



THE EFFECT OF COLLABORATIVE PROJECT ACTIVITIES ON SELF-EFFICACY AND ATTITUDES TOWARDS RESEARCH AND INQUIRY OF GIFTED STUDENTS

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Abstract

The aim of this research is to determine the effect of collaborative project activities on gifted students' self-efficacy perceptions and their attitudes towards research inquiry. In the nature of research mixed pattern was conducted. Study group consists of six gifted students. In this research, cooperative project activities designed according to the project-based learning approach were implemented. Self-efficacy perception scale ($\alpha=.83$), Attitude scale ($\alpha=.75$) and semi-structured interview form was used as data collection tools. Wilcoxon marked rows test and contend analyses were used. As a result, after the collaborative project activities, there was an increase in the attitudes of gifted students towards research inquiry and their self-efficacy towards research inquiry and this difference was statistically significant. As a result of the student interviews, it was determined that gifted students' opinions about cooperative project activities were positive.

Keywords: Attitude towards research questioning, self-efficacy for inquiry, gifted students.

INTRODUCTION

As the world changes rapidly, it is possible to say that gifted individuals with special abilities who make a difference come to the fore. As in history, gifted individuals have managed to attract the attention of societies and it is desirable to benefit from the potential of gifted individuals who have special skills in fields such as management, science, art, sports and economics in Turkey as well as all over the world. It is possible to say that these gifted persons, hidden powers, lead societies with their creativity and innovative ideas, find solutions to the problems of societies and contribute to their development (Davis & Rimm, 2014). The education of gifted individuals, which are considered as national treasure all over the world, is vital for the future of countries. Gifted individuals are highly motivated individuals who learn fast, are interested in learning, and are creative, like also to learn in-depth research according to their peers (MONE, 2013; Silverman, 2013). Individuals who differ significantly from their peers in terms of creativity, intelligence, and productivity, problem solving are defined as gifted individuals (Robinson, Shore, & Enersen, 2014). A study by Clark (2015) found that gifted individuals perform superiorly to their peers in many areas, especially with high language skills. According to the Science and Arts Centers Directive, where gifted students are educated in Turkey, gifteds are difined; "*faster learners than their peers*" as "*individuals who are at the forefront of capacity for leadership, creativity, art, and have special academic skills, understand abstract ideas, like to act independently in their interests and perform at a high level*" (MEB, 2007).



Considering that the characteristics of gifted students; it has been determined that they have problem solving skills and high mental capacity, can analyze, synthesize, make original interpretations, engage in seemingly irrelevant processes, develop different solutions to problems (Davis & Rimm, 2014; Silverman, 2013). With their fast learning, creativity and productivity, gifted students in classroom environments differ from their peers (Dağlıoğlu, 2010). However, in schools in Turkey, gifted students are educated in the same educational environments as their peers, at the same level, in the same methods (Levent & Bakioğlu, 2013). If different educational programs are not implemented for gifted students who are fast learners according to their peers and perform at a high level academically, it will not be possible to meet the educational needs of gifted students (Sak, 2011). Unless appropriate educational environments are provided, event content and program are differentiated, gifted students feel embarrassed and cannot perform. Students' motivations, therefore, decrease and they cannot reveal their abilities or potentials. To meet the educational needs of gifted students and to reveal their abilities, a different program must be implemented apart from the normal curriculum they receive with their peers. In educational environments, it is aimed that gifted students use their high-level cognitive skills, develop their creativity, productive thinking skills, leadership characteristics, seek real life problems and find solutions to these problems, and use different disciplines together (Dereli, & Deli, 2022; Sak, Ayas, Sezerel, Öpengin, Özdemir, & Gürbüz, 2015). The role of teachers is great at the point of implementing the educational programs needed to provide gifted students with these skills (Tortop, 2014). Teachers are able to meet the educational needs of gifted students by using different methods dec educational environments, enriching educational programs and using different disciplines together (Dereli & Deli, 2021; Sak, 2011). According to Cutts and Moseley (2004), the purpose of educational enrichment is to be able to use talents completely, expand the field of knowledge, deepen understanding, develop skills, increase motivation, develop thinking, encourage and develop creativity. It is recommended to use project-based learning, problem-based learning, and collaborative learning and STEM methods that allow students to learn both individually and with groups to develop these characteristics of gifted students (Kazu & Şenol, 2011). On the other hand, in the Directive of the Ministry of National Education (MEB) and Science and Art Centers, design a project and management are considered as an educational program and special emphasis is placed on project-based teaching.

Collaborative learning method, which is one of the learning methods that can be used as an alternative in education, stands out in terms of enriching educational environments and meeting different educational needs (Kırbaş, 2010). The collaborative learning method can be defined as small group studies that give students the opportunity to learn from each other and form a positive bond between students. Collaborative learning activities; in educational environments, students work in small groups to achieve group success by supporting each other's learning for the same purpose (Johnson ve Johnson, 2011). With collaborative project activities, students learn to respect, share, exchange ideas, appreciate the talents of their friends, make decisions when necessary and interact positively with their friends while doing group work (Gillies, 2014). In collaborative learning, students work together to achieve the common goal as a group, that the group task is also the duty of each member, and that their success and failures belong to all group members (Bölükbaş, 2014). Collaborative learning at one and the same time, group work allows students to talk, discuss, experience and learn, and reveal leadership and entrepreneurial aspects (Saban, 2014). In this process, students are able to show different abilities, use their high-level cognitive skills by creating solutions to daily life problems, and take responsibility for their own learning and use leadership characteristics and work in harmony in group work (Genç & Şahin, 2015; Koç, 2014).

