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The Status of Science Teachers Regarding the Application of Guided Research Inquiry-Based Teaching Approach at 5th Grade Level*

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Abstract. The aim of this study is to determine the current status of science teachers regarding the application of guided research inquiry-based teaching approach at 5th grade level. In order to achieve this aim, descriptive case study is used in the research. The study is carried out with three science teachers working in three different secondary schools affiliated to Kars National Education Directorate with 0-3, 4-10 and 10-year professional experience. The related data about the guided research inquiry-based teaching approach application levels of science teachers are collected by using structured interview form and video recordings of teachers' 5th grade level courses. In this context, the obtained data are analyzed according to the behaviors that should be displayed during the application process of research inquiry-based teaching approach, which is highlighted by Çavaş, Kesercioğu and Huyugüzel-Çavaş (2011). According to the findings of the research, it is concluded that teachers do not have enough knowledge about the guided research inquiry-based teaching approach, and they cannot use this teaching approach in their courses. In light of present findings of the study, related suggestions are given to science teachers, teacher educators and officials of the Ministry of National Education (MNE).

Keywords: Guided research inquiry-based teaching approach, science teacher, professional experience

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1. INTRODUCTION

The ability of individuals to adapt to the development and change in the field of science and technology has made raising individuals with advanced critical thinking and decision-making skills important in recent years. This situation has led countries to seek an education model that will enable individuals to find solutions to the problems they encounter, to research and to question them (Ministry of National Education [MNE], 2017). In this context, it has become important to use the Research Inquiry-Based Teaching Approach (RIBTA) training process, which helps students to be responsible for their own learning, to produce solutions for problems, to develop interrogation and critical thinking skills.

RIBTA includes presenting the problem that students may encounter in the real world within the scope of scenarios and the process of finding solutions to these problems with various researches and inquiry activities (Keys & Bayran, 2001). This process provides opportunities for students to use concepts, principles and laws to solve real-world problems by making it easier for them to understand the events around them (Duban, 2008). In line with these opportunities, RIBTA is taken as the basis in the Science Course curriculum, which was reconsidered in 2013 and is prepared by Ministry of National Education Primary Education Institutions (MNE, 2013). In addition, it is foreseen to apply different varieties of RIBTA according to the grade level in the Science Curriculum. In this context, Structured Research Inquiry-Based Teaching Approach (SRIBTA) in 3rd and 4th grades, Guided Research Inquiry-Based Teaching Approach (GRIBTA) in 5th and 6th grades, and Open Research Inquiry-Based Teaching Approach (ORIBTA) in 7th and 8th grades are adopted (MNE, 2013).

RIBTA is divided into different varieties depending on the creation of research question in the process in which teachers conduct courses and their guiding level for students (National Science Education Standards [NRC], 2000). When the literature is examined, it stands out that RIBTA is divided into three as structured, guided and open RIBTA (Colburn, 2000; Spaulding, 2001). GRIBTA begins with the research question asked by the teacher to the students and is expected them to find solutions for this question (Colburn, 2000) and to obtain results in this context (Tatar, 2006). Students develop their social learning skills by interacting with each other in groups in the courses where GRIBTA is conducted (Howe & Jones, 1998).

The fact that RIBTA is taken as the basis in the Science Curriculum brings forward the practices carried out at the national and international level in this field. It is seen that RIBTA's student success, attitude towards science or its impact on the development of various abilities and skills are examined by the researchers in these studies. In this context, many researchers indicate that teachers conduct their courses according to RIBTA rather than traditional teaching approaches so it increases the interest and achievement of students towards science courses more (Johnson, Kahle & Fargo, 2007; Kaya & Yılmaz, 2016). However, it is emphasized that teachers use RIBTA too little in many studies examining the methods used in science courses (Chabalengula & Mumba, 2012; Kowalczyk, 2003). It is pointed out that the teachers using this approach have difficulties in using RIBTA in their lessons due to the reasons such as lack of materials, difficulty in classroom management, insufficient time and schedule (Staer, Goodrum & Hackling, 1998). In addition, it is prioritized that science teachers do not have enough information about when, how much and how to guide students in RIBTA practices (Furtak, 2006; Kaya & Yılmaz, 2016) and they also have problems in forming research

questions (Saka, Akcanca, Kala & Sungur, 2018). However, it is stated that the science teachers have also prejudices towards applying GRIBTA (Meyer, Meyer, Nabb, Connell & Avery, 2013).

The fact that there is no research about the science teachers' application levels of RIBTA in national studies (Saka, 2018) makes the determination of the application levels of this teaching approach in teachers' courses important. An answer will be sought for the question on how science teachers' current situation in applying GRIBTA at the 5th grade level is within the scope of the research conducted in this context.

Purpose

It is aimed to determine the current status of science teachers in implementing GRIBTA at the 5th grade level within the scope of this study. In accordance with this purpose, the answer to the question "What is the current situation of science teachers in implementing GRIBTA at the 5th grade level?" will be looked for.

2. METHOD

The study design, working group, data collection process, data collection tools, and data analysis are included under this topic.

The Study Design

Explanatory/descriptive case study is used to achieve the aim of the study. The case studies are defined as *"a qualitative research approach in which the researcher examines one or a few situations that are limited in time with data collection tools (observations, interviews, audio-visuals, documents, reports) that include multiple sources and defines situations and situational themes"* (Creswell, 2007). Explanatory/descriptive case studies are descriptive researches that make these situations familiar by providing information about the situations that are not known with the help of sample events and provide a common language to the reader (Gökçek, 2009).

Working Group

The working group is created by using the stratified random sampling type. The basis of this sampling method is to divide the target population of the study into substrata according to a certain variable and then randomly select samples from these strata (Onwuegbuzie & Collins, 2007). The working group consists of three science teachers with different professional experiences. The years of professional experience of science teachers are presented in Table 1.

Table 1

Professional Experiences of Science Teachers

Working Group	Gender	Professional Experience (Year)
Teacher coded K3	Male	3

Teacher coded K2	Male	6
Teacher coded K1	Male	10

The teacher coded K1 in the study group has 10-year, teacher coded K2 has 6-year and teacher coded K3 has 3-year professional experience in the working group. When the literature is examined, it is seen that the teachers with 10-year or more professional experience are considered experienced (Coskun, Metin, Birşici and Kaleli-Yilmaz, 2010), the teachers with 3-year and less professional experience are described as inexperienced teachers (İlğan, 2013). In this context, each science teacher in the working group represents a different group according to their professional experience, and separate results are obtained for each group as a result of the study.

