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Discriminatory Behaviors of School Administrators and Their Reflections on Schools

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ABSTRACT

This study examines the reflections of school principals' discriminatory behaviors on schools based on the views of teachers working at different educational levels. The study group consisted of 14 teachers working in Malatya province. Designed using qualitative research methods, the study followed a phenomenological approach. Data were collected through a semi-structured interview form prepared by the researcher and focus group interviews. The data were analyzed using content analysis, initially categorized, and evaluated based on the emerging themes. The research findings revealed three main themes: discriminatory behaviors in the school environment, how teachers perceive these discriminatory behaviors, and suggestions for preventing such behaviors. It was found that some teachers experienced exclusion, injustice, unfair treatment, loss of motivation, loneliness, and low school attachment due to discriminatory behaviors. Teachers participating in the study emphasized that the most critical measures for eliminating discriminatory behaviors include training for school administrators, performance-based evaluation, establishing institutional school structures, and implementing inclusive practices. The recommendations are developed based on research findings. School administrators must develop the ability to treat all teachers equitably, regardless of gender, culture, political ideology, or other factors. Clear policies to prevent discrimination in school environments should be implemented, and staff members should be actively involved in decision-making processes. The selection and training of school administrators should prioritize merit and qualifications to ensure effective leadership.

Keywords: Discrimination, teacher, school administrators.

Introduction

In schools where the human element is central, the expectations, interests, socio-cultural characteristics, and psychological states of teachers must also be taken into account (Can, 2018). School administrators need to pay attention to these differences to better understand their teachers and establish healthy human relationships (İmrek, 2004; Keskinkılıç Kara, 2016). In general, the attitude of administrators towards the differences among teachers in an educational institution is a factor that affects teachers' teaching performance (Şahin, 2014).

School environments bring together individuals with diverse characteristics, requiring administrators to navigate these differences effectively, especially in dynamic educational settings. From an educational management perspective, ensuring mutual respect, integration, and tolerance in the shared spaces of individuals with varied backgrounds is crucial. This is especially significant in schools, which serve as microcosms of society and thus play a pivotal role in fostering a positive outlook among students and staff (Bakaç et al., 2019). School administrators should integrate the differences of individuals in a manner that aligns with the school's objectives, allowing employees to contribute meaningfully to the institution without restrictions and to become an integral part of the school culture. Recognizing, understanding, and accepting these differences within the organization is essential for effective leadership (Gül & Türkmen, 2018).

However, the presence of discrimination can significantly undermine these efforts, leading to recurring problems and conflicts within school environments. Discrimination in this context often manifests when administrators prioritize personal relationships over principles of justice and fairness, resulting in unethical behaviors. Such favoritism towards friends, relatives, or individuals who share similar characteristics, regardless of their qualifications, can create an inequitable environment that hampers the school's overall mission.

Discrimination involves providing resources, services, and goods to certain individuals based on interpersonal similarity and closeness. In organizations, favoritism is

defined as administrators using their discretion to support, protect, and promote individuals they are close to in a manner that is not compliant with the law (Erdem & Meriç, 2013). Favoritism in organizational settings refers to the preferential treatment of certain individuals based on personal relationships rather than professional qualifications, leading to an unfair and unethical work environment (Öztürk, 2015; Polat & Hiçyılmaz, 2017). Regardless of its form, favoritism is undesirable and negatively affects employees. When favoritism occurs, authority is misused, which can be seen as a form of corruption (Argon, 2016). Research shows that favoritism undermines the sense of justice in society and leads to distrust (Polat, 2012). It negatively impacts employees' motivation, performance, and job satisfaction (Günel, 2005).

Employees should be made aware of discriminatory practices that negatively affect school life, and necessary measures should be taken by assessing the situation in schools (Argon, 2016). The problem at hand is that discriminatory practices within school administrations can lead to a toxic work environment, impacting not only teacher morale but also student outcomes. Treating similar individuals differently in a work environment can harm them personally and reduce their productivity, as well as significantly damage the functioning and sustainability of the organization. This situation also leads to numerous problems in terms of organizational ethics, justice, and morality (Demirel, 2011; Fritzsche, 1997; Yamak & Topbaş, 2004). However, the mission of modern organizations includes valuing all employees, treating them equally and fairly, and respecting their differences. This study aims to raise awareness among educational administrators and teachers regarding favoritism in school environments. By providing evidence-based strategies, it seeks to promote an inclusive culture that prioritizes merit and equitable treatment. The significance of this research lies in its potential to contribute to a more equitable educational environment, ultimately enhancing both teacher satisfaction and student achievement.

Purpose of the Study

The primary purpose of this research is to determine teachers' views on the concept of discrimination, identify examples of discriminatory behaviors exhibited by school principals, and determine teachers' suggestions for eliminating discriminatory behaviors. In line with this aim, the research questions are as follows:

1. Have teachers experienced instances of discrimination in their respective institutions? (Yes/No) If 'Yes,' could you please describe the discriminatory situations you encountered?
2. How do their colleagues feel in situations of discrimination?
3. What are the teachers' suggestions regarding discrimination in schools?

Method

This section includes the research model, study group and population, data collection, data analysis, the role of the researcher, and validity and reliability.

Research Design

This study employs the phenomenological design, one of the qualitative research methods. The phenomenology method is used to reveal and interpret individual thoughts or perspectives in line with a specific phenomenon (Yıldırım & Şimşek, 2013). Moustakas (1994) states that phenomenological research methods are effective in revealing individuals' perceptions and experiences from a perspective free of hypotheses and preconceptions. The study aims to explore teachers' experiences of discrimination in school settings. The choice to use a phenomenological design is appropriate because it allows for a deeper understanding of how these experiences shape participants' perceptions and interactions. The study took place in urban schools with diverse teachers from various backgrounds and levels of experience. Understanding the social and cultural dynamics of these settings is essential in comprehending how participants perceive discrimination and favoritism. To ensure the validity of the phenomenological approach, it is important to provide rich and detailed descriptions of the school demographics and the specific characteristics of the participant groups. By fostering an open and reflective discussion environment, the study seeks to gain a comprehensive understanding of teachers' experiences of discrimination in schools. In qualitative research, data collection methods such as document analysis, observation, and interviews are used. To collect in-depth data, this study employed focus group interviews, a key qualitative research method. Focus group interviews are significant for conducting in-depth research and drawing inferences based on group dynamic process. In this method, participants can freely discuss and express their thoughts according to a plan, allowing new and different ideas to emerge (Çokluk et al., 2011). This method was preferred over individual interviews as it leverages group dynamics, fostering richer discussions by encouraging participants to expand on each other’s ideas and experiences. Furthermore, the group setting facilitates theidentification of shared experiences and perceptions of

discrimination, which may remain unexpressed in individual interviews. This approach provides a broader and more nuanced perspective on the phenomenon under investigation.

In qualitative research, the role of the researcher is crucial as they can guide the process and reflect their own experiences. Therefore, the researcher is obligated to explain their role and demographic characteristics in the process (Creswell, 2016). The researcher's involvement in the research process is important for obtaining the most valid information about the process. In this study, the researcher did not intervene with the participants and supported their interactions with each other. Questions were posed by the researcher to encourage discussion. Efforts were made to ensure that each participant took part in the discussions, that everyone's views were included, and that a balance was maintained among participants.

The questions in the focus group interview form aimed to gather each teacher's views on the questions. Guidance was provided for discussing concepts or topics, emphasizing the importance of participants expressing their own views rather than general opinions. During the interviews, participants were given the opportunity to speak in a structured manner, allowing for both sequential and spontaneous contributions. Each teacher was encouraged to provide their perspective on every question posed, ensuring that all voices were heard and valued. While the majority of participants actively engaged in the discussion, there were instances where a few individuals were more reticent, requiring prompts to share their insights. A total of three sessions were conducted, each lasting approximately 30 to 40 minutes. This structured approach facilitated an in-depth exploration of the topics, enabling participants to reflect critically on their experiences and viewpoints. It was specifically noted that no opinion would be judged to ensure teachers could express their views comfortably. When teachers wished to express their opinions, their ideas were collected, thereby attempting to address different aspects of the topic.

Study Group

To select participants, maximum variation sampling, one of the purposeful sampling techniques, was used. This approach aims to examine the situation meeting a certain criterion from various perspectives. The primary criteria for selection were based on the teachers' years of experience, teaching level, and the socio-cultural diversity of their respective schools. This diversity was ensured by selecting participants from different age groups, teaching areas, and backgrounds, with the aim of obtaining a comprehensive range of perspectives on the subject of discrimination. The focus groups were comprised of teachers from various schools within the same urban area, with some participants having prior professional familiarity, while others were initially unacquainted, which fostered both a sense of ease and interaction within the discussions. The goal of maximum variation is to reflect the diversity of individuals relevant to the researched topic to the maximum extent possible within a small group. The purpose here is not to generalize by ensuring diversity, but to identify shared phenomena and differences among diverse situations and reveal different dimensions of the problem according to the variety (Yıldırım & Şimşek, 2013).

A semi-structured interview form and focus group interviews were conducted with 14 teachers involved in the study. The demographic information of the participants in the focus group interview, conducted with 14 teachers using the interview form, is presented in Table 1.

Table 1.

Demographic Characteristics of Focus Group Interview Participants

Participants	Gender	School Type	Branch	Seniority (Years)
P1	Male	High School	English	8
P2	Female	Middle School	Science	12
P3	Female	High School	Guidance	13
P4	Female	High School	Mathematics	9
P5	Male	Middle School	Mathematics	17
P6	Female	Middle School	Turkish	21
P7	Female	Middle School	Turkish	15
P8	Male	Primary School	Religious Education	15
P9	Female	High School	Music	14
P10	Male	High School	Physical Education	12
P11	Male	Primary School	Classroom Teacher	20
P12	Male	Primary School	Classroom Teacher	18
P13	Female	Primary School	Classroom Teacher	10
P14	Female	Primary School	Classroom Teacher	10

When examining Table 1, it is observed that out of the 14 teachers consulted, 8 are female and 6 are male; 5 teachers work in primary schools, 4 in middle schools, and 5 in high schools; and the teachers represent various subjects and seniority levels.

Data Collection Tools

In this study, a semi-structured interview form was used as a qualitative data collection tool. Prior to designing the interview form, a comprehensive literature review was conducted, and the questions were formulated accordingly by the researcher Following expert evaluations in the field of educational sciences, necessary modifications were implemented, resulting in a refined three-question teacher interview form.

It was planned to collect and evaluate in-depth data from 14 teachers working at the pre-school, primary, middle, and high school levels in Malatya. The study was conducted by administrating the interview form to teachers participating in the focus group interview.

According to Çokluk et al. (2011), in focus group interviews, the first step is to define the research topic and thoroughly examine and delineate it. In the second step, the participants and their characteristics, the main topics to be discussed, and the questions to be asked should be determined. Third, the location, time, moderator, rapporteur, and other personnel, if any, for the focus group interview should be identified, and the interview should be conducted. In the final stage, the interview should be summarized, reports and notes should be reviewed, data should be examined, interviews should be analyzed, and a report should be prepared.

In line with these stages, the questions in the interview form were posed to the participants. Care was taken toensure a similar number of participants in the study. The interview was conducted on a day and time previously agreed upon with the teachers. To ensure a comfortable and open environment, the interviews were conducted in a neutral setting outside the school, minimizing potential workplace influences on participants' responses. The interviews were recorded on video and audio. Since a focus group interview was to be held, teachers were informed beforehand that the topic would not be disclosed and that the discussion would be on a subject related to their field. Teachers participated on a voluntary basis. Participants were required to have at least one year of work experience. The first part of the interview form included questions to determine the demographic information of the participants. The second part of the interview form contained the following questions relevant to the purpose of the research.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Inonu University Social and Human Sciences Scientific Academic Committee (Date: 06.01.2022, Number: E-2022-1/27)
- Informed consent has been obtained from the participants.

Data Analysis

The data obtained from the focus group interview were analyzed using the content analysis method. Content analysis is an analytical method that allows the classification of similar data under specific themes and concepts to be organized meaningfully (Akbulut, 2014). The primary purpose of using this method is to reach appropriate concepts and themes that can explain the obtained data (Yıldırım & Şimşek, 2013).

After transcribing the responses from the teachers in the focus group interview, they were coded as P1, P2, P3,…,P14 to maintain confidentiality and distinguish individual responses. Finally, the classifications made were interpreted and evaluated within the framework of the themes identified.

Researcher's Role

In qualitative research, the researcher is the person who participates directly in data collection, conducts individual interviews with participants, and interacts with them. Qualitative researchers have their own opinions on the subject being studied. However, during the data collection phase, they should not influence the participants with their own ideas and thoughts. Qualitative researchers must provide an environment where participants can express their own views and thoughts freely. They should be able to express their own views and thoughts clearly and transparently when necessary and maintain impartiality. They should explain in detail the methods and techniques they used, the numerical information about the data sources, and the results obtained.

Validity and Reliability

In this study, the points emphasized by Creswell (2016) to ensure validity and reliability were carefully considered. Participant trust was established, facilitating the detection of consistencies in their statements. The research process was closely monitored and controlled throughout the study. As the research progressed, the questions were refined in response to contradictory or negative evidence.

Additionally, to ensure the accuracy and credibility of the findings, participants were asked to review the results and interpretations derived from their input. To enhance research validity the findings were presented objectively, incorporating direct quotations from the teachers' responses.

To ensure the reliability of the research, the teachers participating in the study were coded with the letter "P," which stands for "principal. " Their responses were presented through direct quotations. Similarly, the interview forms were analyzed in detail. To verify the control of the obtained data, the prepared interview form, raw data, and notes taken by the researcher during the reporting phase were reviewed by field experts. As a result of the consistency review, a high level of agreement was observed among the field experts, with a consensus rate of 85%, indicating strong reliability in the interpretation of the data.

Results

The data were coded into various themes and presented with direct quotations. Three main themes were identified: a) discriminatory behaviors in the school environment; b) the feelings of teachers regarding discriminatory behaviors; and c) suggestions for preventing discriminatory behaviors. The relationship between the themes and codes is illustrated with figures. The theme of discriminatory behaviors in the school environment and the associated codes are shown in Figure 1.