The current societies need individuals who are aware of their abilities and can develop their abilities, think critically, look at things in a multifaceted way, and use leadership qualities in harmony. It is consired to be possible to increase the number of individuals who try to understand, investigate, question and solve problems encountered in everyday life by bringing the learning approaches in which these skills are acquired to educational environments (Çakal, 2012). In educational settings where collaborative project activities are preferred, students are effectively apprehended scientific



process skills such as thinking about a problem, conducting research, questioning, interpreting, problem solving, and making decisions (Adams, 2013). Research, experiments, activities conducted by students in such learning environments where research and inquiry skills are acquired also help the learned knowledge to be permanent and gifted students to use the knowledge they have learned (Tatar & Kuru, 2009). Students with research and questioning skills learn how to solve the problems they will face in the future by researching and finding solutions. In a learning environment that requires research-inquiry skills, students take responsibility for the learning process by researching, asking themselves the questions they are curious about, accessing the information themselves, and taking responsibility for the information in the learning process (Kardaş & Yeşilyaprak, 2015). Research inquiry-based learning approach, centered on the student; is an approach that allows the student to ask questions, make reviews, observations, look for solutions to problems and activate the student in the learning environment (Davis & Rimm, 2014). Research inquiry-based learning is a learning approach in which students collect data, analyze data and interpret the results they find in order to solve the problem put forward (Contant, Tweed, Bass, & Carin, 2018). Students' scientific research skills and thinking skills develop in the research process in research inquiry-based learning (Wilder & Shuttleworth, 2005).

Students increase their motivation and self-confidence when they fulfill the task assigned to them by conducting research in the process, and they take part as individuals who make a difference in society (Fansa, 2012). The positive outputs of collaborative project/learning activities in educational environments have been revealed by researches and practices in many countries around the world such as the Netherlands, Israel, Australia, America, and Lebanon (Gillies, 2014; Veenman, Denessen, Akker, & Rijt, 2000). Countries desiring get high-level efficiency from the talents and potentials of highly gifted students having quick thinking abilities compared to their peers and different educational needs note that characteristics of gifted students as preparing their education plans (Cutts & Moseley, 2004). Given the characteristics of gifted students and their different educational needs; it can be said that both project and collaborative learning methods can make important contributions in research, inquiry, problem solving, develop decision-making skills and meet different educational needs. Accordingly, in this research, both project-based learning and collaborative learning methods are used together to create a teaching based on collaborative project activities. As mentioned above, it is possible to find many studies on the effectiveness of individual project-based learning and collaborative learning methods. However, there has not been enough indication regarding the effectiveness of the teaching designed by using these two methods together. Similarly, it hasn't been considered of the self-efficacy and attitudes of gifted students towards research inquiry in the literature. In this study, unlike the literature, both the self-efficacy and attitudes of gifted students towards research and inquiry were discussed. In addition, the effect of especially collaborative project activities on these variables has been tried to be revealed. Thus, it is thought that such activities can make important contributions to the literature on how these activities affect research and inquiry skills. In this context, the aim of this research is to determine the effect of collaborative project activities on the self-efficacy perceptions of gifted students towards research questioning and their attitudes towards research questioning.

Problem Statement

Do collaborative project activities have an impact on the perceptions of self-efficacy of gifted primary school students towards research and questioning and attitudes towards research towards questioning?

Sub-Problems

1. Do collaborative project activities contribute to students' self-efficacy perceptions towards research and questioning?
2. Do collaborative project activities contribute to students' attitudes towards research and questioning?
3. How do students think about collaborative project activities?



METHOD

Research Model

This study is designed using the converging parallel mixed method from mixed research patterns. In this context, both qualitative and quantitative data of the research have been collected in a body but analyzed separately. In the quantitative dimension of the study, a semi-experimental pattern is used in the pre-test-post-test without a control group. The semi-empirical settings shows similar characteristics to the experimental pattern, but the issue of unselected assignment of participants discerns the semi-experimental pattern from the actual experimental pattern (Balçı, 2018). A semi-experimental pattern in addition, is wielded to analysis the cause-and-effect related to research where empirical controls are not very possible (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2017). In this study, a semi-experimental pattern is utilised because it is not possible to control all of the variables. Semi-experimental pattern is often opted for in the field of educational researches. (Cohen, Manion, & Morrison, 2000).

The qualitative dimension of the research is a case study. The researcher performs in the educational environment that the application of experimental, experimental observation events by one-on-one throughout the process, facts in-depth examine and decide according to their own perspective that is to shape how they study, requires the execution of the scope of case study research (Ekiz, 2017). To Merriam (2013), the case study is defined as an in-depth description and a detailed examination of a situation by the researcher. The researcher in the case study, conducts in-depth investigations of the real environment with his observations, interviews, documents, reports and decides how to shape the study by collecting research data in the real environment (Creswel, 2007).

The research has an independent and two dependent variables. The independent variable of the research is “Collaborative Project Activities”, and the dependent variables are “Perceptions of Specially Gifted Students towards Research Questioning and Attitudes towards Research Questioning”.

The Study Group

This study is conducted to six gifted students in the Training Room of Gifted Students at Samsun Terme Atatürk Primary School, in the fall semester of the 2019-2020 academic year in Samsun R. K. Center for Science and Arts. Each of the students has taken an Individual Assessment Exam in one or more areas such as general mental ability, visual arts and music which are suitable for their abilities and as a result of the assessment gained the right to enroll into center, all of these students have been recognized as gifted in the field of general mental ability and have been accepted to Samsun R. K. Center for Science and Art. Three of the students taking part of the study group attend the third grade of primary school and are each 9 years old. Three other students attend the fourth grade of elementary school and two are 9 years old, and only one student is 10 years old. Two of the students are female and four are male students.

