independently of either the content or process dimensions. This is because the product is a result of both the content and the presentation format of the content, which is the process. Learning outcomes consist of student products such as ideas, problem solutions, applications, reports, photographs, visual or auditory programs, stories, poems, novels, compositions, dances, or drawings. Regardless of the type of product, both content and process play an active role in its formation. Student products can be created through activities planned and managed by teachers or entirely through activities designed, planned, and managed by students themselves. In the education of gifted students, student products should aim to resemble professional products as much as possible. Therefore, products should be developed to solve real-life problems, include an intention to influence an audience, emphasize synthesis rather than imitation, be evaluated using objective criteria, and be designed with consideration for the characteristics of the target audience.

Maker (1982) proposed that learning environments can be used in the differentiation of instructional programs. The learning environment refers to the classroom, school, or other settings where learning opportunities are provided to students. An ideal learning environment is one that is designed to facilitate active participation of students in all types of learning activities. Among learning environments, classrooms are considered the most important, and they should resemble learning laboratories or workshops where both individual and collaborative work takes place. In such an environment, there should be an interaction-based relationship between students and teachers, characterized by both mentorship and mutual learning and guidance. The learning styles and preferred learning environments of gifted students vary greatly. For example, some students prefer quiet environments, while others prefer environments with mild noise or music. Some students prefer individual work, while others prefer group work. Moreover, student preferences may change over time and depending on the type of learning activities.

An ideal learning environment can be described as one that is flexible enough to accommodate a

wide range of individual preferences. By implementing differentiated instruction in the four dimensions mentioned above, the needs of gifted students can be met. However, it is also necessary for instructional materials provided to gifted students to be prepared in a manner suitable for differentiation. Considering Maker's proposed dimensions during the preparation of instructional materials is believed to enhance the effectiveness of teachers' education delivery.

Teachers instructing gifted students should systematically evaluate how well their activities align with student characteristics and how much they enhance students' creative capacities (Sak, 2013). In Turkey, there are deficiencies in both the instructional models used for gifted students and the instructional materials available for use. While some materials have been developed for use in Science and Art Centers (BİLSEM) for gifted students, it is unclear how suitable these materials are for the education of gifted and talented students. There is a curiosity about whether the materials to be implemented in BİLSEM for gifted students meet the necessary criteria. Therefore, it is important to examine the suitability of the content of auxiliary teaching materials for the education of gifted students in accordance with the strategies used. The current lack of theoretical basis for prepared materials, the absence of activities based on differentiation and models for gifted individuals, the failure to reflect gifted education principles in programs, and the lack of monitoring and evaluation of practices related to gifted individuals (Kurnaz, 2014; Sak, 2013) constitute the problem of this research. This study aims to examine the activities in the auxiliary teaching materials prepared for Science and Technology at Science and Art Centers according to the Maker-Banks Differentiated Instruction Assessment Model. In this regard, the following question is addressed.

The alignment of the content, process, and product elements of the Support Education Program Course Material in Science and Technology at BİLSEM with the differentiation criteria of the Maker Banks Evaluation Principles is examined in the research. Based on the main research question, the following questions are addressed:

RQ1: How suitable are the activities in the BİLSEM Support Education Program Course Material for the "Content," "Process," and "Product" elements of the Maker Banks Program Differentiation Criteria?

RQ2: How suitable are the activities in the BİLSEM Support Education Program Course Material for the criteria under the "Content" elements of the Maker Banks Program Differentiation Criteria?

RQ3: How suitable are the activities in the BİLSEM Support Education Program Course Material for the criteria under the "Process" elements of the Maker Banks Program Differentiation Criteria?

RQ4: How suitable are the activities in the BİLSEM Support Education Program Course Material for the criteria under the "Product" elements of the Maker Banks Program Differentiation Criteria?