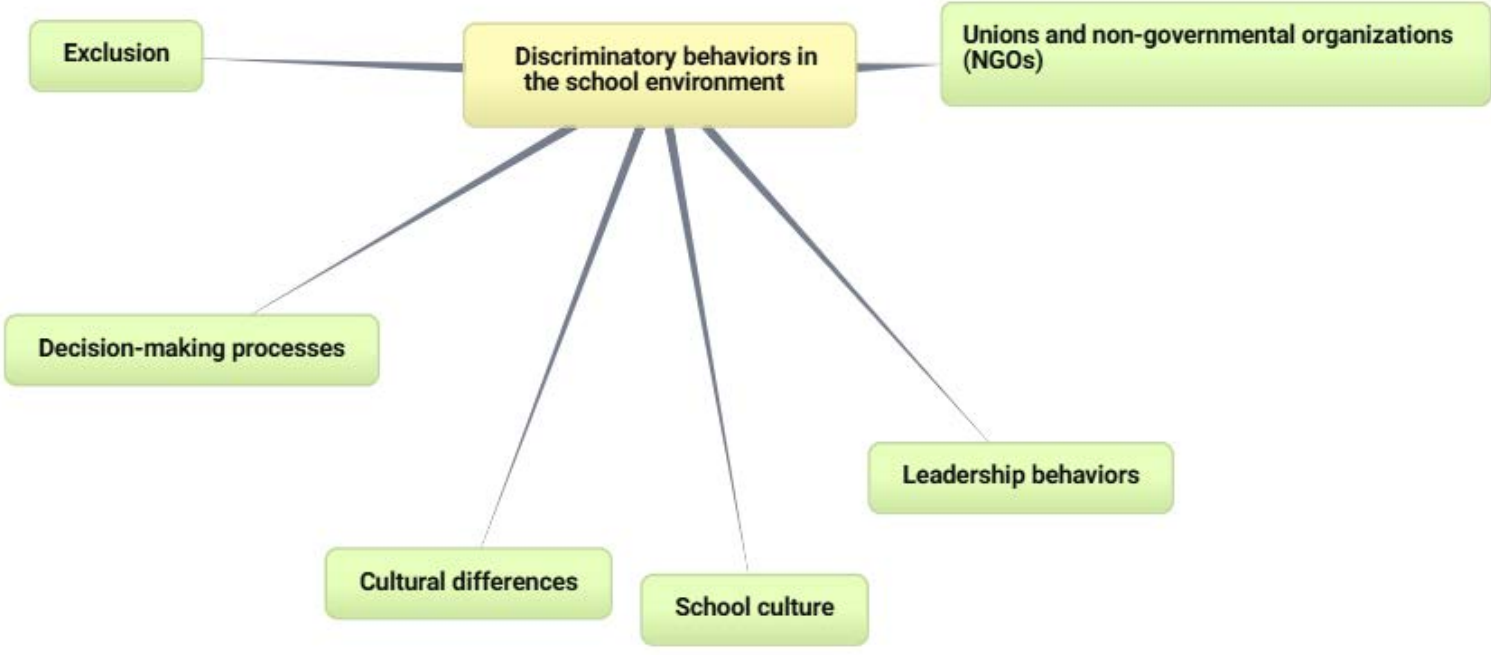

Figure 1.
Relationship Between the First Theme and Codes

Teachers encountering discriminatory behaviors frequently express feelings of exclusion and being placed in undesirable teaching positions.

P6: "At our school, the administrator and their spouse work together and every year they exclude the newcomer, and any characteristic of the person is sufficient for this, such as financial status, beauty, work performance, or educational background, independent of the actual work done. The last woman who joined our school was very beautiful, charming, and a competent worker, but the administrator's spouse was jealous and caused her to be excluded. The administrator started a rumor in the school, which ended in a fight. The teacher had to request a transfer and ended up at a school with worse conditions because she couldn't seek her rights. "

P14: "Different behavior based on gender, attire, and age leads to discrimination. Even if you are at the same status as others, you face different treatment. You encounter exclusion and humiliation, which makes you feel sad and hurt. I agree with everything my colleagues have said. "

In particular, the success of employees in organizations centered on people depends on the effective

implementation of communication skills. Good communication requires understanding people, recognizing their expectations, and empathizing with them. Teachers and administrators should use these skills effectively in decision-making processes within the school environment.

P5: "I believe a managerial team should be formed. Training in areas such as 'I' language, positive communication, and psychology should be provided. Regular training and testing should be conducted. If there are good managers in institutions, discriminatory situations will be eliminated. "

P4: "At a friend's institution, she, as a preschool teacher, mentioned that they were not given the right to speak, their issues were not heard, and even the preschool group was not invited to meetings. Their efforts were overlooked. We don't know the reason, but it was experienced as a group. They were constantly assigned tasks outside their work. "

Teachers with different lifestyles, education, economic status, ethnic backgrounds, beliefs, ideologies, and physical and emotional characteristics work together in a school environment. School administrators are responsible for balancing this process.

P2: "Administrators approach those with similar views more protectively and sympathetically. They pay more attention to the requests of these individuals. "

P11: "Individuals experiencing discriminatory behaviors may develop feelings of worthlessness and think they are incapable of defending themselves. Some may even experience fear, threat, and insecurity in their socio-cultural environments due to these negative experiences. "

P5: "It was related to a dispute between two teachers. Both teachers had similar worldviews, and since the principal had a different view, he did not intervene in the dispute and remained silent against the injustice. "

Organizational culture reflects the recognition, values, and circumstances of the organization and its members. Organizational culture is crucial for the organization's success and progress.

P7: "The institution we work at is a school built entirely on discriminations. Our principal and a few colleagues have worked in village schools for years, and the only important thing for them is their rights; nothing else matters. Everything is set up to find faults and group people. "

P8: "Senior teachers and the school administration adjusted the class schedules as they wished because of their closeness, but they did not help my friend, even though she had a special situation, leaving her in a very difficult position. "

The leadership attitudes, policies, and practices of administrators determine the process.

P13: "I think our administrator colleagues are qualified individuals. I believe they act fairly towards all employees without any discrimination and work diligently to ensure that no colleague faces injustice or difficult situations. "

P1: "Last year, my class had many unruly students, and no solution was found for me, but now they are trying to find a solution for this colleague. In schools, everything varies; some are treated well, some have their classes selected, and those not close to the administration are excluded. Our principal is good; we have been working together for 15 years, and he always helps us as much as he can. Teaching is a job of the heart; I have been doing it with love for 35 years. "

P3: "I actually work at a school with low socioeconomic status, but the school administration and teachers have adapted very well to the environment. I was on duty in the yard, and it was very cold. The administrator came and told me I could go inside if I wanted, and another teacher wanted to take over. Although we were both female teachers, offering it to me first seemed like positive discrimination. "

P8: "Yes, I have experienced both positive and negative. I commute to school by my own car, and sometimes I am late in winter conditions, but our principal tolerates minor delays even though commuting by car is my choice. If he wanted, he could not be so lenient. "

Teachers' opinions predominantly focus on managerial skills and union codes. The fact that political views are prioritized in the selection of administrators, or that individuals gain managerial status due to political proximity, can reflect on their managerial skills. The tendency of administrators to protect and favor those with similar views supports this situation.

P10: "Yes, it happened. I have been working at the same school for 11 years, and colleagues who faced discrimination, just like me, were those who did not join the union that the majority were members of. "

P8: "I am currently on maternity leave, but in my first institution, all the teachers stayed in the dormitory, and I commuted by my own car. There was a lot of grouping among the teachers, and they did not even greet those outside their group. "

P12: "It happens in every institution because the work

done is not considered; political thoughts are always prioritized, as in all institutions. Jobs requiring benefit are not given to that person. "

P13: "Colleagues were subjected to it due to union and political thoughts. "

The theme of the feelings of teachers regarding discriminatory behaviors and the associated codes are shown in Figure 2.

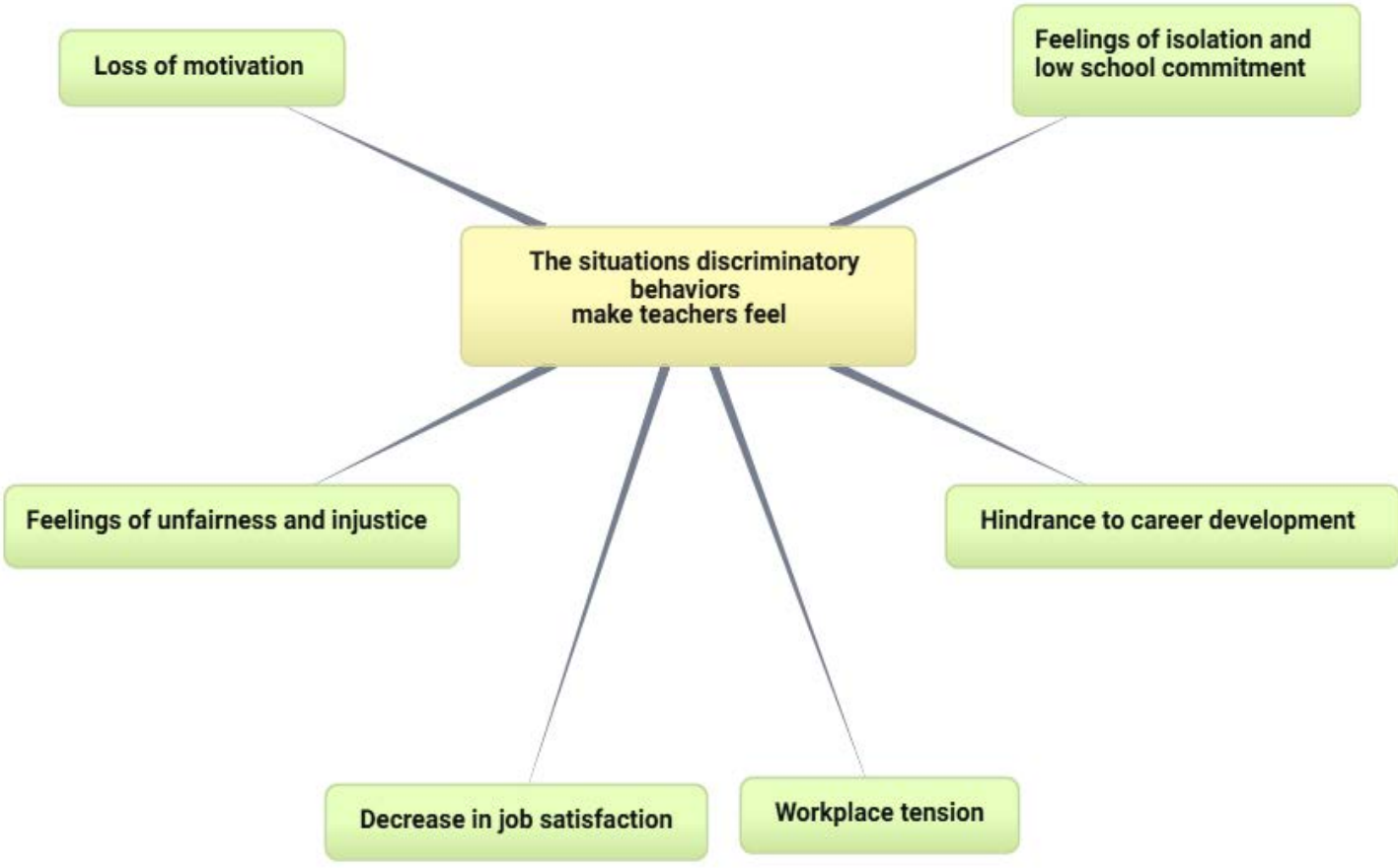

Figure 2.
Relationship Between The Second Theme and Codes

Discriminatory behaviors among teachers can lead to decreased motivation, which in turn causes psychological problems, negative work environments, and lower service quality.

P14: They feel a sense of failure, their self-esteem drops, and they become unhappy.

P11: Motivation completely drops, they lose interest in work, and cannot be productive.

P4: They don't feel belonging to the school and lose their enthusiasm and excitement for their profession.

Instances like unfair treatment in arranging schedules and unfairness in how students are distributed among classes stand out. The main reason for unfair treatment is attributed to administrators, such as not being fair in the distribution of students to classes or not treating teachers equally in scheduling their teaching programs.

P10: I believe our school is currently being managed fairly, but being a project school, we may encounter some issues. These issues are related not to fairness, but rather to the expectations individuals have of you. Understanding is not always met regarding health problems or situations related to children. We do not encounter problems in situations such as duty or lesson schedules. Of course, there have been many unfair treatments in the past regarding duty, lesson schedule, or those who are not members of their own groups.

P9: The workload at school falls on docile teachers, while the school administration gives much less work to questioning and troublesome teachers.

P7: . . . there is unfairness even in student distribution.

Responses indicate that discriminatory behaviors negatively affect job satisfaction. Feeling insignificant and undervalued damages the sense of justice of employees, leading to a lack of trust and job dissatisfaction towards

their institution.

P11: They felt worthless and inadequate. They felt angry sometimes against the administration and sometimes against other teachers. Of course, this also reflected on the teachers. For example, the issue of the lesson schedule was a problem caused by the administration, but it also affected the teachers, and friend groups were shaped accordingly. Some had empty lessons, some had classes one after the other, and their days were easier.

P2: Everyone can be late for school, but while the administrator tolerates everyone, there were veiled insults to the teacher who had personal problems.

P3: In some schools, personal problems between administrators and teachers have affected school work and the worst problem has been made, and the teacher's lessons have been broken into pieces and scattered throughout the day.

Teachers who share their thoughts on how discriminatory behaviors make them feel often indicate feelings such as hurt, sadness, anger, and resentment, indicating tension in the workplace.

P1: Of course, they get hurt, feel upset, and feel incomplete when others are protected.

P4: Their motivation dropped significantly. They didn't even want to go to school, so their productivity at school dropped, they couldn't contribute to their students, and they struggled a lot during lessons.

P5: They feel inadequate and bad. They question what they did wrong and affect their lives during that period. Perhaps after a while, they accept discrimination or fight against it. They are sad and upset in all negative discriminations.

The relationship between school administrators and teachers, the practices administrators implement towards teachers. In schools where clear and attainable goals are established, a supportive learning environment is fostered, and respect is shown for teachers' career progression, their teaching competencies tend to improve. Some participants highlighted that personal closeness to the principal and alignment in political views can lead to certain colleagues receiving preferential treatment, while others face challenges as a result.

P2: Of course, it happened. For example, they gave all the difficult children to my friend's class. While there should have been 2 integration students in the classroom, they gave 5 integration students. They discriminate a lot about the awards given to teachers. Usually, the awards are shared among the principals and their assistants. That situation is rare because they propose among themselves and take them.

P11: Some branches are considered worthless by teachers, administrators, and students in schools. A visual arts teacher friend of mine was called to the room because of a grade given by a student, and it was dictated that the student's grade should be raised in a very bad tone.

P10: In our school, the lesson schedule of the group close to the administration was very good, but the lesson schedules of those who were not close to the administration were created as the first hour-last hour. One of our friends who was receiving colon cancer treatment was experiencing a serious health process, but he had to stay at school for long hours or go back and forth between home and school because of the lesson schedule. Our principal had created groups of good and bad teachers and created an unjust order. Working in such an environment negatively affected us.

P5: There are groups in our school as well, those close to the administration and those who are not. Similarly, scheduling regular lessons, having empty days, and unfair treatment of people who are not members of the group like other friends. One teacher experienced a similar situation and objected to the administration about the imbalance in the lesson schedule, but no solution was found. The principal had created groups of good and bad teachers and created an unjust order like this. Working in such an environment negatively affected us.