The Data Collection Tool

The "Self-efficacy Perception Scale for Research Inquiry of Secondary School Students" developed by Ebre Ozan, Korkmaz, and Karamustafaoglu (2016a) and "Research and Inquiry Attitude Scale of Secondary School Students" advanced by Ebre Ozan, Korkmaz, and Karamustafaoglu (2016b) are used as data collection tools in the study. A semi-structured interview form consisting of four questions has been used to determine the students' views on experimental practice. The scales are applied by giving the necessary explanations and instruction to each student and thus they are enabled to answer the questions. The characteristics of the data collection tools are described below.

Self-Proficiency Perception Scale for Research Inquiry of Secondary School Students

The Self-Proficiency Perception Scale for Research Inquiry was used to measure the self-efficacy perception of the participants for research and questioning (SPSRISSS). The scale was designed by Ebre Ozan, Korkmaz, and Karamustafaoglu (2016a). The validity and reliability analyses of the scale were performed with the data collected from a total of 233 students studying in the 5th and 8th



secondary schools classroom affiliated to the Directorate of National Education in Taşova county of Amasya. This scale, which is 5 point likert scale consists of 3 factors. The factor consists of a total of 14 items and the first factor is 7 items, the second factor is 4 items, the 3rd includes 3 items. For each item, a score was composed of the form of *I completely agree* (5), *I agree* (4), *I am undecided* (3), *I disagree* (2), *I don't agree at all* (1). As a result of Exploratory and Confirmatory Factor Analysis, it was calculated that the scale consists of three factors and the factors are 52.727% of the total variance. It was found that the contribution of the first factor to the total variance was 23.953%, for the contribution of the second was 14.836%, and the 3rd was 13.938%. The internal consistency and stability analyses were performed on the data for the reliability studies of the scale, determined as Cronbach's Alpha reliability coefficient of .835. The stability of the results obtained, which seems to be valid and reliable scale for the determination of the level of the calculated with the correlation coefficients of the three factors and the total score is the correlation coefficient between .793 and .821 for the scale to be a level of stability is .803 point.

Research and Inquiry Attitude Scale of Secondary School Students

The Research and Inquiry Attitude Scale of Secondary School Students (RIASSSS) was used to investigate the participants to measure research and questioning attitudes. The scale was formed by Ebrén Ozan, Korkmaz, and Karamustafaoglu (2016b). The validity and reliability analyses of the scale were performed with the data collected from a total of 233 students studying in the 5th and 8th secondary school's classroom affiliated to the Directorate of National Education in Amasya / Taşova. This scale, which is 5 point likert scale consists of 13 items. For each item, a score was composed of the form of *I completely agree* (5), *I agree* (4), *I am undecided* (3), *I disagree* (2), *I don't agree at all* (1). The first factor is 4 items, the second factor is 5 items, and the 3rd includes 4 items. It is observed that the scale consists of three factors and the factors mean 48.417% of the total variance as a result of Exploratory and Confirmatory Factor Analysis. It was found that the contribution amount of the first factor to the total variance was 18.011, the contribution of second factor was 17.683 and the third factor was 12.723. Cronbach's Alpha reliability coefficient was determined as .756 and the total correlation coefficient of the scale was measured as .821. The results obtained mean that the scale is valid and reliable.

The Semi-Structured Interview Form

A five-question semi-structured interview form was used to measure the students' thoughts about collaborative project activities that require research inquiry skills in the qualitative dimension of the study. The questions in the form are given in the findings section. The interview form was composed from questions that will measure students' attitudes towards collaborative project activities, research, and questioning when the empirical process was carried out. The students were asked questions by the researcher during an interview in the classroom environment, and the answers and opinions of the students were noted. All of the students, in addition were observed by the researcher during the empirical process and some were noted down.

The Empirical Process

This study is conducted in the training room of gifted students. Students worked in groups while implementing collaborative project activities in the support training room. Students are divided into two groups of three while studying in group activities. The collaborative project activities designed according to the project-based learning approach are planned as 8 group activities, with one activity per week to be performed according to the 8-week training plan. Sample research activities in the first 4 weeks of the training plan is designed in accordance with a project when students doing their research activities in the last 4 weeks students as a group by selecting topics designed to prepare their own projects. In the process of designed activities, the project-based learning approach steps were considered. The following project-based learning stages in this respect, have been applied:

- *Preparation and Planning Stage:* The project has determined the subjects with the help of the teacher. The studies that the students would do during the research have been scheduled and time scheduling function have been planned. The necessary lists of materials and which



stakeholders will benefit from them have been determined. The activities of the students have been planned and it is decided to form some posters and presentations as a product.

- *Application and Monitoring Stage:* The data about research subjects has been collected and the studies planned within the scope of the project have been carried out. The products of groups have been devised.
- *Conclusion and Evaluation:* The students have presented their projects, and the information, processes and products they acquired have been shared. The students have evaluated the project process with Presentation Evaluation Forms.

In practice, the educational contents consist of a total of 8 activities in 8 weeks, a project each week, and a total of 2 research projects in this process. Activities on a weekly basis are showed in table 1.