Data Collection Process

Considering the purpose of the study, three science teachers with 0-3, 4-10 and more than 10-year professional experience and working in three different secondary schools affiliated to the Kars Provincial Directorate of National Education are included in the working group. After obtaining the necessary permissions from Kars National Education Directorate, the lessons of three teachers in the working group are determined by taking into account the timetables of the teachers at the 5th grade level and their courses that will not overlap with each other on the same day and time.

A semi-structured interview is conducted with each teacher in the working group to determine their knowledge and practical thoughts about GRIBTA. Afterwards, the randomly selected 5th grade titles like "friction force, change of state and the distinguished properties of matter" are videotaped to determine their current status in the practice of GRIBTA in the courses of the investigative teachers. During this process, the researcher pays attention not to bother the student and the teacher in the back of the classroom. Moreover, the researcher starts to shoot the lessons as soon as he thinks that the students and the teachers in the study group are exhibiting natural behaviors during the lesson. Video recordings taken before this process are not included in the study data. The video recording process continues until the researcher believes that he determines how the relevant teachers conduct their lessons.

Data Collection Tools

Considering the purpose of the study, the data are obtained by using video recording and semi-structured interview. This section provides information about the data collection tools used in the scope of the work.

Interview Form

The interviews have an important place in order to reveal the opinions of the participants about the subject in the research. The interview is defined as a method of collecting data obtained from the relevant people within the framework of the questions that take place between at least two people and whose answers are sought in the research (Büyüköztürk, Şekercioğlu & Çokluk, 2012).

The semi-structured interview form developed by Saka (2018) is used within the study. The semi-structured interview form is used before the video recordings of teachers' application courses are taken. Saka (2018) divides the semi-structured interview form he developed into two groups as those who have knowledge about GRIBTA and those who do not. The questions of the teachers who have information about GRIBTA are at a level that will reveal their theoretical and practical knowledge about the relevant teaching approach, and the questions of the teachers who do not have information about GRIBTA are composed of the questions that reveal the processes in which the teachers conduct the relevant courses.

Video recordings

Video recordings are used to obtain information about the extent to which the teachers in the study group apply GRIBTA in their lessons or otherwise, which teaching approach is applied. The video is shot by the researcher and also takes notes of his observations during the shooting. The researchers have the opportunity to view the images as needed until they reach a decision about the findings they have obtained within the scope of their analysis (Toptaş, 2008).

Data Analysis

When the literature is examined, it is seen that the behaviors that should be carried out during the implementation process of RIBTA are similar according to many researchers (Saka, 2018). Moreover, the workshop carried out by Çavas, Kesercioğu and Huyuguzel-Çavaş (2011) is examined, it is found that they perform their work by using samples from Turkey. Therefore, the data obtained from the science teachers within the scope of the study are analyzed according to the behaviors that should be carried out in the implementation process of RIBTA, which is noted by Çavaş and others (2011).

Table 2

Behaviors That Should Be Displayed in the Implementation Process of RIBTA

Starting to Question	Focusing on Research	Sharing Understanding
• Creating a relationship between student curiosity and content • Asking question that can be investigated	• Interacting with materials in groups, making observations and providing possible explanations Having them test their predictions and record their findings	• Giving students time to gather and share what they do and think • Teacher summarizes the lesson, utilizes groups and data.

The data obtained from semi-structured interviews and video recordings are transcribed in computer environment by the researcher. Afterwards, these data are analyzed with deductive and inductive content analysis.

In order to ensure the reliability of the analysis of the data obtained from semi-structured interviews and video recordings, the data are analyzed by three faculty members who are experts in the field and who have worked on RIBTA and qualitative researches. After the analysis of the expert faculty members, the similarity between the codes and themes obtained is controlled by the researcher. After this check, three faculty members are brought together to discuss their analysis, and then the common codes and themes are determined. Finally, the researcher compare the codes and themes, which he identifies, with the codes and themes determined by the faculty members. The "consensus" and "disagreement" determined in this comparison and the reliability of the analysis is calculated with the reliability formula proposed by Miles and Huberman (1994). According to Miles and Huberman (1994), the reliability calculations more than 70% indicates that the analysis is reliable. The reliability of semi-structured interview analyses is found as 90% for teacher coded K1, 85% for teacher coded K2 and 93% for teacher coded K3. The reliability of the analysis of the data obtained from the video observation records is calculated as 85% for the teacher coded K1, 90% for the teacher coded K2 and 88% for the teacher coded K3. In this case, it can be stated that the analysis of data obtained from semi-structured observations and video recordings is reliable.

3. FINDINGS

In this section, the results related to the current situation of science teachers in the working group regarding their knowledge and application levels about GRIBTA are presented.

Findings Regarding the Current Situation of Science Teachers in the Application of GRIBTA at the 5th Grade

A semi-structured interview is held with the relevant teachers and video recordings of their lessons are taken in order to determine the current situation of science teachers in the application of GRIBTA at the 5th grade level. Afterwards, the data obtained from the video recordings are analyzed with deductive and inductive content analysis. The data obtained from the semi-structured interviews are analyzed according to the inductive content analysis. In this context, the findings obtained from the analysis of the data are presented below for each teacher.

Findings Regarding the Current Situation of the Teacher Coded K1 in the Application of GRIBTA

The findings determined as a result of the analysis of the data obtained from the video recordings of the 5th grade science course applications of the teacher coded K1 are combined in Table 3 with the findings prepared as a result of the analysis of the data obtained from the semi-structured interview in which the information about RIBTA are determined.

Table 3

Integrated Form of Findings from Video Recordings and Semi-Structured Interview of the Teacher Coded K1's Courses

Teacher behaviors without knowledge about GRIBTA [2]				
Preparing for the Topic	Experiment time [2]			
	Theoretical knowledge [2]	I know all about it[2]		
The beginning of the Topic	Review of the previous topic [3]	With direct descriptions [3]		
	Attracting attention and arousing curiosity to the lesson [2]			
	Revealing prior knowledge[1]	With the Questions[1]	Within the scope of examples from daily life [1]	
	Informing about the subject [1]			
	Encouragement to research [2]			
During Subject Processing	Using question and answer technique[2]			
	Direct Instruction [2]	Associating with daily life [2]		
	Descriptive information [3]	Directly [3]	From the book[1]	
			Own Knowledge [1]	From daily life [3]
				Theoretical knowledge [1]
		As part of the demonstration experiment [1]		
		With the examples from the daily life [1]		
	Observation[3]	With the demonstration experiment [3]		
		By using figures[1]		
		By using materials[1]		
	The use of material[3]	With the demonstration experiment[3]		
	Making predictions and allowing to test the predictions [2]			
The end of the Topic	Giving students the opportunity to share their knowledge among themselves [2]			
	Taking notes [3]	Dictating the knowledge directly [1]		
		Dictating examples from the daily life [1]		

