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Evaluation of TUBITAK 2204-B Research Projects Invited to the Regional Exhibition from the Perspectives of Consultant Teachers

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Abstract

This study aims to evaluate the TUBITAK 2204-B Research Projects process from the perspective of the teachers who advise the projects invited to the regional exhibition. In this study, the phenomenology design, one of the qualitative research methods, was used. While determining the study group of the research, criterion sampling, one of the purposive sampling methods, was used. Five advisor teachers were included in the study group. While determining the participants of the study, it was noted that the consultants of the projects invited to the regional exhibition were among the teachers who provided consultancy in TUBITAK 2204-B Research Projects. Obtained data were analyzed by forming codes and themes by taking the opinions of the advisor teachers about the process. As a result of the findings obtained in this research, the prominent features of TUBITAK 2204-B Research Projects; it has a scientific and academic point of view, the idea of the project has an important place in the process, it increases the creativity of students and offers solutions to the problems encountered in daily life. It was concluded that the TUBITAK 2204-B Research Projects regional exhibition positively affected the participants by learning scientific research stages, increasing self-confidence, improving communication skills, gaining a new perspective, and generating new ideas.

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INTRODUCTION

It can be said that students should put forward entrepreneurial and productive projects, starting from the themes formed in science, engineering, and entrepreneurship practices within the current Science Curriculum in Turkey. In this sense, along with science, engineering, and entrepreneurship applications, students are expected to produce ideas with a new perspective, to transform these ideas into design or to plan for service, to come up with a slogan utilizing planning, to develop marketing strategies and to present their ideas. In addition, it is aimed at developing students' scientific process skills and producing solutions to existing problems by using scientific research logic. (Deveci and Daşçı, 2020). Although this approach was included in the 2018 training program, activities were carried out in previous years, especially within the framework of national projects. Within the framework of the protocol signed between the Scientific and Technological Research Council of Turkey (TUBITAK) and the Ministry of National Education (MEB) on 8 November 2004, a national project competition called "This is My Work" was organized, and this competition was carried out for ten years under the responsibility of the Ministry of National Education. In the following period, the competitions were suspended for one year, and in 2017, it was organized under the name of "Secondary School Students Research Projects Competition" and continued until today (Çeken, 2017). As stated in the 2204-B Secondary School Students Research Projects Competition guide published in 2021, the aim of this competition, which is being organized, is to encourage students who continue their education in secondary school to work on basic, social, and applied science fields, to guide their studies and to contribute to the future scientific studies of existing scientific studies, to contribute to their development. Although these competitions are not stated in the main purposes, it is thought that these competitions have positive contributions to gain a new perspective on mentor teachers and contribute to their personal and professional development regarding the details of the project writing process. Although 2204-B Secondary School Students Research Projects Competitions are described as student competitions, consultant teachers take an active role in the project process by guiding students in making analyzes and arrangements from the beginning of the project process to the writing process of the report.

The criteria taken into consideration while making project evaluations in the feedback made by TUBITAK to the participants are stated below. As a result of the scoring made according to these criteria, the projects invited to the regional exhibition are determined by ranking the relevant thematic areas.

- Originality and Creativity - The project's subject and/or method is original and creative (if similar studies have been made, different aspects of the project are stated).

- The project topic is related to the thematic area and is innovative.

- In the project, sufficient and relevant literature was searched.

- The problem or research question is clearly stated.

- A scientific method suitable for the problem or research question was used.

- Conclusion and Recommendations - Data analysis was performed and interpreted correctly.

- Conclusion and Recommendations - The project results are consistent with the data obtained, associated with the relevant resources, and the potential to form a basis for new research is mentioned.

- Feasibility/Wide Impact - The project demonstrates a viable outcome (the project contributes to the field and society)

- Reporting - Report; It included all the titles of the project title, introduction, method, findings, conclusion and discussion, recommendations and bibliography, and satisfactory explanations were made for these titles.

- Reporting - The project report has been prepared by the rules specified in the guide.

In this research, the opinions of the consultant teachers, who were invited to the regional exhibition by TUBITAK, about the projects were revealed. This study, which we have done, is important in determining the common features of the projects invited to the regional exhibition based on the experiences of the advisor teachers both during the project preparation process and during the regional exhibition. Knowing the characteristics of the projects invited to the regional exhibition will guide students and advisor teachers who want to prepare TUBITAK 2204-B projects. From this point of view, the research aims to determine the common features of the projects invited to the regional exhibition in the TUBITAK Research Projects (2204-B Secondary School Students Research Projects Competition) competitions and evaluate the projects from the perspective of advisor teachers. Within the framework of the purpose of the research, answers to the following sub-problems were sought.

- What happens in the process of determining the project idea?

- What activities are carried out for students before the project?

- What are the tasks undertaken by the project consultant teachers and their contributions to the project?

