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Jigsaw Tekniğinin Coğrafya Öğretiminde Akademik Başarıya Etkisi

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The Effect of the Jigsaw Technique on Academic Achievement in Geography Education

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Abstract: The renewed geography curriculum emphasizes a student-centered approach in which teachers act as guides while students actively construct knowledge through experiential learning. This study investigates the effect of the Jigsaw cooperative learning technique on student achievement in geography. A pre-test–post-test control group experimental design was employed. An achievement test covering the "Natural Systems" unit of the 9th-grade geography curriculum was developed and administered as both the pre-test and post-test. The experimental group received instruction using the Jigsaw technique, while the control group was taught through traditional methods. The study was conducted with 58 9th-grade students (32 boys and 26 girls) enrolled in a public high school in central Elazığ, where class placements are random and include students with varying academic performance levels. Due to student attrition in the control group, the experimental group consisted of 34 students and the control group 24 students. Data analyses were conducted using SPSS. Descriptive statistics and independent and paired samples t-tests were applied to compare the pre-test and post-test scores. The findings revealed significant differences between the pre-test and post-test scores within and between groups. Overall, participation in the Jigsaw-based instruction produced a statistically significant improvement in students' geography achievement compared to traditional teaching. These results indicate that cooperative learning is more effective than conventional methods in enhancing student learning outcomes.

Keywords: Collaborative learning, geography, interactive learning, Jigsaw, peer learning

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Introduction

In today's world, where access to information is becoming increasingly easy, learners are expected not only to memorize information, but also to structure, apply, and use it creatively. This change requires a fundamental transformation in the role of teachers. Teachers are now seen not only as transmitters of knowledge, but also as facilitators of learning processes, guides for students, and designers of meaningful learning environments. Responsibilities such as ensuring active student participation, addressing individual differences, and encouraging deep learning emphasize the importance of teachers' pedagogical competence. In this context, the constructivist learning approach radically departs from traditional teaching paradigms by emphasizing the student's active participation in the learning process. According to constructivist theory, learning is an experience-based, interactive, and meaning-focused process in which individuals relate new information to their existing knowledge structures (Suparno, 2004; von Glasersfeld, 1989). Within this framework, the teacher acts not as an authoritative source of knowledge, but as a facilitator who provides meaningful experiences, supports students' thinking processes, and guides them in the learning process. This approach is particularly important because it aims to increase student participation and strengthen learning motivation in traditional classroom environments where students play a passive role.

Geography education, by its nature, encompasses multidimensional learning outcomes in cognitive, affective, and psychomotor domains. Understanding concepts such as location, space, human-environment interaction, natural systems, and cultural diversity requires students to adopt a learning attitude based on higher-order thinking, critical inquiry, and collaboration.

However, geography education in Türkiye has traditionally been shaped by teacher-centered, lesson-based models, in which students remain largely passive participants. Recent curriculum reforms have addressed many of these limitations by shifting to a more student-centered approach (Ministry of National Education [MEB], 2018, 2024). Particularly at the secondary education level, due to the lasting effects of previous curricula, it is often observed that students have low interest in geography, struggle with abstract concepts, and do not actively participate in the learning process. This situation has led to both low academic achievement and the development of negative attitudes toward the subject. In line with the basic principles of constructivism, collaborative learning methods enable students to form their own understanding while also encouraging social interaction and peer collaboration (Slavin, 1995). Among the various student-centered techniques available, the Jigsaw method stands out for promoting shared responsibility for learning by allowing students to acquire in-depth knowledge in expert groups and then share this knowledge with their peers in heterogeneous home groups. Through this approach, students not only acquire content knowledge but also develop higher-order skills such as explaining, listening, interpreting, and teaching.

This study aims to examine the effectiveness of skill-based classroom practices that encourage learning by doing and experiencing, a model in which the teacher guides and students are active in the classroom, on the academic achievement of 9th grade students in geography within the scope of the Century of Türkiye Education Model implemented in 2024. The research was conducted at a high school in Elazığ, identified as a region with low achievement in geography, using observational data. Preliminary assessments at the selected school revealed that most students were passive in class, unable to make meaningful connections with the lesson content, and that teaching was largely teacher-centered. Furthermore, it was observed that only a small group of students participated actively, while the majority avoided asking questions about the teacher or the course content. These observations formed the basis for testing the effectiveness of the Jigsaw model in increasing student participation, motivation, and academic performance. The literature provides strong evidence that collaborative learning strategies significantly improve students' meaningful learning and problem-solving skills, especially in conceptually rich and interdisciplinary subjects such as geography. Therefore, this study not only offers a practical teaching solution but also contributes theoretically to the understanding of alternative teaching approaches in geography education.