METHOD

Research Design

The research utilized document analysis as a qualitative research method. Qualitative research aims to explore the meanings behind phenomena and uncover how human experiences can be interpreted and understood, with the researcher playing a participatory role and employing a flexible structure (Merriam, 2009); it is characterized by rich descriptions and employs an inductive research approach (Glesne, 2011). While document analysis has traditionally been perceived as a research method exclusive to disciplines such as anthropology, librarianship, and history, it has also been used as an additional method in social sciences alongside methods like surveys, interviews, and observations (Mogalakwe, 2006). However, recognizing the importance of this method (Kozak, 2017) and its advantages (Yıldırım & Şimşek, 2013), it has increasingly been employed in social sciences. This is because document analysis, while being equally effective as commonly used methods like surveys, in-depth interviews, or participant observations in social sciences, is sometimes more cost-effective

(Mogalakwe, 2006).

Document analysis, also known as documentary research, involves examining existing records and documents to obtain data. It encompasses the processes of finding, reading, note-taking, and evaluating sources with a specific purpose in mind (Karasar, 2005). In other words, document analysis is a series of operations that involve examining and evaluating printed and electronic (computer-based and internet-accessible) materials (Bowen, 2009). This process is also defined as the examination of written materials containing information about the phenomena under investigation (Yıldırım & Şimşek, 2013). Document analysis involves collecting, reviewing, questioning, and analyzing various forms of written texts as a primary source of research data (O'Leary, 2017). Merriam (2009) mentioned the abundance of societal documents that researchers working on educational topics can benefit from, including opinions on education, documents prepared by public institutions or private organizations, and personal records. In the field of education, educational programs, course content, the effectiveness of a given education, and educational practices can be investigated through document analysis. In short, the collection and examination of various written documents, records, productions, or artifacts created by other individuals or institutions regarding the research topic are considered document analysis (Seyidoğlu, 2016). In this research, the BİLSEM Support Education Program Course Material in the field of Science and Technology has been evaluated as a document according to the Maker Banks Evaluation Model Principles.

Research Sample

The activity booklet prepared for students in the Support Education Program from the BİLSEM Science and Technology Field was chosen as the document. The selection of the Science and Technology field as the document was based on the consideration that it offers a concrete application of the Maker-Banks principles and is particularly suitable for differentiation in BİLSEM centers. In selecting the Support Education Program activities, the class level that could best meet the criteria outlined in the Maker Banks Instructional Differentiation Principles was considered. The belief that as the class level progresses, the materials prepared would reach the highest level of instructional stages was one of the factors influencing the selection of this material for examination.

Research Processes

In accordance with the purpose of the research, a total of 31 activities in the field of science and technology were examined in the auxiliary teaching materials prepared for students in the support education program by the Directorate of Special Education and Guidance Services in 2022. The mentioned activities are application proposals or study plans that are given in line with the objectives and requirements of the relevant disciplines for teachers to use in their practices, taking approximately one class hour. The "Curriculum Evaluation Form According to the Maker-Banks Model" was used as the data collection tool. The "Curriculum Evaluation Form According to the Maker-Banks Model" was prepared by taking into account the recommendations and criteria proposed by Maker (1982) in the Maker Curriculum Differentiation Model, which includes differentiation of the curriculum into four main headings: content, product, process, and learning environment. The evaluation form has been used in various studies (Avcı, 2015; Elmas, 2020; İnan, 2023; Kutlu-Abu, 2018). During the research process, the criteria of the relevant model were first examined. Then, three researchers decided which lessons and stages of the Support Education Program materials from BİLSEM Auxiliary Teaching Materials would undergo document analysis. After determining the document to be examined, the review process and how to ensure consistency among the reviewers were established. At this stage, the criteria in the relevant model were discussed individually by the researchers, and a consensus was reached on each criterion.

Data Analysis

The research data were analyzed using descriptive analysis technique. The analysis results were

expressed in terms of frequency and percentage values. The criteria for evaluating the Teaching Program according to the Maker-Banks Model were read and discussed by the evaluators, thus ensuring conceptual agreement. The activities were evaluated by three experts, and inter-rater reliability was calculated. A matrix regarding the conformity of activities to the criteria was prepared and given to the experts. When there was a disagreement among the experts regarding the conformity to the criteria for the same activity, the marking made by the researcher was accepted, but this situation was considered as a divergence of opinion. Reliability = Agreement / (Agreement + Disagreement) was used, and the rate of agreement among the coders was determined to be 87.9%.