- What are the prominent features of the projects invited to the regional exhibition compared to other projects?

- What are the contributions of the experiences in the regional exhibition?

TUBITAK 2204-B research projects competition is an organization in which students are more active and have a competition format compared to the 4004, 4006, and 4007 coded projects organized by TUBITAK. According to TEKNOFEST, projects, which are also in competition format, contain features that include more academic and scientific work. TEKNOFEST and TUBITAK 2204-B research projects are similar in that students create a work product.

METHOD

RESEARCH PATTERN

In this study, the phenomenology design, one of the qualitative research methods, was used. In the phenomenology design, the opinions of individuals who have experienced the subject in question are used while revealing the facts we have a superficial knowledge of but do not have enough view of the details (Creswell, 2016). Many situations we encounter appear as various events in our daily life. Although we are familiar with these events, it does not mean we fully understand them. Phenomenology constitutes the right research ground for studies that are intended to research phenomena that are not entirely foreign to us but at the same time, we do not fully understand their meaning. (Lightning and Lightning, 2021). Since the phenomenology study considers the opinions of people who have personally experienced the researched situation, it has been determined as the most appropriate research design for this study.

WORKING GROUP

While conducting phenomenological studies, the current phenomenon is investigated by working with individuals who have experienced the determined phenomenon in all its details. For this reason, an inhomogeneous group with a size between 3-4 and 10-15 people is determined (Özet, 2014). Since the main purpose of the phenomenology design is to create personal experiences, people who have experienced these experiences constitute the research participants (Durmuş, 2020). While

determining the study group of the research, criterion sampling, one of the purposive sampling methods, was used. Criterion sampling is the creation of a sample from people, events, objects, or situations that have the characteristics determined for the problem to be investigated (Büyüköztürk et al., 2012). Five advisor teachers were included in the study group. While determining the study participants, it was noted that the teachers who provided consultancy in TUBITAK 2204-B student research competitions were the consultants of the projects invited to the regional exhibition. All the mentor teachers interviewed had previously taken part in TUBITAK 4006 projects as advisor teachers. Only one of the teachers applied for 2204 projects before and was invited to the regional exhibition. Other teachers took part as consultants in the TUBITAK 2204-B project for the first time. It was observed that all of the teachers in the study group had at least a graduate-level education. The characteristics of the advisor teachers who participated in the study are given in Table 1.

Table 1. *Demographic Characteristics of Counselor Teachers*

Teacher	***Gender***	***Seniority Year***	***Branch***	***Postgraduate Education Status***	***Postgraduate Education Department***
T1	Male	5-10 years	Turkish	Ph.D. student	Turkish education
T2	Woman	0-5 years	Science	graduate student	science teaching
T3	Woman	0-5 years	Elementary Mathematics	graduate student	Elementary math
T4	Male	5-10 years	Elementary Mathematics	graduate student	Education Management
T5	Male	5-10 years	IT teaching	graduate student	Computer and instructional technologies

DATA COLLECTION TOOLS

The main data collection tool used in phenomenological studies is interviewing. While using the interview technique to reveal the experiences and situations of existing cases, researchers should be allowed to examine through interaction, flexibility, and probes (Yıldırım & Şimşek, 2021). Since this research was based on the phenomenological design, the interview technique was used as a data collection tool. A semi-structured interview form was used during data collection, and while this form was being prepared, items were determined to reach the opinions of the project consultant teachers about the features of the projects invited to the regional exhibition. In addition, expert opinion was sought on the identified items. As a result of the examinations of three expert academicians working on TUBITAK 2204-B projects, the questions in the interview form were rearranged, the missing items were added, and they were finalized by making them understandable and in line with the purpose of the research. In the interview form, there are questions about the opinions of consultant teachers about TUBITAK projects, the work done during the project process, the general characteristics of the projects invited to the regional exhibition, and their experiences in the regional exhibition.

DATA COLLECTION PROCESS

In this study, a semi-structured form was used for data collection. Within the scope of TUBITAK 2204-B research projects, interviews were held with the consultant teachers of the projects that were invited to the regional exhibition. Before the interview, the participants were informed about the study's content, duration, and purpose. All participants signed an interview consent form. The interviews were conducted in comfortable environments where the teachers could express themselves well. Long-term interviews were held with the advisor teachers, and audio recordings were taken.

Warm-up dialogues were held before the interview to be sincere in answering the questions in the forms. In addition, observations were made, and notes were taken to support the data. At least two meetings were held with each consultant, up to 50 minutes per session, with each session being at least half an hour. After the interview, the analyzed data was shared with the participants to avoid any shift in meaning, and the accuracy of the data was checked. Necessary corrections were made during these controls. One of the participants returned after the interview and stated that there was a topic that did not come to mind during the interview but that he wanted to talk about later, and he stated that he wanted to add a thought to his interview. The mentioned additional thought was included in the evaluation during creating the code and theme.