Conceptual framework

One of the current goals of education systems is to develop higher-order thinking skills in students through student-centered, active, and meaningful learning environments. In this context, teaching methods that place the student at the center emphasize constructing knowledge through personal experiences, aiming to promote deep and lasting learning. Such approaches argue that learning is not a passive transfer of knowledge, but an active process in which students produce meaning through texts, dialogue, experience, and problem solving (Suparno, 2004). According to this perspective, teachers are not merely conveyors of knowledge, but facilitators who guide students in their individual learning processes. This is particularly important in subjects such as geography, which are multidimensional, conceptually rich, and directly connected to real life. In these contexts, it is crucial for students to construct knowledge meaningfully and develop fundamental skills such as problem solving, critical thinking, and decision making (Doğanay, 2014; MEB, 2018, 2024).

Parallel to this approach, collaborative learning methods have been developed to emphasize student active participation and conceptualize learning as a socially interactive process. These methods equip students with fundamental skills such as working collaboratively toward common goals, learning from each other, respecting different perspectives, demonstrating courtesy and tolerance, sharing responsibilities, and developing a sense of accountability. In the literature, this approach is referred to by various terms such as "collaborative learning," "joint learning," or "collective learning" and has been supported by influential theorists such as Slavin, Vygotsky, and Piaget (Açıkgöz, 1992; Bilgin & Geban, 2004; Slavin, 1986). In Türkiye, the adoption of the constructivist approach to the national curriculum in 2005

increased interest in collaborative learning methods and led to the wider implementation of practices that support students' cognitive, affective, and social development (Aktın, 2010). This progress has been further strengthened by the launch of the Century of Türkiye Education Model in 2024, which brings a competency-based curriculum focused on the integration of skills into instructional design (MEB, 2024).

The Jigsaw technique, one of the leading collaborative learning methods, is an original classroom application model developed by Elliot Aronson in 1978. In this method, students are first divided into heterogeneous groups, and each group member is assigned a subtopic of the subject to be learned. Students working on the same subtopic form "expert groups" to collaborate and gain a deeper understanding of the content. They then return to their original groups and teach what they have learned to their peers. In this way, all group members become responsible for each other's learning and collectively build the entire body of knowledge (Aronson, 2002; Hedeen, 2003). The jigsaw technique is recognized not only as a method that increases social interaction among students but also as a method that significantly supports academic achievement. It also encourages the internalization of fundamental values such as group harmony, empathy, mutual respect, and individual responsibility (Türkmen & Yamık, 2015).

The jigsaw technique is particularly effective for topics that can be divided into separate but interconnected components and require interpretive participation. In this respect, geography is an extremely suitable discipline for this technique. The "Natural Systems" unit, which emphasizes the interaction between humans and nature, encourages living in harmony with the environment, and highlights the sustainable use of space, represents a critical area of learning. This unit enables students to understand socio-spatial relationships, establish connections between concepts, and think multidimensionally. However, observations show that in classrooms dominated by traditional teaching methods, students only understand such topics superficially, show low participation, and demonstrate limited academic achievement. In this context, the application of student-centered techniques such as Jigsaw can increase students' interest in the subject and contribute positively to their academic achievement.

Although the Jigsaw technique offers significant pedagogical benefits, there are critical factors that must be considered for its effective implementation. These include forming heterogeneous groups, careful time management, fair task distribution that encourages each student to take responsibility, and the teacher's active role as a facilitator (Açıkgöz, 2002; Slavin, 1986). Furthermore, evaluating students individually and relating group success to these individual contributions can increase both personal learning motivation and the sense of responsibility within the group.

A review of the literature reveals numerous studies that have used the jigsaw technique and found that it increases student achievement and motivation. For instance, Doğru and Ünlü

(2012) reported that this method improved students' motivation and reduced science anxiety in science education. Similarly, Batdı (2014) found that learning through the jigsaw method positively influenced students' academic achievement, knowledge retention, and attitude scores. Gürbüz et al. (2012) also concluded that the technique has several positive aspects, such as encouraging preparation for class, promoting research, increasing classroom communication, and supporting lasting learning. Conversely, the same study noted potential drawbacks, including insufficient coverage of topics, difficulties in comprehension when students are not well prepared, extended lesson duration, challenges in classroom management particularly with non-specialist teachers, and limited opportunities for some students to express themselves in crowded classrooms.