Ethic

According to section 40/8 of the Graduate Education and Training Regulation of Necmettin Erbakan University, ethical committee approval is not mandatory for document analysis and similar studies.

FINDINGS

The Maker Instructional Program is built upon four main pillars: content, process, product, and learning environment. When analyzing the activities, three sub-dimensions, namely content, process, and product elements, were included in the evaluation.

In the first research question, the suitability of the activities in the BİLSEM Support Education Program Materials was examined in terms of the "Content," "Process," and "Product" elements of the Maker Banks Program Differentiation Principles. Findings regarding the appropriateness of these sub-dimensions in the activities are presented in Table 1.

Table 1. *Findings regarding the distribution of differentiation elements in activities*

Sample	Number of Reviewed Activities	* Group Average	** Average of Elements	%
Process			19.66	63.42
Content	31	15.09	12	38.70
Product			11.83	38.16

* Group average is the average presence of criteria from the Maker-Banks Instructional Program Differentiation Principles in the examined 31 activities.

** The average of elements is the average presence of each element in the 31 activities.

When Table 1 is examined, it is observed that the activities meet the criteria in the process element by 63.42% and are above the group average. According to Table 1, it can be said that the prepared activity contents are enriched more than regular teaching materials in terms of abstraction, complexity, and diversity, covering the lives of genius individuals, scientific research methods, and discipline-specific generalizations better. However, there are still aspects that need further improvement. It has been concluded that the activities need to be developed in the content (38.70%) and product (38.16%) sub-dimensions, and activities should be created taking into account the contents in these sub-dimensions.

The second question of the research aimed to answer the question: "How suitable are the activities in the Support Education Program Lesson Material of BILSEM for the criteria in the 'Content' sub-dimension of the Maker Banks Program Differentiation Elements?" In the content sub-dimension, 31 activities were examined under the headings of "Abstraction, Complexity, Diversity, Organization, Distinguished Individuals, Methods, Economic Efficiency." The findings related to the second question are presented in Table 2.

Table 2. *Findings regarding the content element*

Sample	Number of Reviewed Activities	Group Average	f	%
Economy	3	15.	28	90.32

Abstraction			13	41.94
Methods			12	38.71
Complexity			11	35.48
Diversity	1	09	8	25.80
Organization			6	19.35
Distinguished Individuals			6	19.35

Upon examining Table 2, it is observed that the criterion of "economy" (90.32%) is present in the activities above the group average, indicating that the activities are suitable. The findings suggest that the content of the activities is designed to be economical in terms of time and resources. When other sub-dimensions are examined, it can be said that the criteria of "abstraction" (41.94%), "methods" (38.71%), and "complexity" (35.48%) are less represented in the activities. It can be stated that the criteria of "diversity" (25.80%), "organization" (19.35%), and "distinguished individuals" (19.35%) are scarcely represented in the activities.

In the third question of the study, the compliance of the activities in the Support Education Program materials of BİLSEM with the criteria of the "Process" sub-dimension, one of the Maker Banks Program Differentiation Elements, was investigated. Within the Process sub-dimension, 31 activities were examined under the headings of "Higher Order Thinking, Open-endedness, Exploratory Learning, Reasoning, Freedom of Choice, Process Diversification, Research Methods, Instructional Pace, Group Interaction." The findings related to the third question of the study are presented in Table 3.

Table 3. *Findings regarding the process element*

Sample	Number of Reviewed Activities	Group Average	f	%
Reasoning			30	96.78
Pace of Instruction			30	96.78
Open-endedness			29	93.55
Exploratory Learning			27	87.10
Higher Order Thinking	31	15.09	25	80.64
Variety in Process			14	45.16
Group Interaction			12	38.70
Freedom of Choice			5	16.13
Research Methods			5	16.13

Upon examining Table 3, it is found that in the 31 activities analyzed, the criteria of "Reasoning" (96.78%), "Pace of Instruction" (96.78%), "Open-endedness" (93.55%), "Exploratory Learning" (87.10%), and "Higher Order Thinking" (80.64%) are present in the activities above the group average, indicating that these criteria were considered when preparing the activities. In other sub-dimensions, it can be noted that the criteria of "Variety in Process" (45.16%) and "Group Interaction" are less represented in the activities. It can be inferred that the criteria of "Freedom of Choice" (16.13%) and "Research Methods" (16.13%) are minimally represented in the activities.