Employees who do not feel attached to their institution feel low commitment while doing their job, do not have the desire and excitement to do their job, as seen from the answers, negative feelings affect different areas as a result of discriminatory behaviors.

P3: They made cups for all teachers in school with their names for Teacher's Day to give away, but they separated us as two guidance teachers and didn't find us suitable. I felt excluded. It was a simple and small gift, but I was hurt in my first year. I didn't ask why and I thought I didn't feel enough to myself.

P3: They feel wronged, excluded, and worthless. Their commitment to the institution decreases, and they lose their sense of belonging.

Recommendations for preventing discriminatory behavior and related codes are shown in Figure 3.

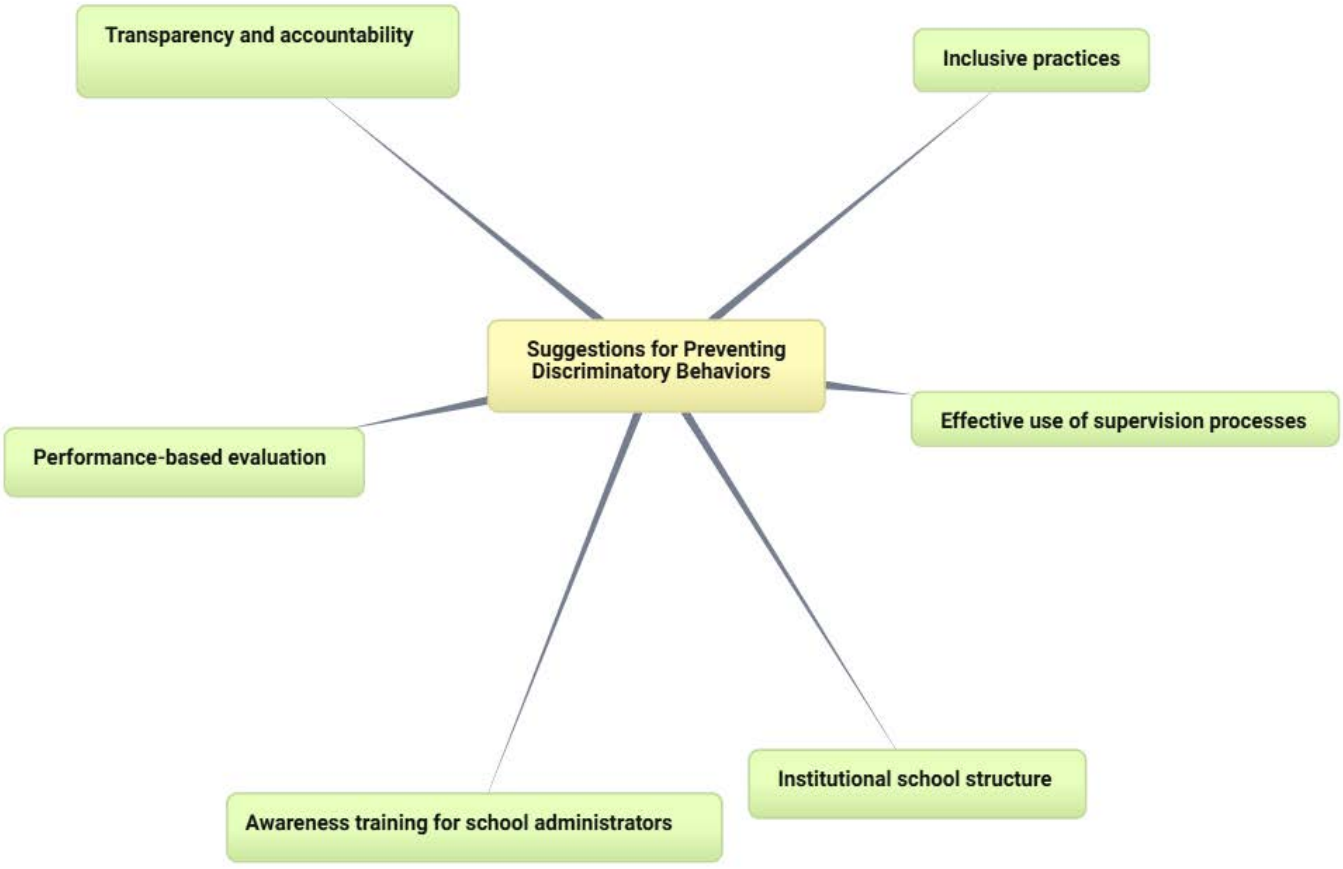

Figure 3.
Relationship Between The Third Theme and Codes

Discriminatory behaviors by school administrators create doubts about the transparency of teachers' rights and their ability to defend those rights. Teachers feel valued when treated positively and report that their happiness improves their job performance.

P10: "I currently work in a very fair institution where decisions are made conscientiously, and academic success is prioritized. I have previously worked in institutions that were not managed fairly. I believe I am working in a fair environment regarding our school's class schedule and gender equality. "

P12: "I work in a large school with 65 staff members, and I believe it is managed well at a rate of 95%. Our class schedules are suitable for us, we enjoy going to our school, we do not experience Monday syndrome. We do not have problems with duty schedules. In previous administrations, of course, there were periods when we had problems. "

P6: "There is good cop, bad cop being played in schools. If the principal is good, the vice principal is forced to play the bad cop. Instead, if rules are established in schools down to the finest details, everyone will behave without crossing their limits, and problems will disappear. These rules should not exhaust both the teacher and the administration and should be protective rules. They should be organized by the Ministry of Education so that equality can be achieved in all schools. "

Teachers who say their institutions are managed fairly emphasize performance evaluation based on performance, equal evaluation, and monitoring concepts.

P9: "Teachers should work diligently, and people who do the work and know the job should take over. People who can maintain work peace, protect team spirit should be chosen as administrators. Rotation should be applied in schools, and people should not stay in their current schools for many years. "

P3: "I am in the first school I was assigned to, and since I came, our administrators have been very helpful, treating everyone friendly and equally. Despite our school being crowded, everyone tries to support and help each other. Our administrators behave well with us unless there are extreme demands, I think my institution is managed fairly. "

Efforts are emphasized to raise awareness among school employees for a fair approach through in-service training activities related to discriminatory practices against school administrators and their results.

P8: "Administrators must have good knowledge and skills.

Administrators need to have new understandings in education, research, and improvement skills. It is clear that our education work is not going well because we do not have administrators with these qualities. "

P7: "Qualified people who can take responsibility should be selected as school administrators; otherwise, when there is a 'Bal tutan parmağını yalar' (like the finger that dipped in honey, like other friends. People do everything to keep in power for their comfort. There must be those who understand education. Some teachers are good at education but cannot be made to understand. Our director's educational leadership is good, and our school is very good.

P2: There should be a professional principal in schools. Principals should not be selected from teachers because they often come into the role with political influence. Conversely, principals should be trained and begin their career as principals. The vice principal should follow the same path. Leadership and administrative roles should come from separate schools because these individuals need to be both managers and educators. Some teachers are excellent educators but not effective administrators, while others are skilled managers but lack educational expertise. Our current principal demonstrates both educational and managerial capabilities well, and our school currently operates like a private school with a strong focus on quality and continuity in education.

The institutional structure of the school represents the organizational and managerial framework established to ensure educational quality and continuity in line with the school's mission, vision, values, and strategic objectives.

P13: "The institution I currently work in is managed very fairly with ethical considerations, and academic success is prioritized. I have previously worked in institutions where fairness was lacking. I must say that differential treatment towards individuals outside their own groups can be very demoralizing, and I would like to discuss these issues further in the future. As for my current school, whether it's the class schedule or gender equality, I work in a fair environment. "

P6: "I serve on the school's strategic planning committee. We have set goals and missions to improve the quality of education in our school. . . Effective use of audit processes ensures continuous improvement in school management and educational quality. These processes are regularly conducted to identify barriers the school faces in achieving its goals and to develop strategic solutions to overcome these barriers. "

P1: "Yes, of course. The most common issue I see in all schools is placing high-achieving students in one class. If a teacher has a reputation for excellence, parents always prefer that teacher, and high-achieving students are grouped together in that class. The principal often feels powerless and may move other students to other classes. Upper management needs to monitor these practices. "

P9: "Because my specialization is music, it is often treated as less important compared to other subjects. During parent meetings, everyone would have separate tables or rooms, but parents would often turn up their noses and not even bother to meet if it was about music. There were instances where I received verbal notifications from the administration urging me to increase grades, saying, 'Let's raise the grades, this is important for the school and the student. ' In my opinion, schools should prioritize core subjects like art, music, and physical education; I do not think being so exam-oriented is correct. "

School administrators must consider differences and effectively manage conflicts. Therefore, administrators should emphasize inclusive practices and possess leadership skills.

P14: "Administrators' records should be checked, and they should not work in their hometowns. They should not work in the same institution for many years, and the teams they work with should change. Administrators should develop and improve themselves. "

P6: "I faced difficulties in my duty at the canteen due to my pregnancy, and when I requested, my duty location was changed. Our duty locations change every three weeks anyway, and after me, another pregnant colleague was assigned to the canteen, even though she did not want to. She was not given such an option. I felt sorry for her in this situation. I had no special connection with the administration; we had the same conditions, but her duty location was not changed. Despite no issue being related to me, there was a negative attitude towards me. "

Discussion

This study identifies three key themes discriminatory behaviors experineced by teachers in the workplace, the emotional impact of these behaviors, and potential solutions for addressing them.

The first theme of the study focuses on discriminatory behaviors observed in the school environment. This theme specifically highlights teachers' experiences of exclusion, limited participation in decision-making processes, cultural differences, school culture, leadership behaviors, and the effects of participation in unions and civil society organizations. According to Gül and Türkmen (2018),

differences among individuals aim to foster unity for common goals within an organization, necessitating managers to ensure employees work harmoniously. Schools, as the fundamental organizational structure in education, should create an environment where individuals are content. When teachers are happy in their workplaces, they exhibit enhanced job performance, integration with the school, increased motivation, and improved performance. Teachers have defined discrimination as "some school administrators showing tolerance to some teachers while not treating others equally and fairly, exclusion, favoritism, and marginalization" (Çelenk, 2010).

The second theme explores the effects of discriminatory behaviors on teachers. It particularly addresses unjust and unfair practices, resulting in loss of motivation, decreased job satisfaction, workplace tension, effects on career development, feelings of loneliness, and low organizational commitment. The findings emphasize the importance of competent school administrators transparent rules, and a predominant belief in equal treatment. Among the recommendations stated by teachers, multiple sub-views exist, emphasizing not only the educational aspect but also personal skills of the manager. Being fair, successful in communication skills, and having knowledge of psychology are mentioned as expected qualities alongside managerial competence.

The third theme of the research focuses on the recommendations of participants to prevent discriminatory behaviors. This theme highlights transparency and accountability, performance-based evaluations, training for school administrators, establishment of a corporate school structure, effective use of audit processes, and inclusive practices. Employees assume greated, responsibility and engage more collaboratively and flexiblywhen they experience a supportive and secure work environment.This type of environments allows group members to freely express their emotions and thoughts, thereby enhancing group productivity (Bökeoğlu & Yılmaz, 2008). Effective school leadership requires administrators to engage in self-assessment, uphold ethical standards, and demonstrate honesty, realism, and fairness in protecting employees' rights. If a school administrator expects ethical behavior aligned with values from teachers within the organization, they should exemplify the same behaviors. Ethical principles should be integral to school culture, necessitating school administrators to adopt these principles first (Kalaz, 2016).

Discrimination refers to treating individuals unequally without a valid reason. Furthermore, a study by Günbayı et al. (2014) found that teachers experience problems such as pressure, unjust criticism, blaming, lack of consideration of their opinions, unplanned procedures, inequality, unresolved issues, and not taking their opinions seriously in official relationships with school administrators. In informal relationships, issues such as excessive familiarity, injustice, and communication deficiencies were reported. Tuna and Türkmen (2015) found that individuals experiencing discrimination within an organization suffer from decreased productivity and lower job performance. These findings indicate that teachers' views on the discrimination by administrators point to organizational justice issues in schools. Organizational justice is defined as employees' belief in being treated fairly (Colquitt & Greenberg, 2003).

Cohen et al. (2009) emphasize that relationships within schools form the foundation of the school climate and should respect differences. Teachers in schools often differentiate themselves based on political views, gender, age, religion, and race. School administrators should treat teachers with different qualifications equally (Polat & Hiçyılmaz, 2017). From this perspective, organizational justice can be described as a concept related to how employees perceive fairness within an organization (İnce & Gül, 2005). When employees perceive they work in a fair environment, they are likely to show commitment to the organization and collaborate willingly. Conversely, if not, employees are likely to demonstrate low levels of commitment and cooperation, and their trust in the organization will be low (Cremers, 2004).

A key limitation of this study is its focus on the perspectives of teachers working in a single province of Turkey, many of whom had previous experience in different provinces. Due to the qualitative nature of the study and the limited sample size, the generalizability of the findings remains restricted. However, the insights obtained may provide valuable contributions to understanding school leadership dynamics and may inform futureresearch and policy development. The study's results could be informative not only for schools but also for other institutions that aim to improve management practices.

Conclusion and Recommendations

The findings of the study highlight significant issues regarding discriminatory behaviors in schools, their impact on teachers, and potentiel solutions to address these challenges. Discriminatory practices, including exclusion, favoritism, and unequal treatment, negatively affect teachers' motivation, job satisfaction, and organizational commitment. These behaviors often lead to workplace tension, feelings of loneliness, and hindered career

development. To mitigate these issues, the study underscores the importance of fostering organizational justice through transparent and fair practices. Recommendations include promoting ethical leadership, implementing performance-based evaluations, and creating a collaborative and inclusive school environment. Establishing trust and fairness within schools is essential to enhancing teacher well-being, motivation, and overall performance. The study's results could be informative not only for schools but also for other institutions that aim to improve management practices. Furthermore, the negative influence of politics on administrator-teacher relationships in schools should be addressed, and union affiliations should not take precedence in decision-making. School administrators must develop the ability to treat all teachers equitably, regardless of gender, culture, political ideology, or other factors. Clear policies to prevent discrimination in school environments should be implemented, and staff members should be actively involved in decision-making processes. The selection and training of school administrators should prioritize merit and qualifications to ensure effective leadership.

Ethics Committee Ethics committee approval was obtained from Inonu University Social and Human Sciences Scientific Academic Committee (Date: 06.01.2022, Number: E-2022-1/27).