The geography teaching program implemented within the scope of the Century of Türkiye Education Model aims to transform students from passive individuals into active participants who ask questions, question, criticize, assimilate knowledge, and access information. Traditional teaching methods and assessment practices are used in the achievement-based geography teaching program implemented from 2004 to 2024. As the Century of Türkiye Education Model is a skill-based model that makes extensive use of discovery learning and social learning methods, the Jigsaw technique can be used as peer learning in some units, if not in every unit.

In line with the conceptual foundations outlined above, the purpose of this study is to examine the effect of the Jigsaw technique on student achievement within the scope of the "Natural Systems" unit in geography education. Based on the fundamental principles of the constructivist approach and the well-documented positive effects of collaborative learning on academic achievement, this study investigates whether the application of this technique leads to a significant improvement in the academic achievement of students in the experimental group. To this end, the following research questions are addressed:

1. Is there a statistically significant difference between the pre-test and post-test academic achievement scores of students in the experimental group taught using the Jigsaw technique?

2. Is there a statistically significant difference between the pre-test and post-test academic achievement scores of students in the control group taught using traditional methods?

3. Is there a statistically significant difference between the post-test academic achievement scores of the experimental group and the control group?

The original aspect of the research is that no such study has been found in the literature within the framework of geography lessons and that it reveals both the functioning of the model and the level of increase in student achievement as an activity within the scope of the Century of Türkiye Education Model. The limitations of the study are the small number of students

and the fact that reliability and validity tests were not applied because the pre-test and post-test used in the analysis were selected from the question pool provided by the Ministry of National Education.

Method

Research design

This study was conducted within the framework of a pretest-posttest control group experimental design, one of the quantitative research models. This design allows for a comparative evaluation of the experimental and control groups by measuring the dependent variable before and after the intervention. In the study, the experimental group was taught using the collaborative learning method based on the Jigsaw technique, while the control group was taught using traditional teaching methods. The main objective of the study was to determine the effect of the teaching method used on students' academic achievement in geography.

Study group

The study group consisted of a total of 58 ninth-grade students attending an Anatolian Imam Hatip High School in Elazığ, Türkiye. Of these students, 34 were assigned to the experimental group and 24 to the control group. The experimental group included 19 male students (56%) and 15 female students (44%), while the control group included 13 male students (54%) and 11 female students (46%). Participants were selected from classes with low academic performance based on first-term midterm exam results. An independent samples t-test was conducted to determine whether there was a significant difference between the groups' pre-test achievement scores. The results showed no statistically significant difference between the groups ($t = 0.897$, $p = 0.374$), suggesting that there was no evidence of a difference between the groups. Based on this finding, the classes were randomly assigned to the experimental and control groups.

Data collection tool

In this study, an academic achievement test consisting of 40 items was used to collect data related to the "Natural Systems" unit. The test consisted of 20 multiple-choice questions and 20 fill-in-the-blank questions. It was designed to cover the four core learning outcomes of the relevant unit. The tool was obtained from the official website of the Turkish Ministry of National Education (https://ogmmateryal.eba.gov.tr/). Since the test was taken directly from this national educational resource, no additional validity or reliability analysis was performed for this tool. However, as the test was developed by the Ministry of National Education through expert review, curriculum alignment, and standard item-development procedures, its content validity and measurement quality had already been ensured during the development process.

Procedure

The study was conducted between November 10 and December 25, 2024, in accordance with weekly teaching plans. The experimental group was taught using the collaborative learning method based on the Jigsaw technique, while the control group was taught using traditional lecture-based methods. Before the intervention, the Jigsaw method was introduced to the experimental group, and the procedure was clearly explained to the students. The students in the experimental group were then divided into seven heterogeneous groups, each consisting of five members. Within each group, students joined "expert groups" to explore specific sub-topics in depth. After working in the expert groups, students returned to their original (main) groups to share and teach what they had learned. Throughout the implementation process, students were encouraged to prepare teaching materials, participate in class discussions, and collaborate through task sharing. In contrast, the control group followed a teacher-centered approach, and the same unit was taught through lectures, question-and-answer sessions, and assignments. For both groups, a pre-test was administered before the start of the teaching unit, and a post-test was administered after the unit was completed. Classroom activities during the implementation are shown in Figure 1.

Figure 1. A classroom Scene from a Process Implemented Using the Jigsaw Technique (Faces have been blurred to protect student privacy)

Data analysis

The quantitative data obtained from the study were analyzed using the SPSS 27.0 statistical software package. The independent samples t-test was used to determine the differences between the groups based on the pre-test and post-test scores. The paired samples t-test was performed to examine the changes within the groups. During the coding process, correct

answers were scored as "1" and incorrect answers as "0". In addition to significance testing, effect sizes were calculated using Cohen's d to determine the magnitude of the differences. Cohen's d values were computed for both the independent and paired-samples t-tests, and the effect size interpretation followed Cohen's (1988) criteria, where 0.20 indicates a small effect, 0.50 a medium effect, and 0.80 or above a large effect.