DATA ANALYSIS

The purpose of the studies using the phenomenological design; is to comprehend a certain feature of a phenomenon or situation, to interpret this phenomenon, and to make sense of it by using its different aspects (Karademir et al. 2017). This study used content analysis to make sense of the data. While performing content analysis, we can list the steps to be applied as classifying the close data, grouping the data around the main concepts and themes, and making the obtained data understandable and editing (Yıldırım & Şimşek, 2013). All the answers given to the questions in the research were recorded. These answers were classified according to their similarity status. As a result of the classification, the main concepts and themes were created, and the content analysis was completed.

VALIDITY AND RELIABILITY

One of the most important criteria of scientific research is its high credibility. To be effective, qualitative research needs to be supported in terms of validity and reliability. According to Guba and Lincoln (1982), the criteria for credibility were grouped under four main themes credibility, reliability, confirmability, and transferability (Başkale, 2016).

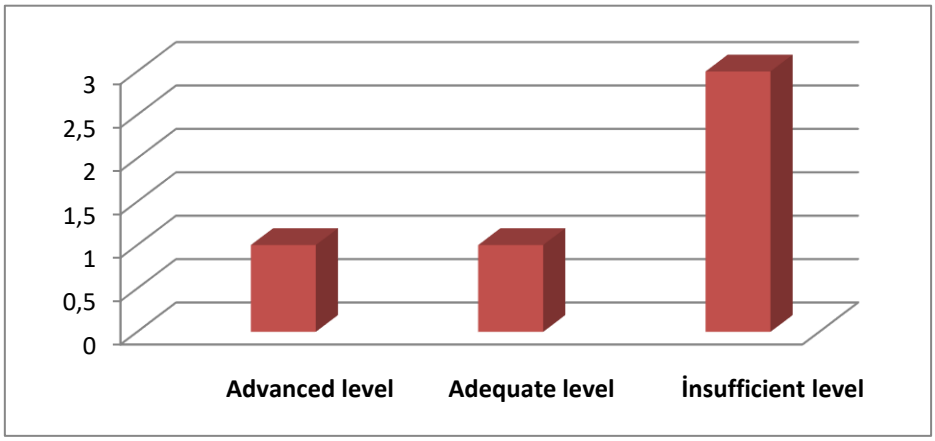
In this study, studies were carried out in line with these criteria. Detailed literature research was conducted to ensure reliability, and interview questions were prepared as a result of this research. During the creation of the data collection forms, necessary arrangements were made by taking the opinions of two experts in the field. During the interview, notes were taken about the attitudes and body language of the participants, along with the voice recording. After the answers were received and written down, the participants were asked to examine and check their answers, thus contributing to their credibility. Two interview recordings were sent to two expert evaluators, who were asked to create codes and themes. During the analysis of the data of the codes and themes obtained, comparisons were made between the researcher's and the experts' views, and the common-different codes and themes were evaluated by comparison. While making this assessment, the reliability of agreement among researchers' method of Miles and Huberman (1994) (Reliability=consensus/consensus + disagreement) was used, and the reliability coefficient of the agreement was calculated as 0.91. This value is in the appropriate range for a qualitative study (Miles & Huberman, 1994). After obtaining the consistency reliability coefficient, the incompatible codes were re-examined, some codes were removed from the study, and a consensus was reached on a new common code.

FINDINGS/RESULTS

In the TUBITAK 2204-B Secondary School Students Research Projects Competition, interviews were conducted through the questions prepared to determine the common features of the projects invited to the regional exhibition and to evaluate the projects from the eyes of the consultant teachers.

Themes and codes were created by analyzing the data obtained. Tables were created to create a separate theme and code for each question, and the participants' views were included in the tables along with the themes and codes.

Table 2. *Opinions on the readiness of students in TUBITAK 2204-B research projects*



When the opinions about the student's readiness in the TUBITAK 2204-B research projects are examined in Table 2, three participants said that the student's readiness level is bad. Regarding this subject, T3, *Students did not know much about TUBITAK. Readiness levels were poor. In previous years, 4006 were built, so there was a perception that an experiment would be conducted in the school's garden. When we applied for TUBITAK 2204-B, I gave the information about the process"*. One of the participants stated that the students' readiness levels were at a reasonable level, and another stated that the students' readiness levels were at an advanced level.