	Consolidating the knowledge [3]	With the examples from daily life[1]	By making them give examples [1] With the examples of the teacher[1]
		With the Questions[3]	With direct information content [1]
		Reviews of the topic[1]	With the direct explanations [1]
Teacher's Feedback	Making Explanation[1]	Student answers to questions [1]	When the wrong answer is given [1] When the correct answer is given [1]
		Student's questions [1]	
		Student's examples [1]	
	Confirming [1]	Student answers to questions [1]	
	Guidance [1]	In problem solving [1]	

"[1]": Findings from video recordings, "[2]": Findings from semi-structured conversation, "[3]": Common findings from semi-structured and video observation recordings

When Table 3 is examined, it is determined that the teacher coded K1 states that he has no knowledge about RIBTA within the scope of the semi-structured interview and do not implement GRIBTA as a result of the analysis of the data obtained from the video recordings in the process of conducting his courses. In addition, it stands out that the findings in the preparation section are determined based solely on the data obtained within the scope of semi-structured interview and the teacher makes preparations if an experiment will be conducted within the scope of the subject, and the teacher does not make any preparations if the experiment will not be conducted.

At the beginning of the topic, the level of the teacher coded K1 to implement questioning stage of GRIBTA is examined. Within the scope of the semi-structured interview, the teacher coded K1 states that he tries to draw student interest and curiosity to the course at the beginning of the subject, but when the data obtained from the video recordings of his related courses are examined, it is determined that he does not perform this behavior in the process of conducting his courses. In this context, it is determined that the teacher coded K1 do not conduct a study to perform the behavior like establishing relationship between the student curiosity and the content in the questioning process of GRIBTA. The teacher coded K1 states that he does not encourage students to investigate within the scope of the semi-structured interview, and when the data obtained from the video recordings of his related courses are examined, it is determined that he does not attempt to do so.

During the subject processing, the implementation level of the teacher coded K1 to focus on the research in GRIBTA is examined. In this context, when the data obtained from the video recordings and semi-structured interview of the teacher coded K1 is examined, it is determined that the teacher does not make the students work in groups and in cooperation during the process of conducting their courses. In addition, the teacher states in the scope of the semi-structured interview that he often conducts his courses by associating them with daily life, using direct instruction method and question&answer technique.

"K1: I try to teach the lesson especially with interesting questions, that is, the situations that usually attract the student's interest.

Res: So you ask the questions that arouse students' curiosity.

K1: Yes, I ask questions about the situation they might encounter in their daily life. I ask questions from situations that might exist in their daily life and that might draw their attention to which they may have seen before.

When the data obtained from the video recordings in the process of conducting the teacher's courses are examined, it is also revealed that he makes explanations by using examples from daily life and demonstration experiments during the subject processing. Within the scope of the semi-structured interview, the K1 coded teacher states that he does not enable the students to make predictions and test these predictions usually by asking questions during the subject processing. When the data obtained from two data collection tools are examined as part of the study, it is determined that the teacher tries to make the students observe with demonstration experiments during the subject processing. When the data obtained from the video recordings of the teacher coded K1 in the process of conducting his lessons, it is found that he tries to enable the students to make observations with the materials he brings to the class and the figures he draws on the board. In addition, considering the data obtained from both data collection tools, it is revealed that the teacher use the material in demonstration experiments and in the process of making students observe.

At the end of the topic, the level of the teacher coded K1 to perform the sharing understanding stage of GRIBTA is examined. As a part of the semi-structured interview, the teacher coded K1 states that he does not give the students opportunities to share their knowledge among themselves and moreover, when the data obtained from the video recordings of their courses are examined, it is found that he does not give the students opportunities to share their knowledge among themselves. In the stage of sharing understanding, it is determined that the teacher should give the students time to gather and share what they do and think at the end of the topic; however, it is seen that the teacher coded K1 does not exhibit these behaviors as a result of the examination of the video recordings obtained and the semi-structured interview data.

"Res: Do you provide environments for students to share what they do and think with their classmates at the end of the lesson and do you give them additional time for this?

K1: No, it doesn't usually happen."

During the process of sharing understanding, it is found that the teacher should also give students the opportunity to comment on the research findings in groups, but the teacher does not perform this behavior because he does not give students the opportunity to conduct research within the scope of the subject. When the data obtained from both data collection tools is examined, it is determined that the teacher coded K1 makes students take notes at the end of the topic and try to make them consolidate their knowledge. In accordance with the sharing understanding stage of GRIBTA, the teacher needs to summarize the subject by taking advantage of student groups and data. However, it is found that the teacher coded K1 summarizes the topic by asking questions, making explanations, giving examples and dictating.

In the section of the teacher feedback, the teachers' level of giving feedback to students from the beginning to the end of the topic is examined according to the relevant teaching approach. In this context, when the data obtained from video recordings in the process of conducting the lessons of the teacher coded K1 is examined, it is determined that the teacher gives feedback in the form of explanation, approval and guidance. It is indicated that the teacher coded K1 gives explanation feedback after the students' answers to questions, the student questions and the student samples.

> *"K1 Teacher: Is there anyone who will give us an example of the benefits of expansion in daily life?*
>
> *Student: I read in the book. It is said it is helpful to open jar lids in the book.*
>
> *K1 Teacher: Yes. For example, your mothers may have difficulty in opening jar lids at home. What she's going to do is to pour some hot water on it. When you pour hot water, it won't have to be difficult for you. You'll open it now. Why? When you pour hot water on that lid, the metal expands and opens easily."*

Moreover, it is observed that the teacher gives feedback by confirming the student's answer. As a result of the analysis of the data obtained from the video recordings, it is determined that the teacher coded K1 gives the guidance feedback only in the solutions of question. As a result of the analysis of the data obtained from the video recordings, it is seen that the teacher coded K1 gives the guidance feedback only in the solutions of the question.

Findings Regarding the Current Situation of the Teacher Coded K2 in the Application of GRIBTA

The findings determined as a result of the analysis of the data obtained from the video recordings of the 5th grade science course applications of the teacher coded K2 are combined in Table 4 with the findings prepared as a result of the analysis of the data obtained from the semi-structured interview in which the information about RIBTA are determined.