Table 1. Activities on a weekly

| WEEK | ACTIVITY | DURATION | DESCRIPTION |
|------|--|-------------------------------|--|
| 1. | - Introduction - Identification of groups -Determination of the rules of group work. | 40 min. + 40 min. | Students get acquainted with their group friends and determine the rules of group work, such as taking responsibility, cooperating, complying with working time, compliance, respect, distribution of tasks by making a joint decision by the group. |
| 2. | - Group games (Who Am I-Color Hunt) -Introduction of the Research Project - Presentation, Sharing | 40 min. + 40 min. | Playing a group game to warm up students, providing students with information about a research project and how to do a research project. |
| 3. | - Sample Project Work -Determination of Questions related to the Project - Preparation and Sharing of the Project Summary | 40 min. + 40 min. | Reminding the project stages to realize a sample project, identifying project topics and creating questions, preparing and sharing a project summary. |
| 4. | - Sample project work (Endangered Animals) - Conducting research - Product creation | 40 min. + 40 min. | Completion of research on a sample project, creation and presentation of a product. |
| 5. | - A Game of Colorful Groups - Creation of Project Groups - Creating a Group Booklet - Determination of Project Topics of Groups | 40 min. + 40 min. | As a result of the group game, new project groups are determined and a group booklet is formed in which new group members introduce themselves. |
| 6. | - Creation of a Project Work Plan and Summary - Creating a Mental Map to the Project Topic | 40 min. + 40 min. | Determining the project topics that the groups will explore, making a project plan, creating a mental map with questions about the project. |
| 7. | - Continuation of Group Work and Preparation of Project Products - Creation of Project Products | 40 min. + 40 min. | Researching on project topics, preparing the product to be created. |
| 8. | -Performance of Group Presentations | 40 min. + 40 min.+ 40 min. | Outputs of project products, group presentations and evaluation. |

The Application of Activities

The Objectives of the First Week

1. He expresses himself appropriately in introduction games.
2. It forms the rules for working with the group.

The students played The game “Who am I”, which is one of the dating games, so that they could explore different aspects of their classmates and get warmed up, the students were then told that the school, the class, the games have their own rules as well as the rules to be followed in group work, and they were asked to establish group working rules on what to look out for when working with the group. Each student was asked to write down the study rules they wanted to be followed on the



blackboard and common group study rules were determined. Students were divided into two groups of three. Students understood what they needed to do first in order to carry out a research project as a group, the need to respect common decisions by creating group work rules in accordance with their own recommendations.

The Objectives of the Second Week

1. Students understand the purpose of the Research Workshop Program and the activities that they will do during the semester.
2. Student have knowledge about the concept of the project.

Students were played the game "Color Hunt". After giving instructions for the game, the group that found the most objects at the end of the period was asked to explain how they found more objects. Students were asked for ideas about the "research project" and then asked to ask about dreams and tell them what to do to realize their dreams. The students were reminded that our dreams can be projects for us and when we want to realize these projects, we need to plan, implement and evaluate whether we have achieved our dream or not, and were informed that there are steps for planning, implementing and evaluating the preparation of a project. The students watched the presentation prepared on the topic of "How to Make a Project" and they were provided with information about the concept and stages of the project. After the presentation was completed, it was informed that they would begin to conduct a sample research project on endangered animals in Turkey based on these concepts that they learned the next week.

The Objectives of the Third Week

1. Students apply the concepts they have learned about the project within the scope of a sample project.
2. They ask questions related to the predetermined project topic.
3. Students form project summary.

The students were divided into two groups, with three students forming the *Sea Turtle*, one of endangered animals group from and the other three students were member of the *Bald Ibis*. Each group was given letters of endangered animal and asked the students some questions such as "What can we do to help these animals? What can we do to introduce these animals to the people around us, to raise awareness that they are extinct? What measures can be taken to ensure that animals do not become extinct?" Then, the students were informed that they would develop a project on the topics discussed. The groups, after that were given a cardboard with a large circle drawn in the middle and three separate sections drawn around the circle, and each student was asked to write down the questions they were curious about in their own side. In the middle section, the groups were asked to write down the common questions they had agreed on, and it was stated to the students that they would shape their projects and plan their plans in accordance with these questions. Thus, the students prepared the cardboard of the sharing ideas. In order to make plan for the project easier for them, they distributed a working paper to each group, and all groups were asked to prepare a working paper on Endangered Animals – A Summary of the Project and submit it to their friends.

The Objectives of the Fourth Week

1. Students apply the concepts they have learned about the project within the scope of a sample project.
2. They design a product in accordance with the project topic and purpose.

The groups were given back the Sharing Tour Cardboard and Endangered Animals - Project Summary Papers that they used to ask their questions the previous week in accordance with the questions they asked the students and the plans they made, they were asked to create a product by conducting a study at the Application and Monitoring stage of the project. Then, flashcard was distributed to each group about the animal they had chosen and with the information obtained from this flashcards, the necessary materials were also provided and they were asked to prepare *Identity Card for Endangered Animals*. After sharing of the groups' Identity Card for Endangered Animals, they were wanted to



produce outputs of the project. For this stage, the groups were wished to choose one of the mask, finger puppet or model and prepare it. Through the sharing and presentation of products, the groups completed a sample research project one by one.

The Objectives of the Fifth Week

1. Students know the concept of social responsibility.
2. They realize that each person has a responsibility in the process of working within the group.
3. They improve feasible project ideas related to the problems around them or the issues they think should be developed.

New project groups of students were set off with the “colored groups” game. It was stated to the students that they would start their own project studies in these groups starting from the next week. Students were informed that they would work on their projects with this group and were asked to find a group title for themselves. After that, each group member was asked to prepare and decorate a card with his personal information, hobbies on a small cardboard. The group members were asked to create a group booklet with their cards and the group booklets were shared after completion.