Table 3. *What are the Common and Different Aspects of TUBITAK 2204-B Research Projects Compared to Other Projects?*

Theme	*Features of TUBITAK 2204-B Research Projects*	
Codes	*Teachers*	*Quotes*
Scientific and academic	T1,T2,T3,T4	*T4: "TUBITAK 2204-B research projects contain a more scientific and academic perspective than 4006 projects"*
Idea oriented	T2,T3,T4	*T3: "Idea is very important in the project, the project process is shaped accordingly"*
Research-oriented	T1	*T1: "Good research should be done at the stage of determining the project idea and during the project process"*
Solution proposition	T2	*T2: "TUBITAK 2204 projects generally offer solutions to problems in life"*
Increasing creativity	T2	*T2: "TUBITAK 2204-B research projects increase creativity in students"*
Design-material oriented	T3,T4	*T3: "…the process is just like an exhibition; the material should come out at the end of the project"*
Article study	T1	*T1:" I see TUBITAK 2204-B research projects as qualified article studies"*

When Table 3 is examined, four participants stated that TUBITAK 2204-B research projects include a scientific and academic perspective. In addition, regarding the characteristics of TUBITAK 2204-B research projects, three participants mentioned that they should be idea-oriented, two design and material-oriented, and two research-oriented.

Table 4. *Opinions on Ideation Processes in TUBITAK 2204-B Research Projects*

Theme		*What happens in the ideation process*
Codes	*Teachers*	*Quotes*
Bringing ideas together	T1,T2	*T2: "We examined all the ideas together with examining the previous projects. We have determined our project idea with a joint decision."*
Determination of the idea by the student	T1	*T1: "We talked about a few ideas. We decided on this idea at the request of my students."*
Determination of the intellectual consultant	T5	*T5 "The work we did was in my mind before. I explained it to the children, and we put it into practice."*
Joint decision making	T2,T3,T4	*T4: Research was made about the projects. We talked about what we could do and the idea was put into practice with a common decision."*
Considering local conditions	T3,T5	*T5: "There are pistachio trees in our region. We wanted to solve the irrigation problem of these trees. We also took into account regional conditions.*

According to Table 4, When the opinions about the idea formation processes in TUBITAK 2204-B research projects were examined, three participants said they made a joint decision with the students while deciding on the project idea. In addition, two of the advisor teachers stated that they considered the characteristics of the region where the school is located during the stage of opinion formation and decided accordingly.

Table 5. *Opinions on the Studies on TUBITAK 2204-B Research Projects*

Theme		*Studies on behalf of TUBITAK 2204-B*
Codes	*Teachers*	*Quotes*
Project-oriented teaching	T1, T2, T4	*T4: "I could not work in a project-oriented manner because I had concerns about educating the curriculum at the secondary school I worked at before. However, I can allocate more time to projects since education is given on this axis at the Science and Art Center where I work."*
Participation in the workshop	T1	*T1: "At the beginning of the year, I attended the 2204 workshop with his guidance at his institution. The workshop had positive contributions."*
Creating a working time	T3	*T3: "During the project preparation process, we created extra working hours during lunch break or after school, apart from my current lessons."*

Considering the views on the studies on TUBITAK 2204-B research projects in Table 5, it is seen that three of the participants are science and art center teachers. All the participants stated that the science and art center teachers participated in the regional exhibition with more projects than the

teachers in other institutions. One of the consultant teachers who participated in the interview said that the workshop he had attended contributed to the project's preparation.

Table 6. *Opinions on the Contributions of Consultant Teachers to the Project Process in TUBITAK 2204-B Research Projects*

Theme	*Contribution of the consultant teacher to the project process*	
Codes	*Teachers*	*Quotes*
Academic language	T1,T2,T3,T4,T5	*T3: "I prepared the interview questions. In addition, I was responsible for creating an academic language, writing a report, and designing a poster for the project exhibition."*
Writing the project report	T1,T2,T3,T4,T5	T5; *Obviously, project writing is usually done by consultant teachers. My next goal is to have students write certain parts of the report.*
Guiding studies	T3,T4,T5	*T5: "I generally worked in disadvantaged schools, where it is still difficult for students to access technology, articles, and theses. I usually do these researches and then direct them."*
Poster and planning	T3	*T3: "I took care of the poster preparation. In addition, I planned the works to be done during the regional exhibition."*
Preparation of interview questions	T3	*T3: "I prepared the interview questions."*

When the opinions about the duties undertaken by the advisor teacher in the TUBITAK 2204-B research projects in Table 6 are examined; All the advisory teachers said that they played an active role in creating the academic language and writing the project report. Regarding this issue, T5; *Obviously, project writing is usually done by consultant teachers. My next goal is to have students write certain parts of the report. Of course, I will ask the student to write it after explaining and teaching the project's purpose, the summary, and how to write the findings, not in the form of writing directly to this student. I generally worked in disadvantaged schools, where it is still difficult for students to access technology, articles, and theses. I usually do these researches and then direct them*."

T2; "*I try to give the student more roles, but the academic writing language inevitably falls to the advisor. I am trying to direct the student to write some sections, but since the student's language is a little simpler, it is not project-based. I tried to edit what they wrote, but when I could not progress very well in this way, I took the writing job*".