Table 4

Integrated Form of Findings from Video Recordings and Semi-Structured Interview of the Teacher Coded K2's Courses

Teacher behaviors without knowledge about GRIBTA [2]				
Preparing for the Topic	Preparation for the topic[2]			
	Preparation for the experiment[2]			
The beginning of the Topic	Making the students prepare for the lesson[2]			
	Repeating the previous topic	Directly[1]	With the explanations[1]	
			With the questions[1]	
		With the students' examples[1]		
	Attracting attention and arousing curiosity to the lesson [3]	With the examples from the daily life [1]		
		With the use of question and answer [2]	From the daily life[2]	
			What the students know[2]	
	Revealing prior knowledge[1]	With direct informational questions[1]		
	Informing about the subject [1]			
	Encouragement to research [2]	Within the possibilities [2]		
During Subject Processing	Using teaching method[2]	According to the suitability of the subject [2]		
	Providing explanatory information[3]	Directly[3]	From the book[1]	
			Their own Knowledge[1]	
		The examples from the daily life[1]		
		Explaining the students' examples[1]		
	Observation[3]	With the demonstration experiment[1]		
		By using figures[1]		
		By using materials[3]		
	The use of material[3]	Limited material[2]	Observation[3]	In the group[2]
				Demonstration experiment[3]

	Making predictions and allowing to test the predictions[2]	Rarely[2]		
The End of the Topic	Giving students the opportunity to share their knowledge among themselves[2]			
	Consolidating the knowledge [1]	Review [3]	With the Examples[1]	With the examples of the teacher from the daily life
				By making them give examples[1]
			With the explanations[1]	From the book[1]
				Within the scope of demonstration experiment[1]
				Directly[2]
		With the questions[1]	Within the scope of demonstration experiment[1]	
			With direct information content[1]	
	Making them take notes[1]	Dictating the information[1]		
		Making them write an example from the daily life[1]		
	Giving homework[2]			
Teacher Feedback	Making an explanation[1]	Student answers to questions [1]	When the correct answer is given[1]	
			When the wrong answer is given[1]	
		Students' examples[1]		
		Students' questions[1]		

"[1]": Findings from video recordings, "[2]": Findings from semi-structured conversation, "[3]": Common findings from semi-structured and video observation recordings

When Table 4 is examined, it is determined that the teacher coded K2 states that he has no knowledge about RIBTA within the scope of the semi-structured interview and do not implement GRIBTA as a result of the analysis of the data obtained from the video recordings in the process of conducting his courses. In addition, the findings in the preparation for the topic are determined by the data obtained from the semi-structured interview and the teacher makes preparation about the subject and the experiment regarding to the subject.

At the beginning of the topic, the level of the teacher coded K2 to implement questioning stage of GRIBTA is examined. Within the scope of the semi-structured interview, the related teacher states that he tries to draw student interest and curiosity to the course by asking answerable questions from daily life at the beginning of the subject.

"Res: What are you doing at the beginning of the class?

K2: I ask the questions to draw the attention of the students to the lesson and to arouse their curiosity. For example, if I am going to deal with the subject of light, I ask questions about the subject of light that will arouse students' curiosity.

Res: What kind of questions?

K2: These questions may be from the students' past life, an event they have seen in nature, or a situation they know. Actually, although the student has heard about the subject for the first time, I am trying to stimulate his curiosity by showing that there are situations he has encountered in his life related to that subject. "

When the data obtained from the video recordings are examined, it is observed that he tries to perform this behavior by giving only examples from daily life in the process of teaching his lessons.

"K2teacher: For example, you have trouble walking down a muddy road, don't you? You apply more force.

Stu: [All together] Yes.

K2teacher: You'll have more trouble walking in the snow, won't you? or You will also find it difficult while walking on a gravel road, on a stony road. You have to apply force further forward, right? You have a hard time taking your step, but on a normal straight road, where the gravel-free asphalt is flat, or in a concrete place, you walk more comfortably. Why? There is little friction. Kids, friction sometimes makes our life easier. It makes you stand when you walk on the ice. It'll help you walk properly."

In this context, it is determined that the teacher coded K2 tries to establish a relationship between student curiosity and content which are the behaviors that the teacher should do at the GRIBTA's beginning of questioning stage. The relevant teacher states that he encourages the students to research within the scope of the semi-structured interview; however, when the data obtained from the video recordings of the courses are examined, it is determined that he does not attempt to do so. In this context, it is determined that the teacher coded K2 has not made any attempt to perform the type of question-asking behavior that the teacher coded K2 should perform during the questioning stage of the relevant teaching approach.

During the subject processing, the implementation level of the teacher coded K2 to focus on the research in GRIBTA is examined. In this context, when the data obtained from the video recordings and semi-structured interview of the teacher coded K1 is examined, it is determined that the teacher does not make the students work in groups and in cooperation during the process of conducting their courses. In addition, the teacher coded K2 states that within the scope of the semi-structured interview, he conducts his courses by using the teaching strategy through presentation or invention. When the data obtained from two data

collection tools are examined as part of the study, it is determined that the teacher tries to make the students observe by using the materials during the subject processing. Moreover, it is found that the teacher coded K2 tries to enable the students to make observations with the figures he draws on the board and the demonstration experiment in the video recordings. In addition, within the scope of the semi-structured interview the relevant teacher states that he uses the materials sometimes in groups and sometimes in demonstration experiments because the school has limited materials and he also states that he tries to make the students observe in this way. However, when the video recordings of the relevant teacher's courses are examined, it is found that he uses the materials to make the students observe only in demonstration experiments in the subject processing. Furthermore, within the scope of the semi-structured interview, the teacher coded K2 states that he asks questions and in return enables the students to make predictions but he rarely gives them opportunities to test their predictions during the subject processing; however, when the data obtained from the video recordings of their lessons are examined, it is seen that he rarely tries to display this behavior.

At the end of the topic, the level of the teacher coded K2 to perform the sharing understanding stage of GRIBTA is examined. In the stage of sharing understanding, the teacher needs to give students time to gather and share what they do and think. However, when the video recordings and the data obtained within the scope of the semi-structured interview are examined, it is indicated that the teacher coded K2 does not exhibit this behavior. In addition, it is determined that the K2 coded teacher should give the students the chance to comment on the research findings in a group at the stage of sharing understanding; nevertheless, the teacher does not perform this behavior as he does not give the students the opportunity to do research within the scope of the subject. When the data obtained from the video recordings of the relevant teacher is examined, it is observed that he tries to consolidate student information and makes them take notes at the end of the topic. The relevant teacher also states that he reviews the subjects and gives homework at the end of the topic within the scope of the semi-structured interview.