Informed Consent: Written informed consent was obtained from pre-service teachers who participated in this study

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Innovativeness and Technological Pedagogical Content Knowledge in Physical Education: A Study of Teacher Competencies

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ABSTRACT

This research aimed to examine the innovativeness and Technological Pedagogical Content Knowledge (TPCK) levels of physical education and sports teachers (PE teachers) and to reveal the relationship between innovativeness and TPCK levels. The study sample comprises 182 PE teachers. “General Information Form,” “Innovativeness Scale (IS),” and “TPCK Scale” were used as data collection tools. General Information Form includes questions prepared to identify the PE teachers participating in the study variables of the gender (male and female), age (24-30 years, 31-40 years, and 41-50 years), professional experience (1-10 years and 11 years and above), the school level (secondary and high school), and educational status (undergraduate and graduate). PE teachers’ innovativeness and TPCK levels are above the scale average scores. There were no significant differences in innovativeness and TPCK levels regarding gender, age, professional experience, school level, and educational status ($p > .01$). A negative and positive relationship existed between the IS and its sub-dimensions and a positive relationship between the TPCK scale sub-dimensions ($p < .01$). The IS scores only showed a significant positive relationship with the sub-dimensions of CK and PCK ($p < .01$). PE teachers exhibit high levels of innovativeness and TPCK, so we recommend designing educational environments open to innovation and support technology.

Keywords: Education, innovation, pedagogy, teaching, technology.

Introduction

Education is a process that develops and changes individuals' behaviors while regulating their relationships with society (Ekici & Ekici, 2014). The success of educational activities depends on various factors, including the identification of educators' needs and the provision of services to meet these needs. Teachers should be trained as individuals proficient in the technology relevant to current conditions, possess subject-specific knowledge, and are competent in pedagogy (Gül, 2015). Recognizing their potential, updating their knowledge individually, and determining their levels of innovativeness and TPCK are crucial in addressing societal needs and resolving related problems.

Global changes and developments have required individuals to adapt to new circumstances and exhibit innovative attitudes that differ from other members of society (Yılmaz-Öztürk & Summak, 2014). This change in mindset and approach has become necessary to meet the changing conditions and challenges in the modern world. Individuals strive to live by the era's requirements, particularly the concept of innovation. Innovation, linked to knowledge, is defined as changing, taking risks, and even going beyond what is known (Demirel & Seçkin, 2008). The innovation concept has always taken its place as an auxiliary and supportive factor in achieving competitive advantage.

Individuals aware of their talents and skills can easily identify problems, produce solutions, provide the necessary opportunities, have high communication skills, and are open to innovations (Işık & Tükmendağ, 2016). Individual innovativeness refers to situations where an individual is open to new things, adaptable, positive, and open to experience (Korucu & Olpak, 2015). In addition to the situations mentioned here, there are many other areas where innovation is related and directly affects education and training processes. Recent studies have focused on how innovativeness can be used effectively in education. For example, Karahan and Gedik (2021) reported that participation in innovativeness-related training activities positively affected teachers' innovativeness levels. A significant positive correlation exists between innovativeness, self-confidence, and risk-taking (Karahan et al., 2021). The findings indicate a statistically important

positive correlation between teachers' innovativeness and their preference to utilize learner-centered instructional approaches and methods (Çetin, 2020). This suggests that more innovative teachers are more likely to adopt teaching strategies that empower and engage students in the learning process. Educators find all these concepts related to innovativeness crucial and connect them to technology.

Teachers with high levels of TPCK exhibit greater interest in educational technologies, develop behavioral intentions to use these technologies, and perceive themselves as more proficient in technology integration (Dikmen & Demirer, 2022). A moderate, positive, significant relationship exists between teachers' knowledge of technology, pedagogy, and classroom management skills (Ekici & Çoruk, 2019). A strong relationship has been identified between PE teachers' techno pedagogical competencies and instructional strategies in the educational environment (Türkeli, 2022). Sullivan et al. (2024) found that most teachers use limited digital technology in teaching Primary Physical Education, even though many examples of technology are used in the primary curriculum in all schools. The use of digital technologies in physical education can increase teachers' professional knowledge, strengthen their ability to monitor students' physical development and improve their communication skills with all actors in the educational process (Maksimović & Lazić, 2023).

Teachers must integrate their subject and pedagogical knowledge with technology, holistically approaching innovativeness and technology while practising their profession. The literature shows limited studies addressing the relationship between innovativeness and TPCK among PE teachers. Studies with the participation of primary and secondary school teachers in various branches (Çoklar & Özbek, 2017) and pre-service teachers in different fields (Çuhadar et al., 2013) reported a positive and significant relationship between innovativeness and TPCK. However, in these studies, different branches/fields were evaluated in the same group. Therefore, the fact that our sample consists of PE teachers reveals the specific contribution of our study. In the literature, studies examine the effect of gender and school level on innovativeness (Güngör, 2019) and the effect of age and professional experience on TPCK (Çar & Aydos, 2022). In our study, the variables of gender, age, professional experience, and school level were analyzed similarly; additionally, we examined the effect of educational status. The aim of our research is to examine PE teachers' innovativeness and TPCK levels and reveal the relationship between them. The importance of our research lies in determining teachers' levels of innovativeness and TPCK and providing recommendations based on these assessments.

Method

Research Model

Within the scope of quantitative research, the survey research model was preferred. Survey research is a study in which the opinions or characteristics such as interests, skills, abilities, talents, and attitudes of the participants in the research on a subject or event are determined and are conducted with more comprehensive samples compared to other research (Büyüköztürk et al., 2014).

Research Group

The research group comprised 182 (150 male, 32 female) voluntary PE teachers from Batman Provincial Directorate of National Education schools. The researchers used simple random sampling to ensure equal selection probability for each teacher. The study was conducted with permission from the Ministry of National Education in Turkey, and teachers provided informed consent. Descriptive values of PE teachers in the research group are given in Table 1.

Table 1.

Descriptive Values of PE Teachers

Descriptive Variables	Frequency(N=182)		Age(years)	
	n	N %	M	sd
Gender				
Male	150	82.4	33.43	5.87
Female	32	17.6	30.59	3.78
Age				
24-30 years	71	39.0	27.61	1.53
31-40 years	88	48.4	34.47	2.85
41-50 years	23	12.6	43.48	2.54
Professional experience				
1-10 years	131	72.0	30.26	3.77
11 years and above	51	28.0	39.78	3.50
School level				
Secondary school	106	58.2	32.68	5.57
High school	76	41.8	33.28	5.80
Educational status				
Undergraduate	164	90.1	32.85	5.71
Graduate	18	9.9	33.67	5.25

Data Collection Techniques and Tools

In this research, data were collected by the use of a questionnaire. The "General Information Form," the "Innovativeness Scale (IS)," and the "Technological Pedagogical Content Knowledge (TPCK) Scale" were used to gather the data. The researcher obtained permission to use the scale.

General Information Form

The form includes questions prepared to identify the PE teachers participating in the study variables of the gender (male and female), age (24-30 years, 31-40 years, and 41-50 years), professional experience (1-10 years and 11 years and above), the school level (secondary and high school), and educational status (undergraduate and graduate).

Innovativeness Scale

This study utilized the "Innovativeness Scale" instrument, which was originally developed by Hurt et al. (1977) and subsequently adapted for use in the Turkish context by Kılıçer and Odabaşı (2010). The scale has a total of 20 items and is a 5-point Likert type. The scale has a four-factor structure consisting of "Resistance to Change (RC)," "Opinion Leading (OL)," "Openness to Experience (OE)," and "Risk Taking (RT)." As a result of the scores, five categories are obtained: "Innovators" (above 80 points), "Early Adopters" (80-69 points), "Early Majority" (68-57 points), "Late Majority" (56-46 points), and "Laggards" (below 46 points). The internal consistency coefficient of the adapted scale was determined to be .82, and on the sample in this study, after reverse scoring, the negative items were calculated to be .77.

Technological Pedagogical Content Knowledge Scale

This study used the "Technological Pedagogical Content Knowledge Scale" developed by Horzum et al. (2014). The scale has a total of 51 items and is a 5-point Likert type. The scale has a seven-factor structure: "Technology Knowledge (TK)," "Pedagogical Knowledge (PK)," "Content Knowledge (CK)," "Technological Content Knowledge (TCK)," "Pedagogical Content Knowledge (PCK)," "Technological Pedagogical Knowledge (TPK)" and "Technological Pedagogical Content Knowledge (TPCK)" respectively. All scale items are positive, and the total score calculated from the sub-dimension shows the sub-dimension level. As the score increases, the level of the relevant sub-dimension also rises. The internal consistency coefficient of the developed scale is between 0.84-0.89 for the seven factors that make up the scale. The internal consistency coefficient was calculated as 0.94 for the sample in this study.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Sinop University Ethics Committee (Date: 27.12.2021, Number: 2021/145)
- Informed consent has been obtained from the participants.

Data Analysis

The data were analyzed by IBM SPSS 21.0., with a significance threshold of $p < .01$. Normality was assessed using the Kolmogorov-Smirnov test, which indicated that the data did not exhibit normal distribution characteristics. Mann-Whitney U, Kruskal-Wallis, and Spearman Correlation tests were used.

Results

Descriptive values of the innovativeness and TPCK levels of the teachers participating in the study are given in Table 2.

Table 2.

Descriptive Values of İnnovativeness and TPCK Levels

Scales (N=182)	Min.	Max.	M	sd
RC	9	38	19.37	5.91
OL	9	25	21.13	2.70
OE	6	25	21.26	2.85
RT	2	10	6.89	1.87
IS	37	89	71.91	8.94
TK	10	30	24.99	3.72
PK	9	35	30.37	3.10
CK	8	40	34.65	3.81
TCK	7	30	25.02	3.20
PCK	8	40	34.35	4.04
TPK	8	40	33.49	4.10
TPCK	9	40	33.34	4.36

*Abbreviations: "*Mean rank values are given, RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge"

According to the data in Table 2, teachers' mean scores of innovativeness and TPCK are above the scale average. The comparison of innovativeness and TPCK levels according to gender with the Mann-Whitney U test is given in Table 3.

Table 3.

Comparison of Innovativeness and TPCK Levels By Gender

Scales (N=182)	Male (n=150)	Female (n=32)	U	Z	*p*
RC	91.69	90.59	2371.000	-.107	.914
OL	92.00	89.16	2325.000	-.280	.780
OE	94.35	78.16	1973.000	-1.594	.111
RT	91.99	89.20	2326.500	-.276	.783
IS	91.67	90.72	2375.000	-.092	.926
TK	93.31	83.03	2129.000	-1.007	.314
PK	89.41	101.28	2087.000	-1.165	.244
CK	88.92	103.59	2013.000	-1.439	.150
TCK	92.16	88.42	2301.500	-.367	.714
PCK	92.27	87.91	2285.000	-.427	.669
TPK	91.85	89.88	2348.000	-.193	.847
TPCK	90.07	98.20	2185.500	-.796	.426

Abbreviations: "Mean rank values are given, RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge"

The data in Table 3 revealed that there was no statistically significant difference in the innovativeness and TPCK levels of PE teachers in relation to the gender variable. No significant difference was detected between the mean rank scores of male and female teachers in all sub-dimensions (p > .01). This finding shows no significant difference in PE teachers' innovativeness and TPCK levels according to gender. Therefore, it can be said that the gender variable does not significantly affect the innovativeness and TPCK levels of these teachers.

In comparing the innovativeness and TPCK levels of the teachers in the study according to their ages, the Kruskal-Wallis test was used and given, as seen in Table 4.

Table 4.

Comparison of Innovativeness and TPCK Levels According to Age

Scales (N=182)	24-30 years (n=71)	31-40 years (n=88)	41-50 years (n=23)	χ^2	p
RC	94.11	88.62	94.48	.513	.774
OL	83.46	99.90	84.15	4.410	.110
OE	83.56	97.62	92.61	2.869	.238
RT	90.09	95.47	80.67	1.565	.457
IS	83.78	98.73	87.67	3.308	.191
TK	99.54	85.26	90.54	2.925	.232
PK	91.56	93.11	85.13	.424	.809
CK	90.97	94.16	82.93	.850	.654
TCK	90.71	91.22	95.02	.123	.940
PCK	85.41	93.82	101.43	1.957	.376
TPK	97.11	86.87	91.91	1.497	.473
TPCK	93.78	90.52	88.22	.255	.880

*Abbreviations: "*Mean rank values are given, RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge"

Based on the data in Table 4, no significant difference in innovativeness and TPCK levels was observed among age groups. No significant difference was detected between the mean rank scores of teachers in the 24-30, 31-40, and 41-50 age groups in all sub-dimensions (p > .01). Therefore, the age variable does not significantly affect these teachers' innovativeness and TPCK levels.

Innovativeness and TPCK levels are compared according to professional experience with the Mann-Whitney U test and shown in Table 5.

Table 5.

Comparison of Innovativeness and TPCK Levels According to Professional Experience

Scales (N=182)	1-10 years (n=131)	11 years and above (n=51)	U	Z	p
RC	90.87	93.11	3258.500	-.258	.797
OL	91.72	90.93	3311.500	-.092	.927
OE	87.98	100.54	2879.500	-1.459	.145
RT	90.63	93.74	3226.500	-.362	.717
IS	91.20	92.26	3301.500	-.122	.903
TK	93.89	85.35	3027.000	-.987	.324
PK	92.16	89.81	3254.500	-.271	.786
CK	91.57	91.31	3331.000	-.030	.976
TCK	91.05	92.67	3281.000	-.188	.851
PCK	89.66	96.24	3099.000	-.760	.447
TPK	93.34	86.77	3099.500	-.758	.448
TPCK	92.03	90.13	3270.500	-.220	.826

Abbreviations: "Mean rank values are given, RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge"

Based on the data in Table 5, no statistically relevant difference was detected in the mean rank scores of innovativeness and TPCK levels in terms of professional experience variable. No significant difference was detected between the mean rank scores of 1-10 years and 11 years and above teachers in all sub-dimensions (p > .01). This finding shows that PE teachers' innovativeness and TPCK levels are the same according to professional experience.

The Mann-Whitney U test was used to compare the innovativeness and TPCK levels according to the level of the school they work in, as shown in Table 6.

Table 6.

Innovativeness and TPCK Levels According to School Level

Scales (N=182)	Secondary school(n=106)	High school(n=76)	U	Z	p
RC	87.33	97.31	3586.500	-1.263	.207
OL	88.66	95.46	3727.000	-.866	.387
OE	91.42	91.62	4019.000	-.026	.979
RT	92.75	89.76	3896.000	-.382	.702
IS	95.02	86.59	3655.000	-1.065	.287
TK	92.95	89.47	3874.000	-.442	.659
PK	92.77	89.72	3893.000	-.388	.698
CK	93.30	88.99	3837.500	-.547	.585
TCK	89.00	94.99	3763.000	-.762	.446
PCK	91.62	91.34	4015.500	-.036	.971
TPK	91.61	91.35	4016.500	-.033	.974
TPCK	94.20	87.74	3742.000	-.820	.412

Abbreviations: "Mean rank values are given, RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge"

Table 7.