Table 7. *Features of the Projects Invited to the TUBITAK 2204-B Research Projects Regional Exhibition*

Theme	*Features of projects invited to the regional exhibition*	
Codes	*Teachers*	*Quotes*
Scientific and academic language	T1,T2,T3,T4,T5	*T1: "Bilsemler and private schools were dominant in the regional exhibition. Scientific and academic use makes the project stand out. Scientific studies are being done more in BİLSEMS and private schools.*
Original	T2,T3,T4,T5	*T3; "The projects in the regional exhibition were mostly original. It is always advantageous to do*

		what has not been done before."
Social benefit	T2	*T2: "I saw that projects aimed at the disabled, using recycled materials, containing solutions to environmental problems, that is, socially beneficial, were invited to the regional exhibition more"*
Innovator	T2	*T2: "There must be different aspects from the projects that have been done. It should include an innovative perspective"*
Visual and attractive	T1,T5	*T5: "Especially in the field of technology design, they must have visually good and interesting features."*
Contain scientific proof	T4	*T4: "Projects with scientific proof, especially in design and biology projects, were included in the regional exhibition"*
Good presentation	T2,T4	*T2:" The subject does not need to be very interesting, the student needs to make a good presentation.*
Contain appropriate method	T4	*T4: "One of the features that the project must have is that it contains a method suitable for the work done."*

Regarding the views on the prominent features of the TUBITAK 2204-B research projects invited to the regional exhibition in Table 7, all the participants stated that the project should have scientific and academic language. Four of the participants expressed their opinion that the originality of the prepared project is one of the most important features. Two of the consultant teachers said that the projects in the technology and design should be visually good and interesting.

Table 8. *Opinions on the Contribution of TUBITAK 2204-B Research Projects Regional Exhibition to the Professional Development Of Counselor Teachers*

Theme	*Contributions to the project process to mentor teachers*	
Codes	*Teachers*	*Quotes*
New perspective	T1,T2,T3,T4,T5	*T1: After the project exhibition, I felt professional development in myself. perspective changed it positively."*
Recognition of new people	T1,T2,T3,T4,T5	*T2: "The process contributes. The best contribution is the new people I meet. I still keep in touch with friends I met at the regional exhibition.*
Learning new things	T3,T4,T5	*T3: "You are learning new things. I learned many things that I did not know. I was happy when I went to the regional exhibition.*
Scientific method development	T4	*T4: "We saw many exemplary projects in the regional exhibition, this contributed positively in terms of the scientific method."*
Increasing self-confidence	T3	*T3: "I can say that my self-confidence increased after the regional exhibition."*
Feeling privileged	T3	*T3: "Looking at the experience we had, at the end of the process, I felt privileged."*
Sense of accomplishment	T5	*T5: "Because TUBITAK 2204-B research projects are like a competition process, one has the feeling of success."*

When the views on the contribution of the TUBITAK 2204-B research projects regional exhibition in Table 8 to the professional development of advisory teachers are examined, each of our teachers stated that they provided professional development after the project exhibition. All the participants said they gained a new perspective and met new people after the regional exhibition. In addition, three people stated that they learned new things after the regional exhibition. One of the participants said that at the end of the process, his self-confidence increased, and he felt privileged.

Table 9. *Opinions on the Contribution of TUBITAK 2204-B Research Projects Regional Exhibition to Student Development*

Theme	*Contribution of the project process to the students*	
Codes	*Teachers*	*Quotes*
Increasing self-confidence	T1,T2,T3,T4,T5	*T4: "My student, who was shy even when asking interview questions at first, At the end of the project process, they were able to communicate better and their self-confidence increased."*
Making new friends	T1,T2,T3	*T2: "After the regional exhibition, my student made new friends."*
Learning teamwork	T1,T2	*T1: "The regional exhibition was a very productive process in terms of social learning, like being a stakeholder in teamwork."*
Development of perspectives	T2,T5	*T5: "I think my students' perspectives on life have changed after the regional exhibition."*
Providing peer learning	T1,T5	*T1: "My students learned good things from their peers to be able to act in a group."*
Development of communication skills	T1,T4	*T4: "I think the regional exhibition improved the students' ability to communicate with different people."*
Learning scientific processes	T4	*T4: "It allowed students to see the stages of the scientific process better."*
Ability to generate new ideas	T1,T2	*T1: "As soon as the exhibition was over, my students said they had new project ideas and would research them next year."*
Creating a sense of accomplishment	T3,T5	*T1: "After the regional exhibition, my students felt a sense of achievement and they started to say that I can do better."*
The development of his oratory	T1,T2	*T2: "During the project process, my student made presentations and made statements to the jury. This contributed to the development of his oratory."*

When the views on the contribution of the TUBITAK 2204-B research projects regional exhibition in Table 9 to student development are examined; All the participants stated that their students' self-confidence increased after the project process. In addition, three people stated that students made new friends, two said that their perspective and rhetoric improved, and two said that their communication skills increased with peer learning. In addition, one participant said that their oratory improved thanks to the presentations they made.