"Res: How do you briefly summarize what you do at the end of the lesson?

K2: At the end of the lesson, I do a brief summary of the subject. I sum up by focusing on what we've done, what we've seen, what students need to learn. If there's a result, I also tell it."

"Res: How do you briefly summarize what you do at the end of the lesson?

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K2: Then the homework is set. The lesson ends."

Within the scope of sharing understanding stage of GRIBTA, the teacher should summarize the subject by taking advantage of student groups and data. However, it is observed that the teacher coded K2 repeats the subject with explanations and examples and summarizes the lesson by making students take notes with the help of questions within the scope of the subject.

In the section of the teacher feedback, the teachers' level of giving feedback to students from the beginning to the end of the topic is examined according to the relevant teaching approach. In this context, when the data obtained from video recordings in the process of conducting the lessons of the teacher coded K2 is examined, it is observed that the teacher gives feedback in the form of explanation. It is indicated that the relevant teacher gives explanation feedback after the students' answers to questions, the student questions and the student samples.

Findings Regarding the Current Situation of the Teacher Coded K3 in the Application of GRIBTA

The findings determined as a result of the analysis of the data obtained from the video recordings of the 5th grade science course applications of the teacher coded K3 are combined in Table 5 with the findings prepared as a result of the analysis of the data obtained from the semi-structured interview in which the information about RIBTA are determined.

Table 5

Integrated Form of Findings from Video Recordings and Semi-Structured Interview of the Teacher Coded K3's Courses

<table>
<tr><td colspan="4">Teacher behaviors without knowledge about GRIBTA[2]</td></tr>
<tr><td>Preparing for the topic</td><td colspan="3">From teacher guidebook[2]</td></tr>
<tr><td rowspan="6">The beginning of the topic</td><td rowspan="3">Attracting attention and arousing curiosity to the lesson [3]</td><td>By using materials[1]</td><td></td></tr>
<tr><td>With short experiments[1]</td><td>By simple experiments done by everyone [1]</td></tr>
<tr><td rowspan="3">With the questions[3]</td><td>With the questions from the daily life[3]</td></tr>
<tr><td>By using materials[2]</td></tr>
<tr><td>From teacher guidebook[2]</td></tr>
<tr><td rowspan="4">Revealing pre-information [3]</td><td rowspan="4">With the questions[3]</td><td>From daily life[3]</td></tr>
<tr><td>Direct information content[1]</td></tr>
<tr><td>By using materials[2]</td></tr>
<tr><td>From teacher guidebook[2]</td></tr>
<tr><td colspan="2">Informing about the subject[3]</td><td></td></tr>
<tr><td colspan="2">Encouragement to research [2]</td><td></td></tr>
<tr><td></td><td colspan="3">Direct instruction[2]</td></tr>
</table>

During subject processing	Giving explanatory information[3]	Within the scope of teacher's demonstration experiment[1]		
		With the examples from daily life[1]		
		Directly[1]		
	Making them observe[3]	With demonstration experiments[3]		
		By using materials[3]		
	The use of material[3]	Within the scope of demonstration experiment[3]		
		Making them observe[3]		
	Making predictions and allowing to test the predictions[2]	With the questions within demonstration experiment[3]		
The end of the topic	Giving students the opportunity to share their knowledge among themselves2			
	Consolidation of information[1]	Review[3]	With short experiments[1]	By simple experiments done by everyone[1]
				With the demonstration experiment[1]
			With the explanations[3]	By explaining the student's question [1]
				By explaining the answers of the questions[1]
				Directly[3]
		With the questions[3]	Direct information content[1]	
			Confirmative[1]	
	Making them take notes[1]	Dictating information[1]	Directly[1]	
			With the help of the questions[1]	
Teacher Feedback	Making an explanation[1]	The student's answer about questions [1]	When they confirm[1]	
			When the correct answer is given[1]	

		When the wrong answer is given[1]
	In the cases where the students do not understand [1]	When the activity is not understood[1] When the subject is not understood[1]
	The student's question[1]	
Confirmation[1]	The answers of the questions[1]	

"1": Findings from video recordings, "2": Findings from semi-structured conversation, "3": Common findings from semi-structured and video observation recordings

When Table 5 is examined, it is seen that the teacher coded K3 states that he has no knowledge about RIBTA within the scope of the semi-structured interview and do not implement GRIBTA as a result of the analysis of the data obtained from the video recordings in the process of conducting his courses. In addition, it stands out that the findings in the stage of preparation for the topic are determined by the data obtained from the semi-structured interview and the relevant teacher examines the acquirements about the subject from the teacher guidebook and prepares the aide-memoires.

At the end of the topic, the level of the teacher coded K1 to apply the sharing understanding stage of GRIBTA is examined. When considered the data obtained from the teacher's video recordings and semi-structured interview in the process of his conducting his lessons, it is found that he tries to attract the students' interest and curiosity towards the course by taking advantage of materials, short experiments and the questions at the beginning of the topic.

"Res: You say that you measure the readiness of the students and try to arouse their curiosity at the beginning of the topic. How do you do this?

K3: I usually do it by asking questions.

Res: How do you plan these questions?

K3: I usually use the questions in the teacher guidebook. Sometimes I try to do this with questions and examples that come to my mind from daily life at that moment."

"K3Teacher: Children, we're going to discuss friction force today. The force of friction, you see it is related to friction, but what kind of force? Now everybody stands up. Put your hands up like this. Now let's stick our hands tightly together and let's do it like this for 30 times fast [The teacher rubbed his hands together.]

Student1: Our hands are getting hot.

K3Teacher: Fast, fast, faster. Well, are your hands burned?

Student: [All together] Yes.

K3Teacher: Put one hand on your cheek. Is it warm?

Student: [All together] Yes."

In this context, it is determined that the teacher coded K3 tries to perform the behavior that he should establish a relationship between student curiosity and content during the starting questioning stage of GRIBTA. Furthermore, the teacher coded K3 states that it is a waste of time to get students to do research within the scope of the semi-structured interview, and when the data obtained within the scope of video recordings of his courses are examined, he does not attempt to exhibit the behavior of conducting research.

"Res: Do you ask questions that will encourage students to research at the beginning of the class?

K3: No, I don't. I think it's a waste of time to get students to do research. I have tried to make it happen in the early years of my career, but students want to read and tell what they research. I can't get up on it when I take the time to do it. So I don't think it's necessary."

In this context, it is determined that the teacher does not make any attempt to ask questions to the students at the beginning of questioning stage of the relevant teaching approach.