Comparison of Innovativeness and TPCK Levels According to Educational Status

Scales (N=182)	Undergraduate (n=164)	Graduate (n=18)	U	Z	*p*
RC	92.50	82.42	1312.500	-.773	.440
OL	90.69	98.86	1343.500	-.630	.529
OE	91.30	93.36	1442.500	-.159	.873
RT	90.96	96.44	1387.000	-.426	.670
IS	90.51	100.53	1313.500	-.767	.443
TK	92.25	84.64	1352.500	-.585	.559
PK	89.95	105.61	1222.000	-1.205	.228
CK	90.49	100.72	1310.000	-.787	.431
TCK	90.54	100.28	1318.000	-.750	.453
PCK	89.89	106.17	1212.000	-1.251	.211
TPK	91.36	92.78	1453.000	-.109	.913
TPCK	92.29	84.33	1347.000	-.611	.541

Abbreviations: "Mean rank values are given, RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge"

From the data in Table 6, no significant difference in the innovativeness and TPCK levels of PE teachers according to school level. No significant difference was detected between the average scores of secondary and high school teachers in all sub-dimensions ($p > .01$). This finding shows that PE teachers' innovativeness and TPCK levels are the same depending on the school level at which they work. Therefore, the school level variable does not significantly affect these teachers' innovativeness and TPCK levels.

When comparing the innovativeness and TPCK levels according to their educational status, the Mann-Whitney U test was used, as shown in Table 7.

According to the data in Table 7, there was no significant difference in PE teachers' innovativeness and TPCK levels according to educational status. No significant difference was detected between the average scores of undergraduate and graduate teachers in all sub-dimensions ($p > .01$). This finding shows no significant difference in PE teachers' innovativeness and TPCK levels according to their educational status. Therefore, the educational status variable does not significantly affect the innovativeness and TPCK levels of these teachers.

The relationship between innovativeness and TPCK levels of the teachers in the study and sub-dimension and scale total scores was analyzed using the Spearman correlation test, as shown in Table 8.

Table 8.

The Relationship Between Innovativeness and TPCK Levels Sub-Dimension and Scale Total Scores

	1	2	3	4	5	6	7	8	9	10	11	12
1.RC	1.000	-.113	-.316**	-.034	-.818**	-.008	.048	-.069	.119	-.038	.099	.043
		.130	.000	.645	.000	.910	.517	.358	.110	.607	.184	.563
2.OL		1.000	.462**	.051	.514**	.307**	.229**	.114	.139	.165	.135	.248**
			.000	.491	.000	.000	.002	.126	.061	.026	.069	.001
3.OE			1.000	.212**	.655**	.345**	.209**	.257**	.318**	.276**	.268**	.268**
				.004	.000	.000	.005	.000	.000	.000	.000	.000
4.RT				1.000	.286**	.044	.122	.153*	.212**	.271**	.097	.017
					.000	.559	.101	.039	.004	.000	.192	.821
5.IS					1.000	.179	.120	.199**	.082	.213**	.035	.107
						.016	.108	.007	.272	.004	.640	.149
6.TK						1.000	.280**	.278**	.475**	.235**	.452**	.512**
							.000	.000	.000	.001	.000	.000
7.PK							1.000	.412**	.294**	.457**	.399**	.339**
								.000	.000	.000	.000	.000
8.CK								1.000	.360**	.405**	.356**	.377**
									.000	.000	.000	.000
9.TCK									1.000	.269**	.574**	.524**
										.000	.000	.000
10.PCK										1.000	.312**	.264**
											.000	.000
11.TPK											1.000	.583**
												.000
12.TPCK												1.000

Abbreviations: "RC=Resistance to Change, OL=Opinion Leading, OE=Openness to Experience, RT=Risk Taking, IS=Innovativeness Scale, TK=Technology Knowledge, PK=Pedagogical Knowledge, CK=Content Knowledge, TCK=Technological Content Knowledge, PCK=Pedagogical Content Knowledge, TPK=Technological Pedagogical Knowledge, TPCK=Technological Pedagogical Content Knowledge, **$p < .01$"

When Table 8 is examined, according to the correlation analysis, it is understood that the relationship between the innovativeness scale and the other sub-dimensions is statistically negative and positively significant, while the relationship between the sub-dimensions of the TPCK scale is statistically positive ($p < .01$).

Discussion

When we consider the teachers' total mean scores of the IS, we understand from the data that they fall into the Early Adopters category, which ranks second among the five innovativeness categories. Their scores are above the scale average. The innovativeness levels of coaches and PE teachers are in the categories of Early Adopters, like our study (Atılgan & Tükel, 2021). We found that the scores of the participating teachers in each sub-dimension of the TPCK scale were higher than the sub-dimension average scores; therefore, their TPCK levels were above average. Baert and Stewart (2014) states that the level of perceptions toward TPCK is high among physical education teacher candidates, which aligns with our study's results. In contrast to the results of our study, Trabelsi et al., (2022) found that Tunisian physical education teachers have little knowledge about using information and communication technologies as a teaching tool, and their TPCK is low, but they state that technological competencies are valuable in the teaching-learning process. Regarding pre-service teachers, TPCK and its components are significantly higher in Australia than in Israel (Redmond & Peled, 2018). We see that the levels of TPCK differ according to the countries, and the unique characteristics of each country may explain the reason for this situation.

"H_{01}: The gender of PE teachers has no effect on their innovativeness and TPCK levels." hypothesis is accepted.

According to the data in Table 3, we understand that there is no statistically significant difference ($p > .01$) between male and female teachers' mean innovativeness scores when we analyze the IS regarding the gender variable. We can attribute this to the fact that increasing gender equality in educational and professional settings fosters similar opportunities and attitudes toward innovativeness for both males and females. Like our study, gender did not affect the level of innovativeness in the research in which Erzurum Provincial Directorate of Youth Services and Sports personnel participated (Kulanşi, 2019). In a different study involving coaches and PE teachers (Atılgan & Tükel, 2021), it is stated that men have higher scores in the RT sub-dimension of the IS sub-dimensions according to gender and statistically differ from women, while there is no statistical difference in other sub-dimensions. Although we found no statistical difference in our study, we observed that male teachers scored higher than female teachers in the risk-taking sub-dimension. We can suggest that social life and cultural structure are among the reasons men can take more risks.

TPCK in terms of gender variable, it is understood from the data in Table 3 that there is no statistically significant difference ($p > .01$) between the scale score rank averages of males and females. We can attribute this situation to factors such as equality of educational opportunities, offering professional development programs regardless of gender, and similarities in access to technological tools. Studies involving PE teachers (Akkaya, 2021; Çar & Aydos, 2022) and teachers working in primary schools (Çam & Saltan, 2019), the statistical evaluation indicated no significant difference in TPCK according to gender.

"H_{02}: Age of PE teachers has no effect on their innovativeness and TPCK levels." hypothesis is accepted.

The data in Table 4 show no statistical difference between the mean rank scores on the IS when analyzed in terms of age variable ($p > .01$). We can attribute this situation to factors such as the prevalence of access to innovativeness and information in all age groups, continuous professional development programs for all teachers, and the promotion of innovative approaches in educational institutions. In addition, individual and professional motivation may affect the tendency to be innovative, regardless of age. In their study in which coaches and PE teachers participated, Atılgan and Tükel (2021) found a difference only in the RC sub-dimension and did not observe any differences in other sub-dimensions.

The data in Table 4 show that there is no statistically significant difference in the mean scores of TPCK when analyzed in terms of age variable ($p > .01$). The fact that teachers' age has no effect on their TPCK may be due to the fact that individuals can adapt to the use of technology at any age. Differently from our study, the age variable of PE teachers affects their TPCK (Tanucan et al., 2021). Ekici and Çoruk (2019) found a statistically meaningful difference in PK and PCK of teachers according to age, but there was no appreciable difference in the other sub-dimensions. Evaluating the studies in the literature, we see that there is a difference in a few sub-dimensions, but since the scale has seven sub-dimensions, age has no effect on the majority of sub-dimensions, which is consistent with our study.

"H_{03}: Professional experience of PE teachers has no effect on their innovativeness and TPCK levels." hypothesis was accepted.

The data in Table 5 show that there is no statistically significant difference ($p > .01$) between the mean rank scores when analyzing innovativeness in terms of the professional experience variable. We can attribute the lack

of difference in innovativeness based on the professional experience variable to the similarity in views on innovativeness, regardless of the years of professional experience. Atılgan and Tükel (2021) found no statistically significant difference in innovativeness between coaches and teachers, according to the variable of professional experience.

Table 5 shows no notable statistical difference was found in the mean rank scores when TPCK is analyzed in terms of the professional experience variable ($p > .01$). The fact that it is much easier to access technology today and the use of similar technologies in education may be the reason why professional experience does not affect TPCK. Teachers working for many years must also master the currently used instructional technologies. Çar and Aydos (2022) found that PE teachers' professional seniority did not affect their TPCK. Contrary to our study's findings, other studies indicate that professional experience affects knowledge of technology, field, and pedagogy. Tanucan et al. (2021) found that the teaching experience of physical education teachers (1-3 years, 4-9 years, 10-24 years, and 25+ years) affects their TPCK. The difference from our study's results may be due to the different year levels used to determine the teaching experience groups.

"H_{04}: The school levels where PE teachers work have no effect on their levels of innovativeness and TPCK." hypothesis was accepted.

When the innovativeness of the teachers is measured in terms of the school level variable, it is understood from the data in Table 6 that there is no statistically significant difference ($p > .01$) between the mean rank scores. Uniformity in professional development opportunities and access to technological resources across different school levels may explain the lack of a statistically significant difference in individual innovativeness based on the school level variable. Similar to our study, Güngör (2019) found that the type of school does not affect the level of innovativeness.

When the TPCK of the teachers in terms of the school level they work in is analyzed, it is understood from the data in Table 6 that there is no statistically significant difference ($p > .01$) between the mean scores. Similar instructional technologies are used at the secondary and high school levels, and the facilities of the schools do not differ. For these reasons, the fact that PE teachers work in secondary or high schools does not affect their TPCK level. Çam and Saltan (2019) stated in their study that there is no statistically significant difference in TPCK according to the primary and secondary school levels.

"H_{05}: The educational level of PE teachers has no effect on their innovativeness and TPCK levels." hypothesis was accepted.

The data in Table 7 indicate that there is no statistically significant difference ($p > .01$) between the mean rank scores when examining innovativeness in terms of the educational status variable. We can attribute the lack of effect of teachers' undergraduate or postgraduate education on their innovativeness levels to the similarity of in-service training and seminars received by teachers. Contrary to the findings in our study, there are studies in the literature in which educational status affects innovativeness. Atılgan and Tükel (2021) found that there was a statistically significant difference in RC, OL, and OE among the sub-dimensions of the IS according to the education level variable in their sample consisting of coaches and PE teachers.

Analyzing TPCK regarding educational status, it is evident from the data in Table 7 that there is no statistically significant difference between the mean scores ($p > .01$). We can attribute the lack of impact of the educational status variable on the level of TPCK to teachers receiving technology and pedagogy-based education at the undergraduate level and focusing on more academic and specialized fields of study at the graduate level. Higher education graduation (bachelor's, master's, and doctorate) of physical education teachers affects their TPCK except for the technological knowledge sub-dimension (Tanucan et al., 2021); the reason for the difference from the results in our study may be thought to be due to different education systems.

"H_{06}: There is no relationship between PE teachers innovativeness and TPCK levels." hypothesis was partially accepted.

According to the results of the correlation analysis, it is understood from the data in Table 8 that there is a statistically significant negative and positive relationship between the IS and other sub-dimensions and a statistically significant positive relationship between the sub-dimensions of the TPCK scale ($p < .01$). There is a negative relationship between RC and OE among the sub-dimensions of the IS because individuals who close themselves by showing resistance to change are not open to change and are closed to innovation. Similarly, a negative relationship exists between RC and the IS total. We found that the total scores of the IS showed a statistically significant positive relationship only with the sub-dimensions of CK and PCK. Innovative teachers are generally more competent in their content and how to teach this content. This innovative attitude does not have a direct effect on teachers' ability to use technology or their ability to integrate technology into

their teaching processes. In the levels of TPCK, we can attribute the fact that all sub-dimensions are positively correlated with each other to the increase in PK at the same time as the increase in TK and the increase in CK. Like our study, Gökbulut (2021) found a positive and statistically significant relationship between all sub-dimensions of teachers' TPCK.

Conclusion and Recommendations

In summary, the majority of participants were male, in the 31-40 age group, with 1-10 years of experience, employed at secondary schools, and having undergraduate degrees. Gender (male and female), age (24-30 years, 31-40 years, and 41-50 years), professional experience (1-10 years and 11 years and above), school level (secondary school and high school), and educational status (undergraduate and graduate) variables do not have any effect on innovativeness and TPCK levels of PE teachers. As a result of examining the relationship between PE teachers' innovativeness and TPCK levels, a negative and positive relationship was found between the IS and its sub-dimensions, a positive relationship between the IS and the CK and PCK sub-dimensions, and a positive relationship between the TPCK Scale sub-dimensions.

The study's main limitations include the sample size (number of participants) and the distribution of participants by gender. The fact that the research data (2021-2022 academic year) was collected during the pandemic (SARS-CoV-2) period has a restrictive effect. PE teachers exhibit high levels of innovativeness and TPCK, so we recommend designing educational environments open to innovation and support technology. In future studies on innovativeness and TPCK, variables such as gender, age, professional experience, school level, and educational status may not need to be prioritized. For example, the same innovativeness training can be provided to both male and female teachers without modifications. It would be helpful to create sharing environments with a high level of participation by developing online environments or different projects that allow teachers to produce innovative ideas and improve their TPK levels. The reasons for the non-correlation between teachers' innovativeness levels and their ability to use technology or integrate technology into teaching processes can be searched.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Sinop University (Date: December 27, 2021, Decision Number: 2021/145).
Informed Consent: Verbal consent was obtained from all the participants.
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Determining the Effect of Peer Mentoring Programme Applied to Nursing Students on Perceived Stress and Adaptation to University Life: A Quasi - Experimental Study

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ABSTRACT

Beginning university is an important change for most young people, but it can limit relationships with family and friends. The purpose of this study was to determine the effect of a peer mentoring programme on the perceived stress and adaptation to university life of nursing students studying at a newly established nursing education institution. This study used a 'pre-test and post-test non control group' design, one of the quasi-experimental research methods. Data were collected using the Introductory Information Form, the Perceived Stress Level Scale and the Adaptation to University Life Scale. Parametric tests were employed in data analysis. Descriptive characteristics of the participants were presented as frequency, percentage, and mean. For normally distributed data, the independent samples t-test was used to analyze two-group comparisons, and the One-Way ANOVA test was used for comparisons involving more than two groups. The mean age of the nursing students who underwent peer mentoring was 19.6 years, 64% of the students were female, 60.8% were first year students (mentees) and more than a third (33.6%) had no information about peer mentoring. The outcomes obtained in this study reveal the effectiveness of the peer mentoring programme. Implementation of the peer mentoring programme decreased the perceived stress level of nursing students and increased their adaptation to university life.