Ethical Considerations

Ethical approval for the study was obtained from the Fırat University Social and Human Sciences Research Ethics Committee (Session No: 2025/01 and Decision No: 17).

Findings

To determine the effect of the jigsaw technique on students' academic achievement in geography, pre-tests and post-tests were administered to both the experimental group and the control group. The data obtained are presented in the table below (Table 1).

Table 1. Comparison of Pre-test and Post-test Scores of the Experimental and Control Groups

Group	Test Type	N	Mean	SD	*t*	*Cohen's d*	*p*
Experimental	Pre-test	34	21.35	4.26		1.69	
Experimental	Post-test	34	31.62	5.12	9.87		.000
Control	Pre-test	24	20.92	3.97		.88	
Control	Post-test	24	25.41	4.89	4.32		.000
Post-test Comparison	Experimental vs. Control	—	—	—	4.56	1.22	.000

A paired samples t-test was conducted to test the effectiveness of the Jigsaw technique applied in the experimental group. The results showed a statistically significant difference between the experimental group's pre-test ($M = 21.35$) and post-test ($M = 31.62$) scores, $t(33) = 9.87$, $p < .001$. This finding indicates that the Jigsaw technique significantly improved students' academic achievement. Similarly, the control group also showed a significant difference between their pre-test ($M = 20.92$) and post-test ($M = 25.41$) scores, $t(23) = 4.32$, $p < .001$; however, the level of improvement was significantly lower than that observed in the experimental group.

An independent samples t-test comparing the post-test scores of both groups revealed that the experimental group's post-test mean score was significantly higher than that of the control group, $t(56) = 4.56$, $p < .001$. These results indicate that the collaborative learning approach

supported by the Jigsaw technique has a positive effect on students' academic performance in geography.

Experimental Group Gain (Jigsaw): 31.62−21.35=10.27 points. Control Group Gain (Traditional): 25.41−20.92=4.49 points. The experimental group achieved approximately 2.3 times more absolute point increase than the control group (Figure 2).

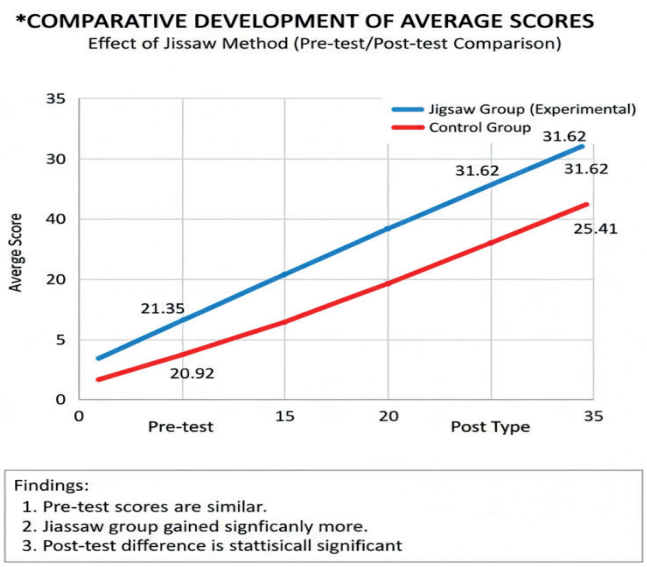

Figure 2. Comparison of Average Scores between the Experimental and Control Groups

Discussion and Conclusion

These findings support the conclusion that collaborative learning significantly improves academic achievement compared to traditional teaching methods. The notable improvement observed in the experimental group's performance demonstrates that learning becomes more effective when students actively teach each other—this is the fundamental mechanism of the Jigsaw technique. Numerous studies support this view and show that collaborative learning has a consistently positive effect on student achievement (Baer, 2003; Langlois, 2001). For example, Kocabaş (1998) found that collaborative learning techniques are more effective than traditional teaching methods in promoting academic gains. Similarly, Baykara (2000) reported that the jigsaw method significantly increased student achievement compared to peer questioning techniques. In the field of science education, Hevedanlı et al. (2005) showed that collaborative learning and mastery learning were more effective than traditional teaching

in improving student performance in biology. Similarly, Altıparmak and Nakipoğlu (2005), observed a statistically significant difference in favor of the experimental group. In the field of geography, Sezer and Tokcan (2003) concluded that cooperative learning is more effective than traditional approaches in improving students' academic achievement. These findings not only support the results of this study but are also consistent with a broader body of research showing that cooperative learning methods contribute positively to academic achievement in various subject areas.