During the subject processing, the implementation level of the teacher coded K3 to focus on the research in GRIBTA is examined. In this context, when the data obtained from the video recordings and semi-structured interview of the teacher coded K3 is examined, it is seen that he does not make the students perform their work in groups and in cooperation during the process of conducting their courses. Moreover, when the data obtained from the teacher's video recordings are examined, it is observed that he makes explanations in the subject processing by using the examples from daily life and demonstration experiments. As part of the semi-structured interview, the relevant teacher says that he allows students to make predictions by asking questions, but does not give them opportunities to test their estimates during the subject processing. When the video recordings of the relevant teacher's lessons are examined, it is observed that he asks questions and takes their predictions but does not give them opportunities to test their predictions as part of the demonstration experiments. When the data obtained from two data collection tools are examined within the scope of the study, it is determined that the teacher coded K3 tries to enable the students to make observations by using demonstration experiments and materials during the subject processing. It is also found that the teacher uses the materials only in demonstration experiments to make the students observe. In this context, it is determined that the relevant teacher does not display the behavior to ensure that students interact with the materials at the desired level.

At the end of the topic, the level of the teacher coded K3 to implement the sharing understanding stage of GRIBTA is examined. The teacher coded K3 states that he does not give the students opportunities to share their knowledge among themselves within the scope of the semi-structured interview, and when the data obtained from the video recordings of the lessons are examined, it is determined that the opportunities are not given to the students to share their knowledge among themselves. In the process of sharing understanding, it is determined that the teacher should give the students time to gather and share what they do and think at the end of the subject, but as a result of the examination of the video recordings and semi-structured interview data, it is determined that the teacher coded K3 does not

exhibit these behaviors. In addition, it is determined that the teacher should give the students the opportunity to comment on the research findings in a group in the process of sharing understanding, but the teacher does not perform this behavior because the teacher does not give the students the opportunity to do research on the subject. When the data obtained from both data collection tools are examined, it is observed that the teacher coded K3 tries to consolidate their knowledge and make them take notes at the end of the topic.

In the teacher feedback section, the teachers' level of giving feedback to the students from the beginning to the end of the topic is examined according to the relevant teaching approach. In this context, when the data obtained from the video recordings during the process in which the teacher conduct his lesson are examined, it is found that the teacher gives feedback in the form of explanation and approval.

"K3Teacher: Well, do you think the substance retains heat from outside or gives off heat during sublimation? Yusuf.

Student1: It retains heat.

K3Teacher: [Some of the students] It retains.

Student1: It evaporates because it retains the heat.

K3Teacher: The substance transforms gas from solid in the process of sublimation. Kids, the substance evaporates directly from the solid state to gas. The substance retains the heat to evaporate, doesn't it? Then, the substance evaporates by retaining heat from the outside during sublimation.

"K3Teacher: How many states of matter are found in nature? Tell.

Stu1: There are three states of matter, teacher.

K3Teacher: What are they?

Stu1: Liquid, solid, gas.

K3 Teacher: Yes."

It is determined that the teacher coded K3 gives the explanation feedback after students' answers to questions, incomprehensible student situations and student questions. In addition, it is observed that the teacher coded K3 also gives feedback by confirming student answers for questions

The Science Teachers' Situation (K1, K2 and K3) to Perform the Stages of GRIBTA

It is observed that the teachers coded K1, K2 and K3 completely perform, partially perform or do not perform the stages of GRIBTA are determined with the help of experts in the process of conducting their courses (Table 6).

Table 6

The Teachers' Situation (K1, K2 and K3) to Perform the Stages of GRIBTA

The stages of GRIBTA		The teacher coded K1			The teacher coded K2			The teacher coded K3		
		FP	PP	DM	FP	PP	DM	FP	PP	DM
Starting to question	Establishing a relationship between the content and the student's curiosity			√	√			√		
	Problem that can be investigated			√			√			√
Focusing on the Research	Making interactions with the materials in groups			√			√			√
	Making observations	√			√			√		
	Enabling possible explanations			√			√			√
	Giving the opportunity to take and test predictions			√			√		√	
Sharing understanding	Giving time for students to gather and share what they do and think			√			√			√
	Giving the chance to comment on the findings of the groups			√			√			√
	Teacher summarizes the course by taking advantage of groups and data		√				√			√
Giving Appropriate Feedback				√			√			√

FP: Fully Performed, PP: Partially Performed, DM: Do not Performed

When Table 6 is examined, it is determined that the science teachers (K1, K2 and K3) do not generally perform the stages of GRIBTA in their courses. It stands out that the teachers (K1, K2 and K3) exhibit the behavior of making the students observe which is in the stage of focusing on the research and the teacher coded K1 partially performs to summarize the lesson by using the groups and the data in the stage of understanding sharing. It is determined that the teachers coded K2 and K3 exhibit the behavior of establishing the relationship between student curiosity and content, and that the teacher coded K3 partially displays the behavior of allowing students to take and test their estimates in the stage of focusing on the research. In addition to these behaviors, it is determined that in the process of conducting the courses, they do not give appropriate feedback to the students in accordance with GRIBTA.

4. RESULTS, DISCUSSION AND SUGGESTIONS

When the science teachers' (K1, K2 and K3) applications of GRIBTA at 5th grade level are examined within the study, it is concluded that teachers do not have knowledge about the relevant teaching approach and do not apply it in their current situation. When the literature is examined, it is expressed by the researchers that the teachers do not have enough knowledge and skills about GRIBTA (Marshall, Horton, Igo & Switzer, 2009; Weiss, Pasley, Smith, Banilower & Heck, 2003). In this case, it is observed that the finding that teachers' knowledge and skills about RIBTA are inadequate is consistent with the finding obtained within the scope of the study, which is noted in the studies in the literature. This compatibility is due to the fact that science teachers in the working group do not have experience about RIBTA in their past life (Weiss et al., 2003; Windschitl, 2004), they do not have sufficient knowledge about RIBTA during their undergraduate studies (Ann-Haefner & Zembal-Saul, 2004) and related teaching and it is thought to be due to the fact that they do not see role models using the approach (Eren, 2009). In addition, it is emphasized that the teacher does not realize the change in their traditional roles and they should give up their traditional instruction technique (Gönen & Kocakaya, 2006; Önen, Saka, Erdem, Uzal & Gürdal, 2008; Yıldırım, 2011) and even if they use RIBTA, they rarely perform it (Kowalczyk, 2003).