Table 10. *Opinions on the Work to be done in the Process of Preparing a New Project in TUBITAK 2204-B Research Projects*

Theme	*Work to be done in the process of a new project*	
Codes	*Teachers*	*Quotes*
Selection of active students	T1,T2,T3,T4,T5	*T2: "Concerning student selection, I think it would be better to work with more talkative and active students."*
Early start of work	T1,T2,T3,T4,T5	*T1: "I plan to start the project work earlier next year."*
Scientific process details	T3,T4,T5	*T5: "I would like to better explain the details of the scientific process to the students. Children who live in science will be more successful."*
Doing exercise	T3	*T3: "I want to open an exercise study at school in the new period... A better working environment will be created when the exercise is opened."*
Students do the writing process	T3	*T3: "In the next project, I plan to leave the project writing process to the students."*

When the views on the work to be done in the new project preparation process in Table 10 are examined, all participants stated that they will start the work early and choose more active students. Three of the participants said they would elaborate more on the studies on scientific processes, and one person stated that he wanted to open an exercise in the school during the project preparation process next year and that he wanted the students to do the writing process as well.

Table 11. *Opinions on the Work to be done to Reach the Finals of TUBITAK 2204-B Research Projects*

Theme	*Characteristics of the projects selected for the Turkish finals*	
Codes	*Teachers*	*Quotes*
Scientific and academic language	T1,T2,T3,T4,T5	*T1: "It must have scientific and academic language."*
Original	T1,T2,T4,T5	*T2: "Because there are many ideas in every field, the project must be original to stand out.*
Social benefit	T1,T2	*T2: "I think projects with social benefits related to global problems and the environment are more advantageous."*
More student contribution	T4	*T4: "As far as I can see, there should be a lot of student contribution in a project that will go to the finals in Turkey."*
Product creation	T2	*T2: "A product was put forward at the end of the project in almost all of the projects that went to the finals."*
Good presentation	T1,T2,T5	*T5: "The work done during the project process need to be presented step-by-step."*
Appropriate research method	T1,T4	*T1: "Since the project is scientific research, a suitable method should be used."*

When the opinions in Table 11 regarding the studies to be made to reach the finals of TUBITAK 2204-B research projects in Turkey are examined, all the participants said that scientific and academic language should be used in the project. In addition, four participants stated that the project should be original, and three people stated that the student presentation should be good. However, T5 says; "*Actually, we do not have to work hard to go to the finals. This greed can lead us to the wrong place. But I believe that children should live scientifically to go to the finals. It should be ensured that the student's contribution is very high*.

Table 12. *Opinions that will Contribute to TUBITAK 2204-B Research Projects*

Theme	*Opinions that will contribute to the process*	
Codes	*Teachers*	*Quotes*
Transparent evaluation	T1,T2,T3,T4	*T1: "In the evaluation process in the regional exhibition, it should be known from where the points were deducted… I don't know how much influence the stand in the exhibition area has in the regional exhibition… Evaluation and transparency should be,*
Clear criteria	T2,T3,T4	*T3: "We should know according to which criteria they chose the first project and why. The selection criteria should be clearer."*
Observable evaluation	T1	*T1: "We cannot see where the evaluation and presentation are made. I would like to create an environment where the inside is seen from the outside and the sounds are heard, and I would like to observe my students in this environment."*
Feedbacks	T1,T5	*T5: "I think feedback on the post-project evaluation should be given."*
Plus points for the student	T2	*T2: "Students who get a degree in TUBITAK 2204-B research projects should be given positive points in the LGS exam."*
Effective promotion	T3	*T3: "I think the promotion of project competitions should be done better by TUBITAK."*

When the opinions contributing to the TUBITAK 2204-B research projects regional exhibition in Table 12 are examined, especially the suggestions regarding the evaluation process attract attention. Four participants expressed their opinion that the evaluation should be made more transparent. Three people said that the evaluation criteria were not clear. Two of the participants said that the feedback on the evaluation process was insufficient. Unlike the evaluation process, one person said students invited to the regional exhibition should be awarded plus points in the central exams. One person expressed his opinion that TUBITAK should better promote TUBITAK 2204-B research projects.