In Türkiye, geography lessons are predominantly conducted using a lesson-based teaching method in which the teacher plays an active role and the student plays a passive and receptive role. This traditional approach often results in monotonous and rote lessons that fail to capture students' interest. Research has shown that this monotony, which begins in elementary school social studies classes and continues throughout secondary education, negatively affects students' attitudes toward the subject. Therefore, active learning methods, especially those involving visual materials, which help make abstract concepts more concrete and understandable, are gaining increasing attention.

In this study, various teaching strategies were deliberately used to diversify the teaching process and increase student participation. The experimental approach, rarely used in geography lessons, was implemented through worksheets that required students to observe events and explain them in their own words. This approach enabled students to understand cause-and-effect relationships through observation, thereby moving away from rote learning. Understanding that no single method is universally perfect, care was taken to use different strategies, methods, teaching activities, and techniques in each lesson. Accordingly, various active learning techniques were used, including worksheets, concept maps, experiments, and creative tasks such as writing poetry. A common feature in all lessons was the use of visual aids through projector-based presentations, which helped clarify concepts. The seating arrangement in small groups within the classroom enabled face-to-face interaction among students and strengthened collaborative learning. On the day of the final test, students in the experimental group were asked to share their thoughts on the activities conducted during the lessons. These thoughts included whether they enjoyed the lessons and whether they encountered any difficulties. Their responses showed that most students enjoyed the interactive activities and that the use of visual materials and experiments supported their understanding, but they were also bothered by classroom noise. Some students reported that they had difficulty concentrating on the content, particularly during group activities, due to the distracting noise level.

As a result, the research hypothesis—"There will be a significant difference in favor of the experimental group between the academic achievement levels of students taught using the collaborative learning method and those taught using traditional teaching methods"—was confirmed by the findings. Based on this result, it is recommended that collaborative learning techniques be used in geography lessons, especially in units that can be divided into sub-

topics. However, for such methods to be effective, it is important that teachers have a solid understanding of the technique and that classroom environments are organized in a way that supports the dynamics of collaborative learning. The use of active learning strategies in geography education has been shown to positively affect both cognitive and affective learning outcomes. Furthermore, by applying collaborative methods, students not only gain a better understanding of the unit content, but also acquire a wide range of cross-curricular competencies. These include data-based inquiry, temporal reasoning, evidence-based inquiry, critical thinking, map literacy, communication, collaboration, social awareness, self-awareness, self-regulation, responsible decision-making, empathy, respect, perseverance, digital literacy, visual literacy, and data literacy. Therefore, the implementation of collaborative learning goes beyond academic performance and makes a meaningful contribution to the development of students' 21st-century skills.

Recommendations for Implementation and Future Research

Active learning strategies that encourage student participation can be incorporated more frequently into geography teaching. As academic achievement increases, students may develop more positive attitudes toward the subject, which can further enhance their success. Based on the findings of this study, the following recommendations are made for curriculum developers, teacher training institutions, classroom teachers, geography teachers, and researchers:

- The active learning approach can be applied to larger groups of students over longer teaching periods. To facilitate this, pilot schools should be selected, the necessary classroom environments should be prepared, and teachers can receive prior training on active learning methods.

- To investigate the effects of active learning on students' attitudes toward geography and their self-concept levels, future studies can be conducted with various student groups and over longer periods.

- Institutions that train geography teachers can include content related to active learning methods and techniques in their programs. In addition, professional development programs can be offered to geography teachers in service to improve their skills in applying active learning strategies.

- The challenges geography teachers encounter when applying active learning strategies, techniques, and activities in their classrooms can be further investigated.

Ethical Considerations: Ethical approval for the study was obtained from the Fırat University Social and Human Sciences Research Ethics Committee (Session No: 2025/01 and Decision No: 17).