In the fourth question of the research, the suitability of the activities in the BILSEM Support Education Program Materials to the criteria of the "Product" sub-dimension of the Maker Banks Program Differentiation Elements was investigated. Within the Product sub-dimension, 31 activities were examined under the titles of "Real-life Problems, Authentic Audience, Product Diversification, Synthesis Product, Transformations, Product Evaluation." The findings related to the fourth question of the research are presented in Table 4.

Table 4. *Findings regarding the product element*

Sample	Number of Reviewed	Group Average	f	%

Activities				
Real-life Problems			28	90.32
Product Evaluation			25	80.64
Synthesis Product	3	15.	8	25.80
Diversification	1	09	7	22.58
Authentic Audience			2	6.45
Transformations			1	3.23

When Table 4 is examined, it is found that the criteria of "Real-life Problems" (90.32%) and "Product Evaluation" (80.64%) are present in the activities at a level above the group average, indicating that these criteria were considered in the preparation of the activities. In contrast, in the other sub-dimensions, it can be said that the criteria of "Synthesis Product" (25.80%), "Product Diversification" (22.58%), "Authentic Audience" (6.45%), and "Transformations" (3.23%) are present in the activities to a very limited extent.

DISCUSSION, CONCLUSION, RECOMMENDATIONS

The auxiliary teaching materials prepared for Science and Art Centers in the field of Science and Technology do not adequately meet the criteria of content, process, and product in the Maker-Banks Differentiated Instruction Evaluation Model. It has been concluded that the activities fulfill the criteria of economic viability, reasoning, teaching pace, openness, exploratory learning, advanced thinking, real-life problems, and product evaluation at a satisfactory level. However, it is noted that the criteria in other sub-dimensions need improvement. A review of the literature reveals that there are no similar studies examining the auxiliary teaching materials prepared by the Ministry of National Education Special Education and Guidance Services General Directorate and made available to BİLSEM teachers, taking into account a curriculum differentiation model's criteria. Therefore, this study is original. Hence, similar studies examining activities prepared by teachers or researchers and implemented in BİLSEMs will be discussed in this section.

According to the findings, it has been concluded that the content of the activities is designed to be economical in terms of time and resources. However, considering that abstraction is not achieved in the activities, it is necessary to include more abstract concepts when preparing the activities. There is a need for more interdisciplinary connections suitable for the education of gifted students. It has been concluded that in activities prepared for students, more opportunities should be provided for students to observe, classify data and information, interpret research findings, and evaluate the scientific evidence underlying interpretations. It has been found that very little space is given to eminent individuals' lives in the prepared activities. Biographies, autobiographies, letters, and manuscripts of eminent individuals, along with their successes and failures, social and emotional problems, relationships, family lives, professional developments, and milestones in their lives should be included, allowing students to interview creative individuals, observe them, and write biographies about them. More diversity should be included in the content of activities, and topics and disciplines not covered by the standard curriculum should also be included.

According to the findings, it has been concluded that the activities frequently include higher-order thinking skills such as analysis, synthesis, and evaluation; as well as questions and problems that require advanced thinking skills such as creative thinking and critical thinking. The activities also incorporate open-ended questions. It has been found that the activities allow students to engage in reasoning and exploratory learning. Çaylak (2019) aimed to examine science activities conducted in Science and Art Centers in his thesis study. In line with this aim, a total of 80 activity plans prepared and implemented by 3 Physics, 3 Chemistry, and 2 Biology teachers at the high school level were examined. As a result of the research, it was found that the majority of the prepared activities did not go beyond the application stage in Bloom's Taxonomy. In our study, it was demonstrated that the activities frequently include questions and problems that require advanced thinking skills. Therefore, the results of our study are not consistent with the findings of the mentioned study. Genç (2013) aimed to see the