DISCUSSION, CONCLUSION, AND IMPLICATIONS

As a result of the findings obtained in this research, TUBITAK 2204-B research projects; It has a scientific and academic point of view, the idea of the project has an important place in the process, it increases the creativity of students and offers solutions to the problems encountered in daily life. With these aspects, the process includes the stages of the project-based learning approach. Project-based learning approach; It is a learning approach that aims to solve existing problems with an approach similar to living under ordinary conditions individually or in smaller groups (Korkmaz & Kaptan, 2001). According to another study conducted similarly, project-based learning activities positively contribute to learning processes. In project-based group studies, students' collaborative working skills have improved, and it has been observed that the curriculum contributes to increasing the awareness of responsibility (Başbay, 2005).

Considering the opinions about the idea determination processes in TUBITAK 2204-B research projects, it is thought that making a joint decision while deciding on the project idea causes students to exhibit positive behaviors in terms of owning the project and continuing their studies. In addition, considering the local conditions while determining the idea allows the work to come to the fore compared to other projects. It is noteworthy that most of the projects invited to the regional exhibition

belong to the Science and Art Center students. It is thought that the effect of the Science and Art Centers' project-oriented education and training in the emergence of this result is great. Ayaydın and Duygu (2018) stated in their study that the education of gifted students in Science and Art Centers is individual, considering the interests and abilities of the students, suitable for learning by doing, being student-centered, project-oriented and practical. Considering the characteristics of the teachers who advise the projects invited to the regional exhibition, it is seen that many of the teachers who have at least a master's level education are considered. It can be said that the report writing language requested by TUBITAK contains academic elements as a reason for the high rate of invitation of teachers with a master's language to the regional exhibition. It is seen that teachers with article writing experience do not have difficulty in preparing reports while consulting.

TUBITAK 2204-B research projects are referred to as student projects in the literature. What is expected from the advisor teacher is to guide the project and contribute as a guide. However, it is seen that advisor teachers undertake more tasks than expected during the project preparation process. Counselor teachers think that students do not have a good command of the project writing language, they play an active role in creating the academic language and writing the project report, and almost complete the entire writing phase themselves. In addition, the work of preparing posters and planning is carried out by the advisor teacher.

Similarly, in the study conducted, Deveci and Daşçı (2020) concluded that the teacher's contribution to the project processes, in many projects, the reporting process of the project was written entirely by the teachers themselves. They noted that it was too much. According to the results we have reached in the research, although the advisor teachers take an active role in the preparation process, they are taken to the background a little more during the regional exhibition process. Due to the nature of the exhibition, students take a more active role in this process.

Students take an active role in the exhibition process, and their experiences contribute to the students. According to Çepni (2018), encouraging students to do scientific studies and increasing their project experience is one of the important goals of project competitions. At the end of the regional exhibition process, students not only gain gains related to social learning such as increasing their self-confidence, improving their communication skills, and changing their perspectives, but also progress in academic achievements such as learning scientific processes and producing new ideas. According to Avcı et al. (2016); Students think that preparing a project increases their analytical thinking, analysis and observation skills, self-confidence, communication skills, entrepreneurship, and creativity. Similarly, in studies conducted; Çetin and Şengezer (2013) and Küfrevioğlu et al. (2011) state that the work done during the preparation of the project contributes to the socialization of students. This situation is in parallel with the findings obtained in this study. In our current research, it was concluded that the student's self-confidence, communication, oratory and social aspects improved after their project work experiences.

In this research, it has been concluded that the project preparation process is a process that requires serious time. It becomes almost impossible for consultant teachers to spare time from the busy curriculum and produce projects during the lessons. Many of the advisory teachers carry out project work by sacrificing their own listening time. One of the reasons why Bilsems and private schools come to the fore in projects is that they can allocate more time to projects. Planning extracurricular exercises for the project preparation processes in schools will contribute to the solution of the problem of time and space. Similarly, in a study he conducted, Canigüroğlu (2019) concluded that there is a need for project working hours outside of class hours so that teachers and students can do project work together. Similarly, Öztuna Kaplan and Diker Coşkun (2009) stated in their studies that teachers and school administrators should act to solve the time and space problem that arises while preparing a project and that creating a place called "workshops" in schools to carry out project work will contribute positively.

The jury members evaluate the presentations prepared by the students to determine the projects that will qualify for the Turkey finals in the TUBITAK 2204-B research projects regional exhibition. The evaluation criteria are stated in the guide published by TUBITAK (The Scientific and Technological Research Council of Turkey [TUBITAK], 2022). However, the evaluation details were not included. In this research, it has been concluded that the counselor teachers think that the criteria during the evaluation should be clearer and the evaluation process should be carried out more transparently. After the jury evaluations, no feedback is given to the students and teachers regarding the evaluation results. It is thought that the feedback given by the jury members will contribute as a guide to the students who will prepare projects in the coming years and to the teachers who will provide counseling. As a result of the study, suggestions were made based on the findings obtained to the researchers who will research TUBITAK 2204-B research projects and to the teachers who will be consulting on TUBITAK 2204-B research projects.