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Jigsaw Tekniğinin Coğrafya Öğretiminde Akademik Başarıya Etkisi

Giriş

Bilgi toplumuna dönüşümün hızlandığı dijital çağda, eğitim sistemlerinden beklenen temel işlevlerden biri, bireylerin sadece hazır bilgiyi ezberlemeleri değil, aynı zamanda bilgiyi anlamlandırmaları, yeni durumlara transfer etmeleri, eleştirel ve yaratıcı biçimlerde kullanabilmeleridir. Bu durum, öğretim programlarının yapısal olarak yeniden ele alınmasını, öğretim yöntemlerinin gözden geçirilmesini ve öğretmen rollerinin klasik bilgi aktarıcısından öğrenme rehberine doğru evrilmesini zorunlu kılmaktadır. Özellikle bireylerin üst düzey düşünme becerileri kazanması, işbirliği yapabilmesi, farklı bakış açılarını anlayabilmesi ve karmaşık problemler karşısında etkili çözümler geliştirebilmesi, çağdaş eğitim sistemlerinin öncelikli hedefleri arasında yer almaktadır. Bu bağlamda, yapılandırmacı öğrenme kuramı günümüz eğitim anlayışında önemli bir paradigma kaymasını temsil etmektedir. Yapılandırmacılık, öğrenmenin bireyin aktif katılımı ve önceki bilgileriyle yeni bilgileri ilişkilendirme süreci olduğunu savunur (Suparno, 2004; von Glasersfeld, 1989). Bu yaklaşımda öğrenci, bilgiyi dışarıdan pasif bir şekilde alan değil, anlamlandırarak ve deneyimleyerek inşa eden bir özne konumundadır. Bu kuramsal çerçeve içinde öğretmenin görevi; otoriter bilgi sunumu yapmak yerine, öğrencinin öğrenme sürecini kolaylaştırmak, öğrenme ortamlarını zenginleştirmek ve düşünme süreçlerine rehberlik etmektir.

Coğrafya eğitimi, yapılandırmacı yaklaşım açısından büyük potansiyel barındıran disiplinlerden biridir. Çünkü coğrafya; mekânsal düşünme, doğa-insan ilişkisi, sürdürülebilirlik, afet bilinci, çevresel farkındalık, yerel ve küresel ölçeklerde bağ kurma gibi hem bilişsel hem de değer temelli çıktılar sunan çok boyutlu bir ders alanıdır. Ancak Türkiye'de yapılan çeşitli araştırmalar (Doğanay, 2014; Sezer ve Tokcan, 2003), coğrafya derslerinde öğretmen merkezli, anlatım ağırlıklı ve ezber temelli yöntemlerin hâkim olduğunu göstermektedir. Bu durum öğrencilerin hem akademik başarısını sınırlamakta hem de derse yönelik tutumlarını olumsuz etkilemektedir. Özellikle soyut kavramların somutlaştırılmasında yetersiz kalan geleneksel yaklaşımlar, öğrencilerin konularla bağ kurmasını zorlaştırmakta; katılım, sorgulama ve anlamlandırma düzeylerini düşürmektedir. Bu bağlamda, yapılandırmacı kuramla uyumlu aktif öğrenme yöntemleri, özellikle de iş birlikli öğrenme teknikleri, coğrafya derslerinin niteliğini artırma potansiyeline sahiptir. İş birlikli öğrenme, öğrencilerin ortak amaçlar doğrultusunda birlikte çalışmasını, birbirlerinden öğrenmelerini ve akademik sorumluluğu paylaşmalarını sağlayan bir yaklaşımdır (Açıkgöz, 2002; Slavin, 1995). Bu yöntem, yalnızca bilişsel kazanımları değil, aynı zamanda sosyal becerileri, empatiyi, dayanışmayı ve iletişimi de geliştirmeyi amaçlamaktadır. Bu yönüyle coğrafya eğitiminin çok boyutlu doğasıyla örtüşmektedir.

İş birlikli öğrenme yöntemlerinden biri olan Jigsaw (Birleştirme) tekniği, öğrencilerin belirli konuların alt başlıklarında uzmanlaşıp, daha sonra ana gruplarına dönerek öğrendiklerini arkadaşlarına aktarmaları esasına dayanmaktadır. Bu teknikte her öğrenci hem öğrenen hem öğreten rolündedir; bu da sorumluluk duygusunu, öz düzenlemeyi ve anlamlı öğrenmeyi teşvik eder. Jigsaw tekniğinin özellikle parçalara ayrılabilir ve yorum gerektiren konular için uygun olduğu; öğrenciler arası etkileşimi ve kalıcı öğrenmeyi artırdığı çeşitli araştırmalarda ortaya konmuştur (Aronson, 2002; Hedeen, 2003). Bu çerçevede yapılan mevcut araştırma, coğrafya dersi 9. sınıf "Doğal Sistemler" ünitesi kapsamında, Jigsaw tekniğinin öğrenci akademik başarısına etkisini incelemeyi amaçlamaktadır. Araştırma, Elazığ ilinde düşük başarı düzeyine sahip olduğu tespit edilen bir lisede gerçekleştirilmiş; yapılandırmacı kuramın ilkeleri temel alınarak öğrencilerin aktif öğrenme ortamında etkileşimli biçimde öğrenmeleri hedeflenmiştir. Geleneksel yöntemle öğrenim gören öğrenciler ile Jigsaw temelli öğrenim gören öğrencilerin başarı düzeyleri karşılaştırılarak, yöntemin etkililiği nicel olarak test edilmiştir. Bu kapsamda çalışmanın, hem uygulayıcı öğretmenlere alternatif bir öğretim stratejisi sunması hem de coğrafya eğitimine kuramsal katkı sağlaması beklenmektedir.