The Objectives of the Sixth Week

1. Students make a study plan for a specific purpose.
2. Students discuss concepts that may be relevant to the selected topic.
3. Students summarize the basic information about the project.

The groups were asked the following questions and wished to brainstorm and list their ideas.

- Are there common needs/problems around you?
- What do you think should be done better around you?
- What problems would you like to have eliminated?

Cards with news about different problems were stick the board in order to support the groups during the idea-forming stage. Students were told that they could the news that interests them. As a result, students were supported to choose a research topic that could be put forward as a product, and various sources could be accessed. Thus, the groups determined the project topics. Then, students were reminded stages of the “How to Make a Project” when preparing their projects and asked to take into account the project stages. After the defining project topics, each groups created a summary of their projects together. The students were informed that they would create a mind map in order to determine the research questions related to the project topics. When preparing a mind map, students were asked to identify the topics/concepts flashing minds and the relationships of these topics/concepts with each other. The activity was completed with the presentation of mind maps.

The Objectives of the Seventh Week

1. Students decide which points of the selected topic should be investigated.
2. Students designs a product suitable for the project.

After the students created their own mind maps related to the project, they were asked to conduct research on project questions library, Internet, books, newspapers, magazines, online resources, etc. The groups were asked to review the project objectives, the mind map they created about the project topic, the information they gained about the topics, and other studies they plan to do within the scope of the project. At this stage, they were asked to decide how they could create products to promote their projects to others, announce them and share what they had learned and the experiences they had gained with others. In order to decide, the following product samples were shared with students.

Cartoon - Graphic - Slide Show - News Broadcast - Storytelling - Manual -Letter - Fairy Tale - Album - Catalog - Photo Brochure - Puppet - Poster - Booklet – Newspaper - Collage Work - Story Map.

After the group members determined the project products and materials, the students started to design and create their products.



The Objectives of the Eighth Week

1. Students create a product in accordance with the purpose of the project.
2. Students verbally express the works on the project and the result of the project.

Students created their products by deciding on the details of how the products they would create were as a group. Each group was asked to make their presentations by giving a period of 15 minutes. A general discussion environment was created about the presentation, and after all the presentations were completed, the groups were asked to answer the following questions by promising.

- How did this project you made contribute to you?
- How do you think this project you have done has contributed to society?

The group presentations were evaluated by Presentation Evaluation Forms. At the end of the project, the groups shared their prepared products with their classmates and also made a comment box, students wrote their opinions about this study, and their friends' projects and threw them in the box and the research project was completed.

Analysis of the Data:

Parametric analysis was used due to the fact that the data collected before and after the experimental application does not provide prerequisites for parametric analysis. Wilcoxon Signed Rank Test was used in line with this, in order to make the statistical analysis of non-parametric tests on research questioning of students' research attitudes and self-efficacy perceptions of competence pre-test and post-test scores. The content analysis method was preferred in the analysis of qualitative data. The accepted significance level in this study was determined as $p < .05$.

RESULTS

The results of the Wilcoxon Signed Rank Test regarding whether the applied collaborative project activities contribute to the students' attitudes towards research inquiry are summarized in Table 2.

Table 2. The effect of experimental practice on attitudes towards research inquiry

| Dependent Variable | Group | Mean | Std.Dev. | | N | Mean Rank | Sum of Ranks | z | p |
|---------------------------|-----------|--------|----------|------------------|---|-----------|--------------|--------|------|
| Research Inquiry Attitude | Pre-test | 3.4615 | .3115 | Negative Ranking | 0 | .00 | .00 | -2.201 | .028 |
| | Post-test | 4.5641 | .2157 | Positive Ranking | 6 | 3.50 | 21.00 | | |
| F1: Curiosity | Pre-test | 3.2500 | .4183 | Negative Ranking | 0 | .00 | .00 | -2.207 | .027 |
| | Post-test | 4.541 | .3679 | Positive Ranking | 6 | .50 | 21.00 | | |
| F2: Avoidance | Pre-test | 3.7667 | .4633 | Negative Ranking | 0 | .00 | .00 | -2.226 | .026 |
| | Post-test | 4.7333 | .2732 | Positive Ranking | 6 | 3.50 | 21.00 | | |
| F3: Valuing | Pre-test | 3.2917 | .2922 | Negative Ranking | 0 | .00 | .00 | -2.023 | .043 |
| | Post-test | 4.3750 | .4401 | Positive Ranking | 5 | .00 | 15.00 | | |

When Table 2 is examined, it is noted that the pre-test score averages of the students' research inquiry attitudes are $\bar{x}=3.461$ before the collaborative project activities application and that this average is $\bar{x}=4.564$ after the application. It is observed that there is an increase in the average score of students' attitudes towards research inquiry after the implementation of collaborative project activities. In addition, students' attitudes towards the research question examined; curiosity (pre-test $\bar{x}=3.250$ post-test $\bar{x}=4.541$), avoidance (pre-test $\bar{x}=3.766$; post-test $\bar{x}=4.733$) and valuing (pre-Test $\bar{x}=3.291$; post-test $\bar{x}=4.375$) sub-factors, it is observed that the average score increased after the application of the project. It can be said that after the implementation of collaborative project activities, the attitude scores of all students towards research inquiry increased in consequence of analyzing the results of the Wilcoxon signed rank test conducted on the significance of this increase. In addition, when the variables obtained in the table is significant, when the calculated test statistical value is examined, there are a significant difference between the students' pre-test and post-test scores of the research



questioning ($Z=-2.201$, $p<.05$). There is a significant difference between the pre-test and final, in the same way, test scores of students' attitudes towards the curiosity, avoidance, and valuing sub-dimensions of research inquiry (Z for curiosity; -2.207 , $p<.05$; avoidance $Z=-2.226$, $p<.05$; for the evaluation of $Z=-2.023$ ($p<.05$). Accordingly, it can be said that the application of collaborative project activities has a positive effect on students' attitudes towards research inquiry. Before and after the collaborative project activities applied to the students, a Wilcoxon rank test was performed to test whether there was a significant difference between the students' perceptions of self-efficacy dec research questioning and the results are summarized in Table 3.