To the teachers who will be consultants in TUBITAK 2204-B research projects:

- Including students in the idea stage will positively contribute to the project in the following process.
- Opening a project preparation exercise with the decision to be taken by the teachers' board will benefit the preparation of the projects and their qualifications at the beginning of the academic year.
- While selecting students for their work on the project, attention should be paid to students who are interested and relevant, as well as presenting and expressing themselves well.
- While writing the project report, using academic language as an article study will contribute to the selection of the project.
- Information and project-oriented teaching methods can be used during the course for TUBITAK 2204-B research projects.
- Starting the project preparation process early and assimilating the project preparation stages in detail with the students will contribute to the quality of the project.

As a result of the study, researchers who will research TUBITAK 2204-B research projects:

- This research can be expanded and researched at the high school level.
- Projects not invited to the regional exhibition can be included in the research process in a new study.
- New research can be done from the perspectives of students participating in the regional exhibition.

REFERENCES

Avcı, E., Özenir, Ö. S., & Yücel, E. (2016). Students' experiences during TUBITAK secondary education students' research projects competition and ıts contribution to their university life. *Uşak University Journal of Social Sciences*, *9* (27/3), 1-21.

Ayaydın, Y., & Duygu, Ü. N. (2018) The stand point of science and arts center teacher's towards the education of gifted students and BİLSEM's. *Journal of Amasya University Faculty of Education* , *7* (1), 121-155.

Başbay, A. (2005). The effects of project-based learning approach supported by the layered curriculum on the learning process. *Aegean Journal of Education*, *6* (1), 95-116.

Başkale, H. (2016). Determination of validity, reliability and sample size in qualitative studies. *Dokuz Eylul University Faculty of Nursing Electronic Journal, 9* (1), 23-28.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2012). *Sampling methods* . Pegem Publishing, Ankara

Çetintaş, H. (2019). *Scientific consultancy process management of Tubıtak middle school students' research projects: Science example. (Publication No. 578158)* [Master's thesis, Kütahya Dumlupınar Unıversıty]. Council of Higher Education Thesis Center, Turkey.

Creswell, JW (2016). *Qualitative research methods: Qualitative research and research design according to five approaches (Trans. Ed. M. Tüm ve SB Demir.).* Political Bookstore: Ankara

Çeken, C. (2017). A comparison between the process of project competitions carried out by TUBITAK and MNE. *Aksaray University Journal of Social Sciences Institute, 1* (2), 46-52.

Çetin, O., & Şengezer, B. (2013). Secondary school students' views on project work. *Aegean Journal of Education, 14* (1), 24-49.

Deveci, İ., & Daşçı, H. (2020). Project experiences of the consultant teachers attending the TUBITAK research projects competition in secondary school. *Journal of Individual Differences in Education*, *2* (2), 75-97.

Durmuş, M. E. (2019). *Primary school teachers' experiences with inclusive students in the context of mathematics teaching: A phenomenological study. (Publication No. 548383)* [Master's thesis, Bayburt Unıversıty]. Council of Higher Education Thesis Center, Turkey.

TUBITAK, (2022). *Middle school students research projects competition project guide (2204-B),* https://tubitak.gov.tr/sites/default/files/2750/ortaokul_proje_rehberi_2022_v3.pdf, (01.06.2022),

Karademir, E., Sarıkahya, E., & Altunsoy, K. (2017). He perceptions of the science teachers toward to the concept of skill: a phenomenological study. *Eskişehir Osmangazi University Journal of Social Sciences*, *18* (1), 53-71.

Korkmaz, H. & Kaptan, F. (2001). Project-based learning approach in science education. *Hacettepe University Faculty of Education Journal, 20*, 193-200.

Küfrevioğlu, R. M. , Baydaş, Ö., & Göktaş, Y. (2011). Achievements, challenges and suggestions in project and skill competitions. *5th International Computer&Instructional Technologies Symposium,* Elazig

Miles, M. B. & Huberman, AM (1994). *Qualitative data analysis: An expanded sourcebook*. USA-California: Sage.

Özet, I. (2014). *Urban studies and qualitative method*. [Unpublished Master's Thesis] Isparta Süleyman Demirel University.

Öztuna Kaplan, A. & Diker Coşkun, Y. (2012). An action research on the problems in project-based teaching practices and the solution suggestions to these problems. *Journal of Mersin University Faculty of Education, 8* (1), 137-159.

Yıldırım, A. & Şimşek, H. (2021). *Qualitative research methods in social sciences* . (12th Edition). Seçkin Publishing, Ankara

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- The first author made significant contributions to the creation of the conceptual framework, planning, data acquisition and analysis and interpretation of the data.

- The second author contributed to the review of the findings related to the article's content, the preparation of the draft, and the final form of editing.