Keywords: Nursing education, peer mentoring, adaptation to university life, perceived stress university life, perceived stress.

Introduction

The transition to university represents a significant change for many young people, potentially limiting their relationships with family members, pre-university peers and new peers they encounter at university. University freshmen are confronted with various stressors, including separation from family, adaptation to a different academic system, and acclimatization to a new environment. Universities implement counseling services to support students in managing the challenges of university life, and the demand for these services increases steadily (Brewster et al., 2014; Thorley, 2017; Williams et al., 2015). Furthermore, universities are equipped to apply peer support and mentoring programs to enable students to manage stress and transition effectively into the university setting (Lillekroken et al., 2024; Zhou et al., 2023).

Text Peer mentoring is a relational process in which a more experienced individual (mentor) is capable of contributing to the professional and personal development of a les experienced individual (mentee) (Otu, 2024). Peer mentoring programs, encompassing peer support practices, constitute a sustainable and cost-effective opportunity to support first-year university students. These programs are shown to yield diverse benefits, including enhanced academic performance, improved adaptation to university life, an increased sense of belonging, reduced perceived stress levels, and greater mental well-being (Kachaturoff et al., 2020; Lillekroken et al., 2024; Pointon et al., 2024). Moreover, peer mentoring programs facilitate participation in volunteer activities, augment social, communication, and organizational skills, and bolster self-confidence among university students (Crisp et al., 2020). Peer mentoring represents an informal but commonly favoured support mechanism among university students. Peer support renders students capable of achieving individual, social, and academic integration into their universities. Promoting teamwork and peer support within university settings is deemed essential to enhancing communication and interaction among students (Le et al., 2024; Mikkonen et al., 2020).

The review of national and international literature indicates that descriptive studies exist which evaluate university students' adaptation to university life and their perceived stress levels (Aslan, 2015; Cuesta-Martínez et al., 2024; Dogan, 2021; Konakçı et al., 2021; Sonmez & Gurbuz, 2022). Additionally, studies are conducted to assess the impact of peer mentoring programs on students' academic success (Kim et al., 2021; Venegas-Muggli et al., 2023) and their influence on psychological empowerment and satisfaction (Al Yahyaei et al., 2024; Amer et al., 2021). However, no studies are identified that implement and evaluate a peer mentoring program with the aim of enhancing students' adaptation to university life while simultaneously reducing their perceived stress levels. This situation constitutes the originality of the present study.

The institution where this study is conducted commenced its educational activities one year prior to the initiation of the study. Consequently, first-year nursing students enrolled during the study period are designated as mentees within the implemented peer mentoring program, while second-year students are appointed as mentors. Ordinarily, in peer mentoring programs at undergraduate institutions, first-year students assume the role of mentees, and third-year students undertake the role of mentors (Lillekroken et al., 2024; Otu, 2024). Nonetheless, in the absence of third-year students within the nursing department, second-year students are assigned the role of mentors. The health school affiliated with the nursing department is situated in a rural region characterized by low population density and limited social facilities. Therefore, the implementation of a peer mentoring program in the nursing department is considered a facilitating factor for first-year students transitioning to university. Through this program, first-year students are enabled to form new friendships and derive the benefits provided by the peer mentoring initiative.

Purpose of the Study

The purpose of this study is to determine the effect of a peer mentoring programme on perceived stress and adaptation to university life among nursing students enrolled in a newly established nursing education institution

To reach the purpose of the research, answers were sought to the following research questions:

- Does the peer mentoring programme implemented for nursing students enrolled in a newly established nursing education institution affect their perceived stress levels?
- Does the peer mentoring programme implemented for nursing students enrolled in a newly established nursing education institution affect their adaptation to university life?

Method

Research Model

In this study, the "pretest-posttest design without a control group," one of the quasi-experimental research methods, was utilized. Quasi-experimental research is a study design that evaluates whether a program or intervention produces the intended effect on the participants involved in the research (Polit & Beck, 2014). For these reason, in this study, the quasi-experimental research was used since the effect of a peer mentoring programme on perceived stress and adaptation to university life among nursing students.

Study Group

The study population consisted of first-year (79 students) and second-year (55 students) nursing students enrolled in the 2022-2023 academic year at Yozgat Bozok University School of Health. No sampling method was applied, and the entire population was included in the sample group. The inclusion criteria for the study were being enrolled in the program between October 2022 and May 2023 and agreeing to participate in both the peer mentoring programme and the study. Initially, all students agreed to participate in the study. However, during the study, three first-year and six second-year students who did not continue the programme or failed to complete the posttest form were excluded. The study was completed with a total of 125 students.

Prior to implementing the peer mentoring programme, information about the programme and the study was provided to the nursing students enrolled in the newly established nursing institution. Pretest data for the study were collected using data collection tools before the start of the programme. Posttest data were collected at the end of the peer mentoring programme in May of the 2022-2023 academic year.

Data Collection Tool

The research data were collected using the "Demographic Information Form," the "Perceived Stress Scale," and the "University Life Adaptation Scale."

Demographic Information Form: This form was developed by the researchers based on the literature (Crisp et al., 2020; Horgan et al., 2013; Lillekroken et al., 2024; Pointon et al., 2024). It consists of five questions regarding the socio-demographic characteristics of the students (age, gender, and grades) and their knowledge about peer

mentoring.

Perceived Stress Scale: This scale was developed by Cohen et al., (1983) and consists of 14 items. The Perceived Stress Scale is designed to measure the extent to which individuals perceive certain situations in their lives as stressful. It includes questions such as, "In the last month, how often have you been upset because of something unexpected?" This measurement tool is a 5-point Likert scale, where each item is rated from "Never (0)" to "Very Often (4)." Seven items containing positive statements are reverse scored. The scale, which has no sub-dimensions, is evaluated based on the total score. It contains seven items with negative statements. The Turkish validity and reliability study of the scale was conducted by Eskin et al. (2013). The total score obtained from the scale indicates the individual's level of stress. Scores between 11–26 indicate low stress levels, 27–41 indicate moderate stress levels, and 42–56 indicate high stress levels. Eskin et al. (2013) found the internal consistency of the scale to be .86, while in this study, the internal consistency was found to be .82 (Eskin et al., 2013).

University Life Adaptation Scale: This scale, developed and validated by Aslan (2015), consists of three sub-dimensions: "Personal Adaptation," "Social Adaptation," and "Academic Adaptation." The scale includes 60 items and is a 5-point Likert-type measurement tool rated as "Strongly Agree," "Agree," "Undecided," "Disagree," and "Strongly Disagree." Higher scores indicate better adaptation, while lower scores indicate poor adaptation. In Aslan's (2015) study, the internal consistency of the scale was found to be between .89 and .92. In this study, the internal consistency was found to range from .95 to .97.

Implementation of the Peer Mentoring Programme

The faculty member responsible for the peer mentoring programme, along with the research team, introduced the programme in October 2022. During this introduction, details regarding the programme's content, implementation process, and expectations from both mentor and mentee students were explained. Pretest data for the study were collected prior to the programme introduction. In the programme, mentees and mentors were paired by the faculty member responsible, ensuring factors such as gender or academic performance were not considered as criteria. Some mentors were paired with one mentee, while others were paired with two, facilitating interaction among students. Monthly follow-ups were conducted to support these interactions. During these follow-ups, the nature of their interactions, topics in which they supported or did not support each other, and any challenges encountered during the process were evaluated. Mentors were encouraged to communicate with their mentees regardless of whether the mentees actively sought support. The programme continued for eight months.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Yozgat Bozok University University Social and Humanitarian Ethics Committee (Date: 19.10.2022, Number: E-37/28)
- Informed consent has been obtained from students who participated in this study.

Data Analysis

The statistical analysis of the study was conducted using the "SPSS 25.0" software package. To assess whether the data followed a normal distribution, the Kolmogorov-Smirnov test was used, and it was determined that the data did follow a normal distribution. Parametric tests were employed in data analysis. Descriptive characteristics of the participants were presented as frequency, percentage, and mean. For normally distributed data, the independent samples t-test was used to analyze two-group comparisons, and the One-Way ANOVA test was used for comparisons involving more than two groups. To compare pretest and posttest mean scores of the peer mentoring programme, the Paired samples t-test was applied. A significance level of $p < .05$ was considered statistically.

Results

As shown in Table 1, the nursing students who participated in the peer mentoring programme had a mean age of 19.6 years (min: 18; max: 26). Of the students, 64% were female and 36% were male. Additionally, 60.8% were first-year students (mentees), while 39.2% were second-year students (mentors). More than one-third of the students (33.6%) reported having no prior knowledge about peer mentoring.

Table 2, which compares the pre- and post-program mean scores of nursing students on the subdimensions and total score of the University Life Adaptation Scale as well as the Perceived Stress Scale, shows the following findings; The mean score on the Perceived Stress Scale was 28.05 ± 7.60 before the peer mentoring programme and 27.12 ± 5.82 after the programme. No statistically significant difference was observed between the pre- and post-programme mean scores for perceived stress ($p > .05$)

Table 1.
Socio-Demographic Characteristics of the Students (n=125)

	n	%
Age	19.60±1.33 (min:18;max:26) year	
Gender		
Female	80	64.0
Male	45	36.0
Peer Mentoring Status		
Mentee (First-year)	76	60.8
Mentor (Second-year)	49	39.2
Knowledge of Peer Mentoring		
Knowledgeable	38	30.4
Partially knowledgeable	45	36.0
Unknowledgeable	42	33.6

The mean score for the personal adaptation subdimension was 63.28 ± 16.06 before the programme and 64.44 ± 15.47 after the programme. No statistically significant difference was found between the pre- and post-programme mean scores for personal adaptation ($p > .05$). The mean score for the social adaptation subdimension was 78.67 ± 13.37 before the programme and 78.90 ± 14.90 after the programme. No statistically significant difference was observed between the pre- and post-programme mean scores for social adaptation ($p > .05$).

The mean score for the academic adaptation subdimension was 28.05 ± 7.60 before the programme and 78.72 ± 12.77 after the programme. No statistically significant difference was found between the pre- and post-programme mean scores for academic adaptation ($p > .05$). The total mean score on the University Life Adaptation Scale was 220.68 ± 36.57 before the programme and 221.95 ± 37.60 after the programme. No statistically significant difference was found between the pre- and post-programme total mean scores ($p > .05$).

The findings indicate that the peer mentoring programme improved the students' adaptation to university life, including academic, social, and personal adaptation. Furthermore, the students' perceived stress levels showed a reduction. However, these changes were not statistically significant ($p > .05$). While no statistically significant differences were observed between pre- and post-test scores for the total and subdimension scores of the University Life Adaptation Scale and the Perceived Stress Scale, post-test mean scores were consistently higher than pre-test mean scores.

Table 2.
Comparison of the Mean Scores of the University Life Adaptation Scale Subdimensions, Total Score, and Perceived Stress Scale Before and After the Peer Mentoring Programme (n=125)

Scale Score		*Mean Score ± SD*	*Median (min-max)*	*t*	*p*
Perceived Stress Scale Score	Pre-test	28.05 ± 7.60	27 (10 - 43)	-1.057	.290
	Post-test	27.12 ± 5.82	28 (6 - 45)		
Personal Adaptation Sub-dimension Score	Pre-test	63.28 ± 16.06	65 (26 - 91)	-.495	.621
	Post-test	64.44 ± 15.47	68 (26 - 95)		
Social Adaptation Sub-dimension Score	Pre-test	78.67 ± 13.37	82 (46 - 100)	-.198	.843
	Post-test	78.90 ± 14.90	80 (23 - 100)		
Academic Adaptation Sub-dimension Score	Pre-test	78.05 ± 7.60	78 (6 - 45)	-.187	.852
	Post-test	78.72 ± 12.77	81 (42 - 100)		
Total University Life Adaptation Scale Score	Pre-test	220.68 ± 36.57	225 (143 - 279)	-.253	.800
	Post-test	221.95 ± 37.60	228 (71 - 294)		

*Abbreviations: t: Paired samples t-test , *:p < .05, SD: Standard Deviation*

Table 3.

Comparison of the Mean Scores of the University Life Adaptation Scale Total Score, Subdimensions, and Perceived Stress Scale Based on Gender, Role in the Peer Mentoring Programme, and Knowledge of Peer Mentoring

		Gender		*Peer Mentoring Status*		*Knowledge of Peer Mentoring*		
		Female	Male	Menti (1. sınıf)	Mentör (2. sınıf)	Knowledgeable	Partially knowledgeable	Unknowledgeable
Perceived Stress Scale Score	Pre-test	29.36±6.54	27.48±6.10	27.48±7.45	28.93±7.84	27.02±5.70	29.24±7.57	28.42±7.64
	Post-test	26.92±5.68	25.73±8.81	26.19±6.21	28.52±7.87	26.23±7.47	27.66±6.21	26.64±5.59
	n	80	45	76	49	38	45	42
	t	-2.519		-2.262			F: 3.462	
	p	.012*		.025*			.701	
Personal Adaptation Sub-dimension Score	Pre-test	63.21±15.28	60.37±17.63	63.51± 17.17	62.81±17.19	62.76±17.61	61.40±17.08	61.72±14.72
	Post-test	64.92±14.97	66.62±15.74	65.48±14.28	62.93±14.32	69.52±17.82	62.68±13.16	65.78±13.28
	n	80	45	76	49	38	45	42
	t	-1.397		.941			F: 3.092	
	p	.162		.348			.049*	
Social Adaptation Sub-dimension Score	Pre-test	79.33±14.45	77.04±13.01	79.19± 17.05	76.12±11.81	77.86±13.84	75.31±15.65	78.54±13.23
	Post-test	79.58±13.56	78.13±15.81	80.31±14.12	78.44±10.91	83.55±14.87	79.40±11.38.	78.62±13.23
	n	80	45	76	49	38	45	42
	t	-1.128		1.674			F: 3.283	
	p	.875		.097			.041*	
Academic Adaptation Sub-dimension Score	Pre-test	79.71±11.41	76.02±12.06	79.09±14.46	74.85±12.65	79.02±13.34	79.33±11.48	77.33±11.56
	Post-test	80.25±12.99	76.64±15.64	81.22±12.30	77.85±10.80	82.57±15.06	76.44±12.22	77.80±13.78
	n	80	45	76	49	38	45	42
	t	-1.953		1.674			F: .167	
	p	.041*		.097			.846	
Total University Life Adaptation Scale Score	Pre-test	222.26±34.60	213.44±36.99	223.77±41.31	213.91±34.42	219.65±40.20	214.44±36.38	217.59±32.30
	Post-test	224.76±35.92	221.40±42.83	225.05±37.46	219.12±31.18	235.65±41.53	220.13±32.16	222.21±38.38
	n	80	45	76	49	38	45	42
	t	-1.672		2.793			F: 3.875	
	p	.095		.006			.023*	

*Abbreviations: t: Independent Samples t-test, F: One way anova test, *:p < . 05*

As shown in Table 3, there is a statistically significant difference between the gender of nursing students and their perceived stress scale scores and academic adaptation subdimension scores before and after the peer mentoring programme ($p < .05$). These results indicate that the peer mentoring programme reduced the perceived stress levels of female students more than male students and increased the academic adaptation subdimension scores of male students more than female students.