outcomes of interdisciplinary activities in visual arts education for gifted students in his thesis study. In line with this aim, activities with good levels of interest and participation from students were implemented by relating them to other disciplines. It was also concluded that interdisciplinary activities contributing to the development of students' creative thinking and problem-solving skills positively affect students' application skills and that the activity method would be beneficial to be applied in other disciplines as well. In our study, the inclusion of questions requiring advanced thinking skills in the activities was found to be positive. Therefore, it can be said that our study aligns with the mentioned study. Accordingly, when preparing activities, it is necessary to consider the development of students' higher-order thinking skills.

It has been found that teacher presentations in activities have been kept as short as possible and repetitions have been avoided. However, it was concluded that the majority of the activities were not designed to increase group interaction to support peer teaching. Bozkurt et al. (2019) examined the methods and techniques used in mathematics books prepared for use in Science and Art Centers in their study conducted in 2019. For this purpose, the methods and techniques used for each activity in mathematics framework books of DEP (Support Education Program), BYF (Individual Talent Recognition), and ÖYG (Special Talent Development) programs were analyzed. As a result of the research, it was observed that teacher-centered methods and techniques increased as the programs progressed. Teacher-student-centered methods and techniques were used more in the Support program. It was found that student-centered methods and techniques were the least preferred in all groups. According to the research results, it was concluded that the methods and techniques used in activities included in the programs of Science and Art Centers varied, but as the programs progressed, they became more teacher-centered rather than student-centered. In this study, the activity booklet prepared for students in the Support Education Program of BİLSEM Science and Technology Field Auxiliary Course Material was examined. It was concluded that the prepared activities reduced the teacher's influence and were student-centered. Therefore, it can be said that this study is consistent with our study.

The learning process in activities has not been sufficiently diversified with various teaching and learning methods. Direct instruction, film screenings, TV programs, field trips, seminars, workshops, computer-assisted instructions, structured discussions, individual work, group work, exploratory learning, and project-based learning, expert mentoring and observation, field trips, etc., could be included in the teaching program to allow students to choose their learning methods. Additionally, it was found that different options for decision-making by the student were not provided within the activities. Diversification can be achieved by giving students the chance to make choices within the activity. Only a small portion of the activities have focused on enhancing research skills as students progress through the activities. When preparing activities for students, considerations can be made to develop skills such as observation, data and information classification, interpretation of research findings, and evaluation of scientific evidence, which would enhance students' research skills.

The findings suggest that a significant portion of the activities include problems and project topics that personally, nationally, or universally capture students' attention, thus meeting the criterion of real-life problems. It was found that the majority of activities have established criteria for evaluating the products at the end of the activities and have enabled self-assessment by students. However, the focus has not been on products that allow students to reinterpret, detail, develop, combine, or differentiate, resulting in a lack of emphasis on products synthesized through these methods. Additionally, there should be diversity in the types of products students are expected to produce, and students should have the autonomy to decide the type of products they can develop. When designing their products, students should be encouraged to target real audiences such as school administration, municipality, art galleries, publishers, or other students, and have the opportunity to present their products to these audiences.

The recommendations derived from this study are as follows:

- Based on the finding that the instructional materials were not appropriately differentiated in terms of differentiation elements, all instructional materials can be designed to incorporate suitable differentiation elements.
- Considering the conclusion that the instructional materials were not adequately differentiated in terms of content elements, all instructional materials can be appropriately diversified in terms of content elements.
- Since the study suggests that the instructional materials were not sufficiently differentiated in terms of process elements, all instructional materials can be appropriately diversified in terms of process elements.
- Given the conclusion that the instructional materials were not adequately differentiated in terms of product elements, all instructional materials can be appropriately diversified in terms of product elements.
- When preparing activities for gifted students' education, activity characteristics can be designed by considering the criteria in the Maker-Banks Differentiated Instruction Assessment Model.
- Evaluation of compliance with criteria can be conducted not only for the field of Science and Technology but also for other fields.

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