Table 3. The effect of empirical application on self-efficacy perceptions of research inquiry

| Dependent Variable | Group | Mean | Std.Dev. | | N | Mean Rank | Sum of Ranks | z | p |
|------------------------------|-----------|--------|----------|------------------|---|-----------|--------------|--------|------|
| Research Query Self-efficacy | Pre-test | 3.3929 | .1735 | Negative Ranking | 0 | .00 | .00 | -2.207 | .027 |
| | Post-test | 4.2857 | .0903 | Positive Ranking | 6 | 3.50 | 21.00 | | |
| F1: Avoidance | Pre-test | 3.7857 | .4309 | Negative Ranking | 0 | 1.00 | 1.00 | -1.997 | .046 |
| | Post-test | 4.4048 | .2772 | Positive Ranking | 6 | 4.00 | 20.00 | | |
| F2: Continuing the Research | Pre-test | 2.8333 | .5627 | Negative Ranking | 0 | .00 | .00 | -2.214 | .027 |
| | Post-test | 4.1667 | .2041 | Positive Ranking | 6 | 3.50 | 21.00 | | |
| F3: Personal | Pre-test | 3.2222 | .4554 | Negative Ranking | 0 | .00 | .00 | -2.226 | .026 |
| | Post-test | 4.1667 | .5055 | Positive Ranking | 6 | 3.50 | 21.00 | | |

The average self-efficacy perceptions of the students for research questioning before the application of collaborative project activities are $\bar{x}=3.392$, and the average self-efficacy perceptions of the students for research questioning after the application are $\bar{x}=4.285$ when table 3 studied. Accordingly, it can be said that students' perceptions of self-efficacy towards research inquiry after collaborative project activities increased in their score averages. Along with this, sub-factors of questioning of student's research and qualifications of self-efficacy avoidance (pre-test $\bar{x}=3.785$ post-test $\bar{x}=4.404$), continuing the research (pre-test $\bar{x}=2.833$; post-test $\bar{x}=4.166$) and personal (pre-test $\bar{x}=3.222$; post-test $\bar{x}=4.166$) means that the average score increased after the application. As the results of the Wilcoxon signed rank test conducted regarding the significance of this increase interpreted, it comes out that all of the students had an increase in their self-efficacy scores for research questioning after the application of collaborative project activities. Whether the variables obtained in the calculated value of the test statistic is examined, it is understood that students research a questioning of self-efficacy score increase after the implementation of the cooperative project, and this increase differed significantly ($Z=-2.207$, $p<.05$). In the same way, students are observed that sub-dimensions such as research their questioning of avoidance, continuing the research and it's on the personal self-competencies significant difference between pretest post test scores (avoidance for Z ; -1.997 , $p< 0.05$; for continuing the research $Z=-2.214$, $p<.05$; for personal $Z=-2.226$, $p<.05$) Accordingly, it can be said that collaborative project activities contribute significantly to students' perceptions of self-efficacy towards research inquiry.

The answers of the students to the questions posed in order to determine their views on the collaborative project activities can be summarized as follows.

1. Do you like participating in collaborative project activities? Why? Answers to the question:

S1: "Yes, I liked it, because the research project work was fun."

S2: "Yes, I liked it, it was especially nice to work as a group, and I learned many new things."

S3: "I didn't really like it at first, but then I really enjoyed it because I thought I had developed different perspectives."



S4: *“Yes, I liked it because I both had fun and learned new things.”*

S5: *“Yes, because I learned new things and I liked studying as a group.”*

S6: *“Yes, I like it because I like research.”*

When the answers given by the students to the first question are viewed, we observe that they have gained new knowledge through collaborative project studies, gained different perspectives and found collaborative project studies to be fun. Accordingly, it can be said that students like to participate in collaborative project activities and find collaborative project activities useful.

2. How was it studying with your friends as a group while making a research project at collaborative project events? Why? Answers to the question:

S1: *“I think it was very nice, I could have been bored if I was the only one, it might have been difficult, but I had fun as a group. Also, my friends knew some things that I didn't know, so my deficiency was complete.”*

S2: *“It was very nice to work as a group because we had fun and we all learned new information by helping each other.”*

S3: *“I think it's different, there are some bad sides and good sides. As a group, sometimes when we make the wrong decisions, it's all our fault, I think it's bad. And sometimes because we question together, we can easily make the right decision, which is a good thing.”*

S4: *“It was very pretty to work together because it was nice to do the same event with my friends, to make decisions together.”*

S5: *“It was nice because my shortcomings can come out when I'm studying alone, but sometimes my other friends can overcome my shortcomings when I'm a group.”*

S6: *“I think it was nice to work as a group, because when we mix different thoughts of all of us, some good ideas come out as a result.”*

When the students' answers to the second question examined, it may mean that when they work together with their group mates, they learn new information by helping, complete their deficiencies together, can make the right decisions by exchanging ideas together. Accordingly, it can be said that students find group work useful in collaborative project activities.