It is concluded that the teachers (K1, K2 and K3) make preliminary preparations in the cases where the experiment activities are necessary within the course and just the teacher coded K1 does not make any preliminary preparation in the cases where the experiment activities should be done. When the literature is examined, it is noted that teachers with high professional experience often carry out their courses with teacher-centered method (Yildirim, 2011), they consider themselves sufficient in terms of the content (Coskun et al., 2010), their self-confidence is high in the process of conducting their courses and they come to the class without preparing for their courses (Karacaoğlu, 2008). It is emphasized that the teachers with low professional experience do not consider themselves sufficient in terms of subject content (Coşkun et al., 2010), have low self-confidence in teaching and come to their lessons by preparing for their lessons (Karacaoğlu, 2008; Gönen & Kocakaya, 2006). It is also noted that teachers with high professional experience do not make an effort to improve themselves (Coşkun et al, 2010). In this case, it is seen that the situations in which the teachers come to their classes by preparing for their classes according to their professional experiences are

consistent with the findings obtained within the scope of the study. This compatibility is due to the fact that the teacher coded K1 generally conducts his lessons with a teacher-centered approach, he sees himself as sufficient in terms of subject content due to his 10-year professional experience and because his self-confidence is high, on the other hand, the teachers coded K2 and K3 do not see themselves sufficient in terms of subject content due to their low professional experience and it is thought to be due to their low self-confidence.

The initial situations of the teachers (K1, K2 and K3) are examined within the scope of the study in the process of conducting their lessons. In this context, it is determined that the teacher coded K1 repeats the previous topic with explanations and does not attract the interest and curiosity of the students about the new subject. Under these circumstances, the teacher coded K2 gives examples regarding daily life, while the teacher coded K3 tries to attract students' interest and curiosity about the course with short experiments and questions. In this context, the teacher coded K1 does not exhibit the behavior about establishing relationship between student's curiosity and content in the starting questioning stage of GRIBTA while the teachers coded K2 and K3 display it.

When the current situation of the teacher coded K1 is determined, it is estimated that he generally conducts his lessons by using the method of direct instruction and does not try to attract the interest and curiosity of the students to the course because he receives this type of education in his own education life. Teachers 'interest and pleasure in their profession is an effective factor to increase students' interest and to arouse their curiosity in the lesson (Akbaba, 2006). The fact that the teacher coded K1 has more professional experience may lead to a decrease in his interest in the profession. Therefore, it is thought that the teacher coded K1 does not try to attract the interest and curiosity of the students at the beginning of their courses. It can be said that the teachers coded K2 and K3 exhibit this behavior due to their lower professional experience and their interest and curiosity towards the course in their own past education life. Furthermore, it is estimated that the teachers coded K2 and K3 try to attract the students' interest and curiosity towards the lesson due to the fact that they are new and more idealist in their profession although they use direct instruction method in their courses. Walker (1984) states that awakening students' interest and curiosity towards the lesson at the desired level depends on the preparation of the teachers. In this context, it is in line with the fact that the teachers coded K2 and K3 prepare before the lesson and try to attract the students' interest and curiosity after the lesson, while the teacher coded K1 does not try to draw the attention and curiosity of the students in the study conducted by Walker (1984).

In the beginning of the teaching process in RIBTA practices, it is emphasized that teachers should benefit from scenarios related to daily life and these scenarios should attract students' attention (Çavaş et al., 2011). In addition, it is necessary to establish a relationship between the students' curiosity and the content which is taught at the beginning of the courses where teachers apply RIBTA (Bostan-Sarıoğlan, Can & Gedik, 2016). It is stated that they are reluctant to solve the problems they encounter within the scope of the subject if the students' interest and curiosity for the course is not awakened by the teacher (Akbaba, 2006). In this context, attracting students' interest and curiosity towards the lesson by teachers is important in increasing their desire to learn new information in the teaching process (Tatar & Kuru, 2009).

When the current situation of the teachers (K1, K2, and K3) is examined in the process of conducting their relevant courses, it is determined that they do not encourage students to do research. When the literature is examined, it is stated that the teachers do not exhibit this behavior, although there are many benefits of making the student conduct research and design activities (Volsey, 2006; Wajeman, 2009). This situation highlights that the findings obtained within the scope of the study are compatible with the fact that the teachers, who have been noted in the studies in the literature, do not give students the opportunity to conduct research within the course. The teacher coded K3 states that it is a waste of time to do research with students, and the teacher coded K2 states that he wants to encourage students to investigate within the scope of the study, but it is found that he does not exhibit this behavior. According to Campbell, Zhang and Neilson (2011), teachers think it is very time-consuming to make students do research. The finding about the teacher coded K3 is consistent with Campbell and others' thoughts as part of the study (2011). Teachers have difficulty in making students do research by applying a student-centered teaching approach in their lessons, as they lead their teaching life in a teacher-centered manner. This shows that teachers have difficulty in changing their teaching habits (Furtak, 2006).

Considering the fact that the teachers (K1, K2 and K3) do not make the students do researches within the scope of the study, it stands out that they do not exhibit the behavior of asking research questions that should be carried out at the beginning of questioning stage of GRIBTA. In addition, the teachers state that they have difficulties in creating research questions within the scope of the study. The researchers also note that students should be kept busy within the scope of the research question in the classrooms where RIBTA applications are carried out (Matyar, 2012; Yıldız, 2013). Sadeh and Zion (2012) indicate that the research question should be given to the student by the teacher and then the teacher should make the students do researches in GRIBTA practices. When the literature is examined, it is determined that prospective science teachers have difficulty in designing a problem situation related to daily life during GRIBTA applications (Bayram, 2015). It is stated in several researches that prospective science teachers have difficulty in forming problem sentences (Kala and others, 2017), they have significant deficiencies in planning research question in the applications of GRIBTA (Garcia-Carmona, Criado & Cruz-Guzman, 2017) and both teacher and prospective teachers have problems about creating research questions in the applications of RIBTA (Peeters & Meijer, 2014). When these situations are taken into consideration, it stands out that the findings obtained within the scope of the study are in accordance with the literature. Since teachers coded K1 and K3 usually use the method of direct instruction in their lessons, and the teacher coded K2 draws attention to the fact that they do not have the necessary opportunities to conduct research, it is thought that they cannot exhibit the behavior of asking research questions that should be exhibited according to GRIBTA. In the literature, it is stated that most of the teachers conduct their lessons with a teacher-centered approach (Yıldırım, 2011) due to the fact that they make use of the direct instruction method, schools do not have enough equipment in cases where RIBTA practices are necessary, and there is lack of knowledge about time and teaching approach (Gönen & Kocakaya, 2006). Moreover, it is emphasized that the learning styles and experiences which the students have during their pupillage are effective in the inability of prospective teachers or teachers to apply RIBTA and have difficulty in asking research questions (Kala et al., 2017).