Yapılandırmacı öğrenme yaklaşımı, bireyin öğrenme sürecinde aktif rol aldığı, bilgiyi kendi deneyimleri üzerinden inşa ettiği bir model sunar. Bu modele göre öğrenme; metin, diyalog, deneyim ve problem çözme gibi süreçler aracılığıyla anlam üretmeye dayanır (Suparno, 2004; von Glasersfeld, 1989). Öğretmen ise bu süreçte bilgi aktarıcısı değil; öğrenme deneyimlerini kolaylaştıran bir rehberdir. Coğrafya gibi kavramsal yoğunluğu yüksek ve çok boyutlu disiplinlerde, yapılandırmacı anlayış öğrencilerin anlamlı öğrenme düzeylerini ve problem çözme becerilerini geliştirme açısından büyük avantajlar sunar (Doğanay, 2014).

İş birlikli öğrenme, bu kuramsal temelin pratiğe yansıyan biçimlerinden biridir. İş birlikli öğrenmede öğrenciler, ortak amaçlar doğrultusunda birlikte çalışır, birbirlerinin öğrenmesinden sorumlu olur ve grup üyeleri arasında bilgi alışverişi gerçekleşir (Slavin, 1995). Vygotsky'nin sosyal etkileşim vurgusu ve Piaget'nin bilişsel gelişim basamakları bu modeli destekleyen önemli kuramsal dayanaklardır. Türkiye'de 2005 yılında müfredatlarda yapılandırmacı yaklaşıma geçişle birlikte, işbirlikli öğrenmeye olan ilgi artmış; son olarak 2024'te uygulamaya giren "Türkiye Yüzyılı Maarif Modeli" ile bu yaklaşım daha da güçlendirilmiştir (MEB, 2024). Bu çerçevede, Elliot Aronson tarafından geliştirilen Jigsaw tekniği, öğrencilerin önce uzmanlık gruplarında alt başlıkları öğrenip sonra ana gruplarına dönerek arkadaşlarına öğretmelerine dayalı özgün bir yapıdır (Aronson, 2002). Bu teknik, yalnızca akademik başarıyı değil, sosyal becerileri, sorumluluk bilincini ve empati gibi duyuşsal kazanımları da desteklemektedir (Türkmen & Yamık, 2015).

Yöntem

Bu çalışma, nicel araştırma desenlerinden öntest-sontest kontrol gruplu deneysel desen çerçevesinde yürütülmüştür. Araştırma, 2024 yılı Kasım-Aralık ayları arasında Elazığ ilinde bir

Anadolu İmam Hatip Lisesi'nin 9. sınıfında gerçekleştirilmiştir. Katılımcılar, akademik başarıları düşük olan sınıflar arasından seçilmiş ve rastlantısal olarak deney (n=34) ve kontrol (n=24) gruplarına atanmıştır. Gruplar arasında başlangıç düzeyinde anlamlı bir fark olup olmadığı t-testi ile kontrol edilmiş ve grupların denk olduğu belirlenmiştir. Veri toplama aracı olarak "Doğal Sistemler" ünitesini kapsayan ve Milli Eğitim Bakanlığı'nın resmî materyal havuzundan alınan 40 soruluk bir başarı testi kullanılmıştır. Testin 20 sorusu çoktan seçmeli, 20 sorusu boşluk doldurma biçimindedir. Öğrencilerin cevapları 1 (doğru) ve 0 (yanlış) olarak kodlanmıştır. Deney grubuna Jigsaw tekniğine dayalı iş birlikli öğrenme yöntemi uygulanmıştır. Uygulama öncesi öğrencilere teknik hakkında bilgi verilmiş, sınıf 5 kişilik heterojen gruplara ayrılmış ve her öğrenci bir alt başlıkta uzmanlık kazanmak üzere uzman gruplarına yönlendirilmiştir. Daha sonra ana gruplarına dönen öğrenciler öğrendiklerini grup arkadaşlarına öğretmişlerdir. Öğretmen bu süreçte rehber rolü üstlenmiş, materyal hazırlama, sınıf içi tartışmalara katılma ve görev paylaşımı konularında öğrencilere destek olmuştur. Kontrol grubuna ise aynı ünite geleneksel öğretim yöntemleri (düz anlatım, soru-cevap, ödevlendirme) kullanılarak işlenmiştir. Her iki gruba da ünite öncesinde ön test, uygulama sonrası ise son test uygulanmıştır.