3. How did this project that you did as a group contribute to you? Answers to the question:

S1: *“I found out at what point I would start research and where I would complete it. Sometimes I find out that everything I know is not true.”*

S2: *“The topic of the presentation I studied in the research project came across in the social studies course, so it helped me in other courses.”*

S3: *“Working as a group has improved my sense of togetherness. I found out that a study is done better by exchanging ideas as a team.”*

S4: *“This event allowed me to get new information.”*

S5: *“I have learned how to work as a group and how to do research.”*

S6: *“I have learned more about the issue I am researching. I never knew how to prepare a presentation, I also learned how to prepare a presentation when preparing a research project.”*

When the answers given by the students to the third question are examined, it is possible to say that the students have learned how to conduct research, exchanged ideas, gained new knowledge thanks to the research project they have prepared. According to the students' opinions, made an inference that collaborative project activities have a contribution on students' learning of new information.

4. How do you think this project that you are doing as a group can contribute to society? Answers to the question:

S1: *“I think it will make a positive contribution, our project will raise public awareness about children's rights.”*



- S2: *"I think people become more aware of the problems in society and become aware of them."*
S3: *"We will raise public awareness. We make people sensitive and more responsive."*
S4: *"Our project provides awareness of people in society."*
S5: *"It makes more people in society realize the problems in the world."*
S6: *"By our project, more people learn what we have learned, and so people are more careful to solve problems."*

It may be deduced that they will have a positive contribution to the fact that people will be more sensitive to world problems, awareness, and problems will be noticed by more people with the research projects they have prepared when the students' answers to the fourth question are examined. According to the opinions of students, it can be said that they think that students contribute to society with research projects prepared in collaborative project activities.

5. What would you pay more attention to if you had to prepare a research project on a new topic? Answers to the question:

- S1: *"I would do each step in the research project with more attention, without skipping in turn. I would like to add more of what I have learned in other courses to my research."*
S2: *"Our energy resources are running low, I would like to choose and investigate this issue. I would also like to prepare large posters in the square to create more awareness when the project is over."*
S3: *"I would have cared more about teamwork."*
S4: *"I would choose the topic, the places, the people I would be helped to investigate, more carefully."*
S5: *"I would have liked to gather with my friends outside the school and do more research."*
S6: *"I would have chosen the topic carefully. I would choose the topic that I am more interested in, that I would like to have information about."*

When the answers given by the students to the fifth question are examined, it is possible to say that they want to make a new research project by paying attention to the research project stages, choosing the topic they are interested in, paying attention to the group work and the dissemination of the project. Accordingly, the findings shows that students are actively learning through collaborative project activities and are learning how to do a research project.

6. Do you want to do new research projects as a group? Why? Answers to the question:

- S1: *"Yes, I would like to, because I'm learning new things. I'm learning better with what I've learned by discussing it as a group and researching and doing everything ourselves."*
S2: *"Yes, I would. I learned new information in my first research project, I would like to do new projects and learn more. And we'd learn new things as a group, and I really like that."*
S3: *"Yes, because it contributes more to me, and I liked to do everything ourselves."*
S4: *"I would have liked to, and I really liked to prepare the presentation and to learn new things."*
S5: *"Yes, because it's fun. And as a group, we learn better when we do everything ourselves."*
S6: *"I would like to because it's fun to do research and we did the research ourselves freely."*

Students when examining their answers to the sixth question, when preparing a research project, feel free to learn new information, they enjoy working as a group for better learning by doing everything themselves and it can be said that new research projects they want to do. Thus, it can be said that the students' thoughts about collaborative project activities are positive.

According to the answers given by the students to the questions asked about the activities, it can be said that the opinions of the students regarding the collaborative project studies are positive. According to the teacher observations in the classroom when the activities are being applied, in the research project studies; it can be said that the students are active, carry out the studies themselves,



even if there are occasional differences of opinion in the group studies, they can ultimately come to a common decision, respect the decisions of their friends, choose the subjects they are curious to investigate, use different sources when researching new information, use technology effectively and efficiently. That the students want to do other research projects after eight weeks of collaborative project activities completed, and as a group they think they learn better because they do all the work themselves, support that they find collaborative project activities fun, enjoyable and useful.

DISCUSSION and CONCLUSION

The results of this study show that after the collaborative project activities applied to the students, the students' attitude towards research inquiry scores increased on average. Collaborative project activities contribute significantly to students' attitudes towards research inquiry, and it is founded out that this contribution is also statistically significant. It's similarly, seen that there is a significant difference between the pre-test and post-test scores of the sub-factors of the research such as curiosity, avoidance and valuing inquiry-based attitude scale sub-factors in favor of the post-test. This reveals that the attitudes of gifted students towards research inquiry applied in collaborative project activities can develop in a positive way. It can be said that the collaborative project activities implemented in this research; planning them as project-based learning activities, continuing them over a long eight-week study period, and implementing them in a flexible work environment affect the positive development of students' attitudes towards research inquiry. When other studies in the field are examined, there are many related studies dealing with cooperative learning and the gifted, whereas it is very limited that the research in which the two parts of the research are combined.