As part of the study, it is determined that teachers (K1, K2 and K3) do not perform the behavior of "enabling students to interact with materials and with each other in groups", which the teachers should perform in the focusing on research stage of GRIBTA (Bostancı-Sarıoğlan et al., 2016; Çavaş et al., 2011), nonetheless it is indicated that they enable the students to make observations with the demonstration experiment within the course. It is stated that science teachers do not have the necessary materials for students to conduct research in groups, but the materials they have are sufficient for demonstration experiments in the studies conducted (Dindar & Yaman, 2003). When this situation is taken into consideration, it is revealed that the findings obtained within the study are in accordance with the literature. It is also noted that teachers (K1, K2 and K3) allow students to conduct research within the scope of the subject and do not provide possible explanations in this context.

It is determined that teachers coded K1 and K2 do not give students opportunities to ask questions and make predictions and test these predictions during the course of their lessons. It is determined that the teacher coded K3 provides the students to ask questions and make predictions, but does not give them opportunities to test their predictions. Considering this situation, it is determined that only the teacher coded K3 displays the behaviors that should be exhibited in the focusing on the research stage to take students 'predictions and allow them to test, and none of the teachers exhibit the behavior of testing students' predictions. It is emphasized that teachers do not sufficiently display the behavior of getting students to test their hypotheses in the applications of RIBTA (Köksal, 2011). When this situation is taken into consideration, it is revealed that the findings obtained within the study are in accordance with the literature. It is thought the reason why the teacher coded K3 exhibits the behavior of taking students' predictions within the scope of the studies is that the teacher has just completed his undergraduate education and has more desire to conduct his lessons in a student-centered method. Accordingly, Önen et al. (2008) state that teachers are more idealistic in the first years of their profession and are willing to use different teaching methods and approaches in their lessons. Since teachers (K1, K2, and K3) do not provide opportunities for students to conduct research in the process of conducting their lessons, it has emerged that they do not give students the opportunity to plan and share their findings with other groups. In the applications of GRIBTA, it is pointed out that students should be given time to gather what they do and think within the scope of their research, to plan how they will tell other groups, and allow them to share their ideas with other groups (Bostan-Sarıoğlan et al., 2016; Çavaş et al., 2011). In addition, within the scope of RIBTA, teachers should be encouraged to put forward new ideas by having students discuss at the end of the subject (Çavaş et al., 2011).

The feedbacks given by teachers to the students in the process of conducting 5th grade science lessons are also examined in the scope of the study. Since the teachers conduct their lessons with the method of direct instruction, it is determined that the feedback they give to the students is not the kind of feedback that should be given in a course carried out according to GRIBTA. In the literature, it stands out that since teachers generally conduct their lessons by using the direct instruction technique (Gönen & Kocakaya, 2006; Önen et al., 2008; Yıldırım, 2011) and they experience that method during their education life (Weiss et al., 2003; Windschitl, 2004), they think that it is a waste of time to make the students do the experiments (Bayram, 2015; Song & Schwenz, 2013) and they may have difficulty in developing the subject.

Therefore, it is thought that teachers cannot display the behaviors they should exhibit according to GRIBTA in science classes within the expected level. In addition, it is pointed out that teachers do not know how to guide students since they have not received training according to RIBTA in their past education life (Zion, Schanin & Shmueli, 2013). When several of the studies in the literature are examined, it is emphasized that teachers are hesitant about when, how much and how to guide students in the applications of RIBTA (Furtak, 2006; Kaya & Yılmaz, 2016; Zion et al., 2013). However, it comes to the forefront that teachers have difficulty in guiding students in the applications of RIBTA (Bayram, 2015; Zion, Cohen, & Amir, 2007).

As part of the study, it is highlighted that they have prejudices towards implementation of GRIBTA in their courses since teachers (K1, K2, and K3) think that the implementation of GRIBTA causes loss of time and financial burden and requires them to work harder and because they have difficulties in motivating students to the lesson and do not have enough information about this approach. In the literature, it is reported that when the teachers apply this approach, they are biased towards losing time (Bayram, 2015; Luera & Otto, 2005), experiencing problems about obtaining the necessary materials (Bayram, 2015; Dindar & Yaman, 2003; Staer et al., 1998) and having difficulty in classroom management (Staer et al., 1998). In addition, it is emphasized in several of the studies that they have prejudices towards implementing this approach owing to the fact that the classes are crowded (Luera & Otto, 2005) they do not have enough information about the relevant teaching approach (Bayram, 2015; Luera & Otto, 2005) and due to the exam type in education systems (Miranda & Damico, 2015). It is thought that these prejudices are due to the fact that the teachers cannot have any experiences about GRIBTA in past education life and they will implement the Science Curriculum, which changed in 2013, for the first time. In this context, it stands out that science teachers' implementation of GRIBTA are influenced by their past experiences (Weiss et al., 2003).

When considered the results of the study, the recommendations are specified below:

1. In order to ensure that science teachers can apply GRIBTA at the targeted level, the applications carried out by organizing teaching environments suitable for this approach both for the teachers during pre-service teacher training and the teachers during the in-service training process should be evaluated by field experts and feedback should be given to the relevant parties.
2. In order to eliminate the prejudices of science teachers about applying GRIBTA and to implement the relevant teaching approach in their lessons, suitable environments should be provided in schools in terms of materials and laboratories.
3. Considering the rapid developments in today's technology, technology-supported enriched materials based on GRIBTA should be prepared and the necessary technological environment should be provided for all teachers to access these materials. In addition, environments, where teachers can interact with each other through the web, can be prepared and the solutions can be provided to the problems they may encounter during the implementation of GRIBTA.

4. Based on the results of the study, the application levels of the pre-service science teachers and the lesson plans prepared by science teachers according to this teaching approach can be examined before applying GRIBTA in their lessons.

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In the writing process of the study titled “The Status of Science Teachers Regarding the Application of Guided Research Inquiry-Based Teaching Approach at 5th Grade Level”, the rules of scientific, ethical and citation were followed; it was undertaken by the authors of this study that no falsification was made on the collected data. “Sakarya University Journal of Education Journal and Editor” had no responsibility for all ethical violations to be encountered, and all responsibility belongs to the authors and that the study was not submitted for evaluation to any other academic publishing environment.