Additionally, a statistically significant difference was found between the role of nursing students in the peer mentoring programme (mentor or mentee) and their perceived stress scale scores before and after the programme ($p < .05$). This finding suggests that the programme reduced perceived stress levels of mentees more than those of mentors. A statistically significant difference was also found between students' knowledge of peer mentoring and their personal adaptation subdimension scores, social adaptation subdimension scores, and total scores on the University Life Adaptation Scale before and after the programme ($p < .05$). This result indicates that the peer mentoring programme increased the personal and social adaptation subdimension scores and total adaptation scores of students who were knowledgeable about peer mentoring more than those who had partial or no knowledge.

Additionally, a statistically significant difference was found between the role of nursing students in the peer mentoring programme (mentor or mentee) and their perceived stress scale scores before and after the programme ($p < .05$). This finding suggests that the programme reduced perceived stress levels of mentees more than those of mentors. A statistically significant difference was also found between students' knowledge of peer mentoring and their personal adaptation subdimension scores, social adaptation subdimension scores, and total scores on the University Life Adaptation Scale before and after the programme ($p < .05$). This result indicates that the peer mentoring programme increased the personal and social adaptation subdimension scores and total adaptation scores of students who were knowledgeable about peer mentoring more than those who had partial or no knowledge.

Table 4.
Examination of the Relationship Between University Life Adaptation Scale Total Scores, Subdimension Scores, and Perceived Stress Scale Scores

		Perceived Stress Scale Score
Personal Adaptation Sub-dimension Score	r	-.420
	p	.000*
	n	125
Social Adaptation Sub-dimension Score	r	-.057
	p	.475
	n	125
Academic Adaptation Sub-dimension Score	r	-.695
	p	.027*
	n	125
Total University Life Adaptation Scale Score	r	-.491
	p	.004*
	n	125

*Abbreviations: r: Pearson Korelasyonu, *:p < .05*

As shown in Table 4, a negative and high-level correlation was found between the personal adaptation subdimension scores, academic adaptation subdimension scores, and total University Life Adaptation Scale scores and the perceived stress scale scores of nursing students ($p < .05$). After the peer mentoring programme, it was observed that nursing students with higher personal adaptation, academic adaptation, and total adaptation scores exhibited lower perceived stress levels.

Discussion

This study, conducted at a newly established nursing education institution, suggests that the peer mentoring programme reduced the perceived stress levels of nursing students and enhanced their adaptation to university life. Jacobsen et al. (2022), in their meta-analysis, found that peer mentoring programmes empower students in becoming professional nurses, facilitate their clinical adaptation, and are beneficial for both mentees and mentors when planned effectively. Within the framework of the peer mentoring programme, the social interaction between mentees and mentors, which extends beyond academic support to include personal and social adaptation, is believed to have contributed to reducing students' perceived stress levels and improving their adaptation to university life.

Similarly, Seshabela et al. (2020) conducted a qualitative study with 20 nursing students, examining their perspectives on the role of peer mentoring programmes in fostering professional relationships within a supportive environment. They found that mentor students significantly contributed to mentees' ability to develop professional relationships by providing appropriate support during nursing education and practice. Additionally, Bahari (2024) in their quantitative study evaluating the effectiveness of a peer mentoring programme implemented for nursing students, reported that mentees exhibited improvements in problem-solving skills, adaptation to the university environment, self-awareness, and self-confidence, and became more effective in building positive relationships with their mentors. Consistent with the findings in the literature, this study also found that the peer mentoring programme implemented in the nursing department resulted in reduced perceived stress levels and improved adaptation to university life.

Being a nursing student in a newly established institution located in a region with limited social opportunities can be a source of stress for students. The peer mentoring programme provided a supportive environment for these students, which is believed to have contributed to reduced perceived stress levels and improved university life adaptation.

In this study, female students participating in the peer mentoring programme showed a greater reduction in perceived stress levels compared to male students, while male students demonstrated greater improvement in academic adaptation levels compared to female students. Similar findings were reported in the study by Aslan and Erci (2021). The higher number of female students in this study may have influenced these results.

In a study conducted by Kiye et al. (2020) with students from an education faculty, they found that the peer mentoring programme they implemented increased students' adaptation to university life. Similarly, Sune (2023) found in their study that the peer mentoring programme positively impacted students' sense of belonging to the university and their adaptation. Similar results were obtained in this study as well. It is believed that the interaction with different individuals during the programme, as well as mentees feeling supported by their mentors when encountering problems, led to these outcomes.

Conclusion and Recommendations

The results obtained in this study revealed that nursing students did not have sufficient knowledge about the peer mentoring programme. With the implementation of the peer mentoring programme, it was found that the students' perceived stress levels decreased, and their adaptation to university life improved. This adaptation was observed across all sub-dimensions: personal, social, and academic. The programme was particularly effective in

reducing perceived stress levels more significantly in female students compared to male students, and in mentee students compared to mentors. Additionally, the peer mentoring programme increased the academic adaptation levels of female students more than male students. Students who had knowledge about the peer mentoring programme showed greater improvements in personal adaptation, social adaptation, and overall university life adaptation after the programme compared to students with less or no knowledge of the programme.

The results of this study show that the peer mentoring programme enhances nursing students' adaptation to university life, personal and academic adaptation, and reduces their perceived stress levels. The findings from the existing literature and this study indicate that the peer mentoring programme brings about highly beneficial changes in the development of students in nursing education. Therefore, all institutions offering nursing education, particularly those introducing nursing education, should integrate the peer mentoring programme into their educational systems and monitor the outcomes to ensure the programme's sustainability. There is a limited number of intervention studies related to peer mentoring in nursing departments in national and international literature. This suggests the need for further research to evaluate the effectiveness of peer mentoring interventions.

In this study, due to the absence of third-year nursing students during the research period, second-year students were selected as the mentor group. This represents a limitation of the study. Additionally, data was not collected from nursing students not involved in the peer mentoring programme or from students in other departments of the same institution who had the opportunity to observe the mentors and mentees. This is another limitation of the study. The findings of this study reflect only the students from the nursing education institution where the research was conducted. Therefore, the results cannot be generalized to all nursing students in Turkey.

Ethics Committee Approval: Ethics committee approval was obtained from Yozgat Bozok University Social and Humanitarian Ethics Committee (Tarih: 19.10.2022, Sayı: E-37/28)

Informed Consent: Informed consent has been obtained from from students who participated in this study

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An Examination of Middle School Students' Mathematical Identities in a Social Context

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ABSTRACT

This study examines the mathematical identities of middle school students in a social context. Mathematical identity is an important factor affecting students' relationships with mathematics and their success in mathematics. Identity is formed by individuals' interactions with their perceptions and environment. In this context, mathematical identity is also shaped by social environment, education system, socio-cultural norms, and socio-economic status. In this research, the case study design, one of the qualitative research methods, was used. This research was conducted with 24 middle school students studying in different six public schools in a provincial center in the Marmara Region in the 2023-2024 academic year in Turkey, and 24 relatives determined by these students. The participants were selected through the maximum diversity sampling method. In the data collection stage, the "Mathematics Identity Scale" and the "Mathematics Identity Social Context Interview Form" developed by the researchers were used. The data were analyzed through a content analysis method. Findings indicate that themes such as attitudes toward the social environment, education system, socio-cultural norms, and socio-economic status significantly affect students' mathematical identities. In addition, it has been determined that individual characteristics such as mathematical communication skills, mathematical literacy, attitude towards mathematics, and mathematical persistence also affect the formation of mathematical identity. In conclusion, students' social environments and individual characteristics play a significant role in shaping their mathematical identities. Researchers are recommended to conduct similar studies in different social and cultural contexts and to examine the changes in students' mathematical identities through longitudinal studies.

Keywords: Middle school students, mathematical identity, social context in mathematics.

Introduction

The middle school period is considered a significant phase in the identity development of students. During this time, individuals undergo rapid cognitive and emotional development. Research indicates that family, peer groups, and teachers play influential roles in the identity development of middle school students (Aliyev & Tunç, 2017). Peer groups play a critical role in shaping students' social identities (Jones et al., 2014). During this period, students begin to identify with and associate themselves with the groups they belong to. Additionally, middle school students, who tend to explore their differences, start to question their values and beliefs as they shape their identities (Eccles, 2009). Therefore, creating environments that support both the academic success and identity development of middle school students is essential for fostering healthy identity development. Identity begins with the individual's process of perceiving themselves as a unique and separate entity, a process shaped through continuous interactions with their life story and environment. Throughout these interactions, individuals consider both their expectations and those of their surroundings (Scheuringer, 2016). Identity also reflects an individual's sense of belonging to social groups and their interactions with these groups. These interactions are crucial in fostering a sense of social security and belonging (Finuras, 2023). In this context, identity can be viewed as a complex structure shaping the relationships between individuals and societies. Weidner (2013) and Scheuringer (2016) emphasize that identity comprises both individual and social elements, which take form through interactions with one's sociocultural environment. Hence, identity should be considered a dynamic process encompassing how individuals perceive themselves and how they are perceived by others. This process includes individuals' social roles, expectations, and relationships with groups, which form the fundamental building blocks of identity (Finuras, 2023). The relationships between the individual and society reflect both the individual and society aspects of identity. This interaction determines how identity is

understood, analyzed, and interpreted within both the inner world of the individual and at a societal level. Vignoles (2018) argues that identity is both personal and social in terms of its content and the processes through which it is constructed, maintained, and changed over time. Connolly (1995) defines identity as who we are and how we are recognized. These definitions suggest that identity is influenced by the perspectives of others.

Social identity is defined as a structure shaped by individuals' interactions with social groups and environments, determining how one perceives themselves and others. The concept of social identity helps us understand the boundaries of our identity, how we contribute to it, its context, the intersection of different identity aspects, and how identity can serve as a source for action (Ásta, 2018). Poche (1997) notes that collective identities are influenced by one's environment, rather than merely representing political or economic positions. This influence suggests that identities have an autonomous form in a social context. Persoob (2014) states that individuals tend to categorize themselves into groups when interacting in social contexts, making social identity a critical element. Social identities can facilitate individuals' understanding of themselves, their development, and their relationships with others in a social context. Finke (2022) emphasizes the importance of individuals' relationships and recognition within their social environments in forming social identities. Bronfenbrenner (1979), in his ecological systems theory, argues that individuals develop through interactions within various environmental systems and that these interactions have profound effects on personal development. This theory includes five layers: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. This research focuses on the microsystem and mesosystem layers, examining the immediate environmental contexts with which the individual directly interacts—such as family, friends, school, and neighborhood—and the relationships among these contexts.

Identities consist of sub-identities that individuals acquire within various social contexts and groups. These sub-identities are components of an individual's primary identity, becoming more pronounced in certain contexts. For example, a person may be both an academic and a parent, and they may also hold a mathematical identity. These roles represent different facets of the individual's identity and emerge as distinct sub-identities in specific situations. Ásta (2018) emphasizes that identity is multidimensional, with various sub-identities coming social environments, including family, friends, and together to form an individual's holistic identity. Social identity theory posits that these sub-identities are shaped through individuals' interactions with their social environments and the resulting social categories (Poche, 1997). Therefore, sub-identities play an important role in helping individuals understand themselves and organize their relationships with others within social contexts (Persoob, 2014).

Mathematical identity can be described as the process by which individuals' mathematical abilities and identities are recognized by themselves and their surroundings. This process can influence students' relationships with mathematics, their attitudes toward it, and their success in the subject. Mathematical identity is regarded as a socio-motivational construct that is a significant determinant of students' mathematics achievement, with the social environment playing a crucial role in its formation (Barba, 2022). Research on middle school students' mathematical identities (Martin, 2001; Nasir & Hand, 2006) has shown the impact of family, peers, and teachers on shaping these identities. Boaler et al. (2000) emphasize that young individuals' developing identities significantly affect their success in middle and high school mathematics. Kafoussi et al. (2019) examined the influence of parents on sixth-grade students' formation of mathematical identity, revealing qualitative differences between students who identified as "good" or "average." It was found that engaging in math-related activities with parents at home supports students in approaching mathematical tasks with a positive attitude and belief. Gweshe and Brodie (2019) identify that factors such as family members, peers, career prospects, and the desire to please others play a significant role in shaping students' mathematical identities. Horn (2008) suggests that students' identities of mathematical competence emerge from the interaction between the mathematical worlds they encounter at school and their existing identities. Another study by Boaler et al. (2000) highlights that the developing identities of young individuals have a significant yet often overlooked impact on their middle and high school mathematics achievements. Students commonly view mathematics as a difficult and rigid subject, indicating that they particularly struggle to find meaning in it. These findings underscore that mathematical identity is a critical variable in helping students better understand mathematics and reduce the challenges they face in the subject. Investigating mathematical identity is therefore essential for enhancing students' success in mathematics. Additionally, students' mathematical identities are greatly influenced by the attitudes and interactions within their

teachers. This study aims to provide insights into the impact of these social factors on mathematical identity. To improve the quality of mathematics education, policies and strategies that positively influence students' mathematical identities should be developed. This research can offer data and analysis necessary for shaping educational policies and providing more effective mathematics education to students. Studies on mathematical identity in Turkey are primarily focused on scale development (Arslan, 2023; Hacıömeroğlu, 2020; Satmaz & Kıncal, 2023) and the mathematical identity of teacher candidates (Ergen et al., 2023). This study, however, focuses on middle school students and the social context of mathematical identity. Therefore, it fills a significant gap and contributes both to academic research and educational practices.

The primary aim of this study is to examine middle school students' mathematical identities within a social context. To achieve this objective, the following questions have been explored:

- What factors influence middle school students' mathematical identity in a social context?
- What individual characteristics shape middle school students' mathematical identities in a social context?

These sub-objectives aim to understand the multidimensional structure of students' mathematical identities and their dynamic connection with social interactions.

Method

Research Design

This research is a qualitative study focusing on examining middle school students' mathematical identities within a social context and is designed using a single-case study approach. A case study is a research method used to examine a specific event, situation, individual, or group in depth (Yin, 2018). This method provides researchers with the opportunity to understand and interpret complex phenomena within their real-life context, making it widely applicable in fields such as social sciences, education, business, and health sciences (Creswell & Poth, 2018). This design was selected to gain an in-depth understanding of students' relationships with mathematics and how this relationship intertwines with their social identities. The case under investigation is the mathematical identities of middle school students. Different units of analysis, including the student's mother, father, friend, and math teacher, were considered for evaluating this case. A diagram of the research model is presented in Figure 1.