As a result of a literature review, it is possible to find similar studies that support the results of this research. It is examined that while studying with students at the lower, middle and upper level of success and increasing student attitudes as a result of the study, it was seen that this increase was affected by the importance of tasks and responsibilities in the lower group, course success in the middle group and knowledge and learning in the upper group in the study of Durmuş (2020) revealing the impact of guided research inquiry approach activities on students' attitudes towards research inquiry. Similarly, it has been observed that there has been an increase in the attitudes of the students towards research inquiry and that there has been an improvement in the scientific process skills of the students at the higher level of success in the research of Koyunlu and Ünlü (2015) in which students examined how their views and perceptions of research and questioning changed with science courses based on technology-supported research inquiry. Kanter, and Konstantopoulos (2010) and Turkmen (2019)'s works have revealed that cooperative project activities also work with the students' concerns to be actively involved in the assessment process and discuss with members of the research group are important in terms of the provision of permanent learning. Çiçek's (2018) study also supports these findings. It is concluded that cooperative learning increases students' self-confidence and participation in the learning process, and that students learn better in a similar study (Gavali & Banu, 2020). A study conducted by Mentz and Van Zyl'in (2016) also revealed that cooperative learning has positive contributions to students' attitudes towards learning and self-learning. Another study found out that permanent and meaningful learning is achieved in students by assuming their own learning responsibility of each of the students with a project-based learning approach (Dobrin, 2020). These studies show that by using collaborative project activities in educational settings, students investigate the issues they are interested in themselves, thus providing persistent learning, and collaborative project activities positively increase students' attitudes towards research inquiry.

However, it may be encountered opposite results in the educational researching field. In Özer's (2019) study which measuring the attitudes of students towards research inquiry with educational technologies, no significant difference has been found between the scores of the pre-test and post-test of student attitudes. This situation has been interpreted as the fact that 3 weeks of study is not enough for research inquiry-based attitudes to develop and that students are encountering this method for the first time. Another different study, in which the effect of collaborative group studies on the students'



questioning skills was examined, has shown that there is no significant change in the students' attitude scores towards the course (Kaplan Parsa, 2016). That findings are interpreted as the fact that although the application lasted for two months, the 14 activities during this time decreased the motivation of the students. It is reported that Questioning of students' research of the attitude of increase in the positive way are derived from every week for a period of eight weeks event planning, research, questioning, curiosity about studying with gifted students, students in the selection of the topic to be researched given the opportunity to choose their topics of interest in this study.

The implemented collaborative project activities contribute significantly to the students' perceptions of self-efficacy towards research inquiry and is that this contribution means statistically significant. There is a significant difference between the pre-test and post-test scores of the self-efficacy perception scale sub-factors aimed at questioning the research; avoidance, continuing the research, and personal subfactors in favor of the post-test. This result shows that the self-efficacy perceptions of gifted students joining to collaborative project activities towards research inquiry can develop in a positive way.

One may find research that shows that collaborative project activities and project-based learning approach bring students skills such as problem solving, collaboration, decision making, research review, questioning and, discussion in when this field is research. The studies of Yaman and Yalçın (2004), Uysal (2009) and Yılmaz (2015) are noteworthy at this point. Wu and Hsieh's findings (2006) also revealed that research inquiry-based learning environments contribute to the development of students' inquiry skills. In other study, the effect of online learning on the development of students' critical thinking skills with the cooperative learning strategy was studied on and it was found out that the cooperative learning strategy positively affects the development of students' critical thinking skills (Sholikh, Sulisworo, & Maruto, 2019). It is emphasized that the importance of project-based learning approach contributes to the creative thinking, reflective thinking and problem solving skills of gifted students in a different paper (Kıran, 2018). In the study of Turkmen (2018), it was revealed that the project-based learning approach provides meaningful learning for students by searching for solutions to problems, discussing ideas, using scientific research skills and creating their own products. Chu, Tse and Chow (2011) also revealed that the project-based learning approach has a positive effect on the development of students' scientific research skills. As in similar studies in the field, it is possible to say that collaborative project activities in this study contribute to the development of students' self-efficacy towards research inquiry.

When their views on collaborative project activities are examined, it is seen that the students find the collaborative project activities fun, useful and are happy to learn new information. Yaman and Yalçın's study (2004) is also remarkable work at this point. It is seen that students can reach a common point by discussing their ideas in cooperation with their group mates, they can correct each other's failures by helping each other so that they can learn better, and they want to do a research project again. The studies of Çiçek (2018), Anderson (2019) and Durmuş (2020) also advocate these findings. Chu (2009)'s study also monitored those students find collaborative project-based learning approach easy and enjoyable. It is showed up those students who receive high marks prefer to learn collaboratively in a different study (Eijl, Pilot, & Voogd, 2005). It is possible to find findings in similar studies in the literature that students can investigate the topic they are interested in and curious about themselves, feel free in the working environment as a group, and have increased motivation in research inquiry-based collaborative learning (Demir, 2013; Ecevit, 2018; Yılar, Şimşek, Topkaya, & Balkaya, 2015). As in this study, similar studies in the field show that students find collaborative learning environments useful, learn better, and enjoy working collaboratively. In addition, in this study, observations of teachers in the classroom during the implementation of activities also support these results. In this regard, the research results are in parallel with the findings contained in the relevant field resources. Students in collaborative learning environments acquire many skills such as cooperation, assistance, exchange of ideas, research inquiry, new learning, and social skills as well as cognitive skills are developed.



Recommendations

It is recommended that the collaborative project activities discussed within the scope of the research should also be used in other courses such as science and social studies that require knowledge and skills in this context.

Within the scope of this research, the effect of collaborative project activities on the competence and attitudes of students towards research inquiry has been discussed. It is suggested to conduct different studies aimed at the effect of collaborative project activities on different psychometric characteristics of gifted students, such as critical thinking, problem solving, and creative thinking.

Limitations of the Research

This research is limited to six gifted students.

This research is limited to a total of 8 activities, once a week in the gifted support room.

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The data of this research were collected in 2019-2020 academic year. As the authors of this study, we declare that we collected data in accordance with ethical rules during the research process and acted in accordance with all ethical rules. We also declare that there is no conflict between the authors.

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