Bulgular

Araştırma verileri SPSS 27.0 programı kullanılarak analiz edilmiştir. Deney grubunun öntest ve sontest puanları arasında anlamlı bir fark bulunmuştur: $t(33) = 9.87$, $p < .001$. Bu bulgu, Jigsaw tekniğinin akademik başarıyı anlamlı şekilde artırdığını göstermektedir. Kontrol grubunda da istatistiksel olarak anlamlı bir artış gözlenmiştir: $t(23) = 4.32$, $p < .001$; ancak bu artış, deney grubundaki kadar yüksek değildir. Gruplar arası sontest karşılaştırmasında deney grubunun ortalaması kontrol grubuna kıyasla anlamlı derecede daha yüksek çıkmıştır: $t(56) = 4.56$, $p < .001$. Bu da, uygulanan öğretim yönteminin akademik başarı üzerinde belirleyici bir etki yarattığını ortaya koymaktadır. Ayrıca deney grubuna uygulanan derslerin ardından öğrencilere yapılan nitel değerlendirmede, büyük çoğunluğun görsel materyaller ve deneysel etkinliklerin anlamalarını kolaylaştırdığını; ancak bazı öğrencilerin grup çalışmaları sırasında oluşan sınıf içi gürültüden rahatsız olduklarını ifade ettikleri görülmüştür. Bu durum, yöntemin etkili olması için sınıf yönetimi becerilerinin de güçlendirilmesi gerektiğini ortaya koymaktadır.

Sonuç ve Tartışma

Elde edilen bulgular, iş birlikli öğrenme yöntemlerinden Jigsaw tekniğinin coğrafya dersinde öğrencilerin akademik başarılarını artırmada geleneksel yöntemlere göre daha etkili olduğunu göstermektedir. Bu sonuç, daha önce yapılan birçok araştırma ile de paralellik göstermektedir (Altıparmak ve Nakiboğlu, 2005; Baer, 2003; Langlois, 2001; Sezer ve Tokcan, 2003). Coğrafya eğitimi, kavramların çok boyutlu ilişkilerini anlamayı, mekânsal düşünmeyi ve doğa-insan etkileşimini analiz etmeyi gerektiren bir alandır. Bu nedenle soyut kavramları

somutlaştırmak ve öğrencilerin derse aktif katılımını sağlamak açısından Jigsaw gibi teknikler büyük potansiyele sahiptir. Ayrıca, öğrencilerin sadece akademik bilgi değil, iş birliği, iletişim, sorumluluk, eleştirel düşünme, sosyal farkındalık, empati ve dijital okuryazarlık gibi 21. yüzyıl becerilerini de kazandıkları gözlemlenmiştir. Bununla birlikte, yöntemin etkili olabilmesi için öğretmenlerin bu tekniklere yönelik yeterli pedagojik donanıma sahip olmaları, sınıf fiziki düzeninin grup çalışmalarına uygun olması ve öğretim sürecinin iyi planlanmış olması gerekmektedir.

Araştırma bulguları ışığında aşağıdaki öneriler geliştirilmiştir:

- Coğrafya derslerinde Jigsaw tekniği gibi aktif öğrenme yöntemleri daha yaygın olarak kullanılmalıdır. Özellikle bölümlere ayrılabilir, kavramsal yoğunluğu yüksek konular bu yöntem için uygundur.

- Bu tür yöntemlerin uygulanabilmesi için öğretmenlere yönelik hizmet içi eğitim programları düzenlenmeli; öğretmen yetiştiren kurumlar aktif öğrenme tekniklerini öğretim programlarına dâhil etmelidir.

- Öğrencilerin tutum, benlik algısı, öğrenme stratejileri gibi değişkenler açısından da bu yöntemlerin etkisi incelenmelidir.

- Sınıf içi gürültü ve dikkat dağınıklığı gibi faktörlere karşı grup yönetimi ve sınıf kontrolüne ilişkin stratejiler geliştirilmelidir.

- Pilot okullarda uzun süreli uygulamalarla yöntemin sürdürülebilirliği test edilmeli; coğrafya öğretiminde etkin yöntemler sistematik olarak yaygınlaştırılmalıdır.