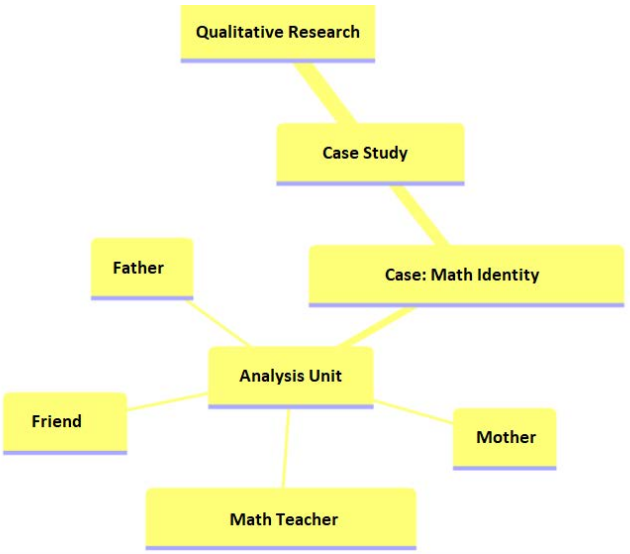

Figure 1.
Model of the Research

Participant Group

In selecting the participant group for this research, the maximum variation sampling method, one of the purposeful sampling types, was utilized. Maximum variation sampling is a strategy that allows researchers to select cases or participants with a wide range of variations (Patton, 2015). This strategy aims to maximize diversity within the sample to encompass all possible cases, perspectives, and characteristics related to the research question, thereby enhancing the generalizability and depth of the study (Creswell & Poth, 2018). This research was conducted with 48 participants, including 24 middle school students and 24 individuals identified by these students as close contacts, attending public schools affiliated with the Ministry of National Education in the central district of a provincial city in the Marmara Region, northwestern Turkey, during the 2023-2024 academic year. Information regarding the participants is presented in Table 1.

Table 1.

Participant Information

Student	Grade	Gender	Student Affinity
S1	5. grade	Female	Mother
S2	6. grade	Male	Math Teacher
S3	7. grade	Female	Math Teacher
S4	5. grade	Female	Father
S5	7. grade	Male	Sister
S6	8. grade	Male	Mother
S7	7. grade	Female	Father
S8	5. grade	Male	Math Teacher
S9	8. grade	Male	Mother
S10	8. grade	Female	Father
S11	6. grade	Female	Math Teacher
S12	7. grade	Male	Friend
S13	5. grade	Female	Mother
S14	6. grade	Male	Father
S15	8. grade	Male	Friend
S16	5. grade	Male	Friend
S17	8. grade	Male	Mother
S18	6. grade	Female	Math Teacher
S19	7. grade	Female	Mother
S20	6. grade	Male	Friend
S21	5. grade	Female	Father
S22	8. grade	Female	Primary school teachers
S23	7. grade	Male	Primary school teachers
S24	8. grade	Female	Friend

Table 1 presents the information on participants' grade levels, gender distribution, and social environment distribution. A total of 24 students participated: 6 students from grade 5, 5 students from grade 6, 6 students from grade 7, and 7 students from grade 8. An equal gender distribution was maintained, with 12 female and 12 male students. The participants, representing the students' family members and educators, included 6 mothers, 5 fathers, 5 friends, 5 mathematics teachers, 2 primary school teachers, and 1 older sister. The students are labeled as S1, S2, S3, … S24.

Data Collection Instruments

In the initial phase of the research, the "Mathematics Identity Scale" developed by Satmaz and Kıncal (2023) was used. This scale consists of 16 items and includes no reverse items. It encompasses three sub-factors—interest in mathematics, recognition, and performance—and has a reliability coefficient of .863. In the second phase of the research, the "Mathematics Identity Social Context Interview Form" was utilized. This form, developed by the researchers of the current study, consists of two sections. The first section provides an "informed consent" text for participants, and the second section includes the "interview questions." The interview questions consist of six questions addressing participants' relationships with mathematics, role models and sources of support in mathematics, emotions toward mathematics, recommendations, and applications of mathematics in daily life. The interview form was finalized after being reviewed by five experts: two in curriculum and instruction, one in mathematics education, one in assessment and evaluation, and one in Turkish language. The agreement status for the first part of the research is presented in Table 2.

Table 2.

Agreement Status

Student	Student Affinity	Estimated	Scale Result	Compatibility Status
S1	Mother	Low	Low	Compatible
S2	Math Teacher	High	High	Compatible
S3	Math Teacher	Low	Low	Compatible
S4	Father	Low	Medium	Incompatible
S5	Sister	High	Medium	Incompatible
S6	Mother	Medium	Medium	Compatible
S7	Father	Medium	Medium	Compatible
S8	Math Teacher	High	High	Compatible
S9	Mother	Medium	Medium	Compatible
S10	Father	Medium	High	Incompatible
S11	Math Teacher	High	High	Compatible
S12	Friend	Low	Medium	Incompatible
S13	Mother	High	High	Compatible
S14	Father	High	High	Compatible
S15	Friend	High	High	Compatible
S16	Friend	Medium	High	Incompatible
S17	Mother	High	Medium	Incompatible
S18	Math Teacher	Medium	Medium	Compatible
S19	Mother	Medium	Low	Incompatible
S20	Friend	Medium	Medium	Compatible
S21	Father	Low	Low	Compatible
S22	Primary school teachers	High	High	Compatible
S23	Primary school teachers	Medium	Low	Incompatible
S24	Friend	Low	Low	Compatible

Upon examining Table 2, it can be observed that a total of 48 individuals participated in the first phase of the research, consisting of 24 students and 24 close contacts of these students. The "Mathematics Identity Scale" developed by Satmaz and Kıncal (2023) was administered to the participating students, along with the question, "Who best describes you in mathematics?" Based on the students' responses, the researchers contacted their close contacts and asked, "How would you assess the mathematics

identity level of [student's name]?" Following the researchers' review, 16 consistent results were found between the measurement outcomes of the 24 students and the descriptions provided by their close contacts. The category with the highest consistency rate (100%) was identified as "teacher." Inconsistent results were excluded from the study, and the decision was made to proceed with the consistent findings. The researchers conducted phone interviews with the participants to ask whether they would like to participate in the second phase. Some participants expressed their unwillingness to continue due to reasons such as work commitments, lack of time, and distrust in research. These participants were thanked for their involvement in the first phase. One participant expressed a desire to continue with the study under the condition of being a backup participant. The second phase of the research proceeded with 12 voluntary participants, who were labelled as P1, P2, P3, … P12. The characteristics of these participants are presented in Table 3.

Table 3.

Characteristics of Participants

Participant	Student Affinity	Participant Gender
P1	Mother	Female
P2	Mother	Female
P3	Mother	Female
P4	Father	Male
P5	Father	Male
P6	Father	Male
P7	Friend	Female
P8	Friend	Male
P9	Friend	Male
P10	Math Teacher	Male
P11	Math Teacher	Female
P12	Math Teacher	Female

In the second phase of the research, 12 voluntary close contacts participated. Analyzing the relationships of the participants, it was found that three were mothers, three were fathers, three were friends, and three were mathematics teachers. The group consisted of six females and six males. Face-to-face interviews were conducted with the participants. These interviews took place either at the participants' homes or in the researchers' offices at the university. Participants were informed about the research, and their consent was obtained. The interviews were recorded with the participants' permission and each session lasted approximately 45 to 60 minutes.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Çanakkale Onsekiz Mart University Social and Humanitarian Ethics Committee (Date: 04.05.2023, Number: E-84026528-050.01.04-2300100856).
- Written informed consent was obtained from students and student affinity who participated in this study.

Data Analysis

The data from the research were analyzed using the content analysis method. Content analysis is the systematic examination of texts to identify and classify specific themes or concepts (Hsieh & Shannon, 2005). The research data were collected through semi-structured interviews with participants. The collected data were analyzed using coding, aiming to reveal the social relationships of students with mathematics, their identities, and how these identities were formed. This process was based on the analysis steps proposed by Braun and Clarke (2006). In the analysis of the data, a literature review was conducted first, followed by the coding of relevant data segments and the formation of themes. The themes created by the researchers were presented to field experts for their opinions. The final versions were developed based on the feedback received from these experts. MAXQDA qualitative data analysis software and Microsoft Word were used for all modeling and analysis tasks.

Validity and Reliability

When conducting qualitative research on middle school students' mathematical identities in social contexts, the validity and reliability of the obtained data are of critical impMediumnce. In qualitative research, validity and reliability are assessed through concepts such as consistency, credibility, transferability, confirmability, and objectivity. These concepts enhance the reliability of qualitative research and are essential for the acceptance of the results (Lincoln & Guba, 1985). The consistency of the research has been ensured by the researcher clearly documenting the process and decisions made throughout the study. The credibility of the research has been bolstered by obtaining participants' approval, maintaining long-term interactions, and spreading the data collection process over time. The transferability of the research has been strengthened by comparing the characteristics and results of participant groups with similar situations. The confirmability of the research has been achieved by transparently reporting the data collection and analysis processes. Throughout the research process, the researchers have acted independently of any biases.

Results

Findings Regarding Factors Affecting Middle School Students' Mathematical Identity in a Social Context

The parameters affecting middle school students' mathematical identity in a social context are grouped under the themes of social environment attitudes, the education

system, socio-cultural norms, and socioeconomic status. These themes are illustrated in Figure 2. Direct quotations related to these themes are provided below.

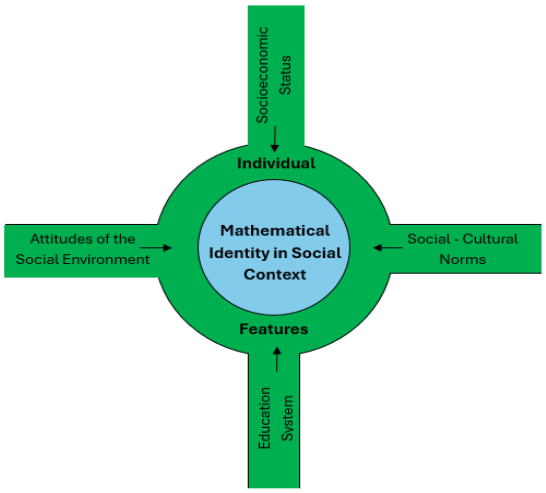

Figure 2.
Parameters Affecting Mathematical Identity in a Social Context

Attitudes of the Social Environment

Direct quotes regarding the attitudes of the social environment that affect middle school students' mathematical identity in a social context are presented below.

P1*: "I think mathematics is an important subject, but it is not indispensable. When we look at many of the people who govern the country today, I think they are successful because they can express themselves better verbally. Of course, this doesn't mean that mathematics is ineffective."*

P2: *"Mathematics is very important to me. I believe that whatever profession my child chooses in the future, mathematics will be like a key. It will help open every door they wish to."*

P3: *"I think my child is influenced by their friends. They are very affected by comments like 'this topic is hard' that they hear from their friends about certain math topics. It seems to create some prejudice."*

When the direct quotes are examined, it is understood that the attitudes of the social environment are an important factor affecting middle school students' mathematical identity in a social context. Relatives of the students have indicated that they are influenced by people in their social environment.

Education System

Direct quotes regarding the views on the education system affecting middle school students' mathematical identity in a social context are as follows.

P10: *"Actually, I think the mathematics curricula are good. There is a spiral structure in our math programs. Therefore, I believe that students who have a solid foundation in mathematics will do better as they progress to higher age groups."*

P11: *"I think the classroom systems in schools are not very suitable for learning mathematics. In this system, teachers are always explaining, and students are in the listening part. Afterward, students are made to solve many problems by the teacher. So, students are learning to solve problems, not mathematics."*

When examining the direct quotes, it is evident that the education system is an important factor influencing middle school students' mathematical identity in a social context. Components of the education system, such as curricula, classroom interactions, and teaching methods, have been determined to be effective in shaping students' mathematical identity.

Social-Cultural Norms

Direct quotes regarding the views on social-cultural norms as parameters affecting middle school students' mathematical identity in a social context are presented below.

P5: *"I have a daughter and a son. If I have to compare them, my daughter is more organized and successful in mathematics. Recently, I think girls are more successful in mathematics than boys. Maybe it was like this before too, but the attendance rate of girls in school was low. We didn't know about this situation."*

P12: *"As a nation, we are bad at mathematics. I don't know where we are making mistakes, but we definitely can't handle this."*

When the direct quotes are examined, it is seen that social-cultural norms are an important factor affecting middle school students' mathematical identity in a social context. Especially, it appears that misleading or incomplete stereotypes within society have an impact on individuals' thoughts.

Socioeconomic Status

Direct quotes regarding the views on socioeconomic status as parameters affecting middle school students' mathematical identity in a social context are presented below.

P6: *"I try to provide all kinds of opportunities for my daughter. I think the textbooks provided at school are insufficient. I buy different resource books. Additionally, we have also purchased an online education system. It's all to help her improve in mathematics."*

P7: *"I know that some of my friends take private lessons. Therefore, they have an advantage over us. If my friend's family could afford private lessons, she could also be more successful in mathematics."*

When the direct quotes are examined, it is evident that individuals' socioeconomic statuses are important factors affecting middle school students' mathematical identity in a social context. Participants indicated that the extra opportunities provided to students positively influence their mathematical identities.

Findings Regarding Individual Characteristics Shaping Middle School Students' Mathematical Identities in a Social Context

When examining the individual characteristics shaping middle school students' mathematical identities in a social context, they are grouped under the themes of mathematical communication skills, mathematical literacy, attitudes toward mathematics, and mathematical resilience. These themes are shown in Figure 3. Direct quotes related to these themes are presented below.

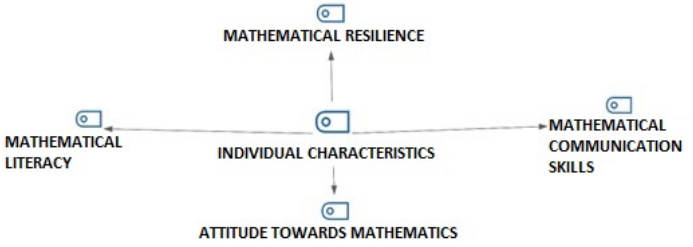

Figure 3.
Individual Characteristics

Mathematical Communication Skills

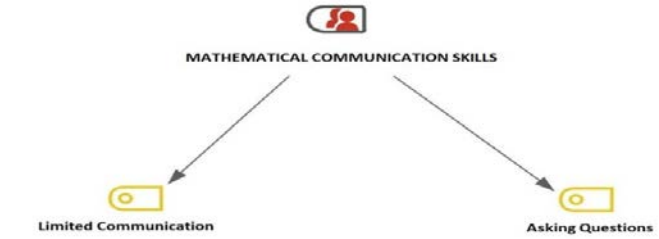

Figure 4.
Mathematical Communication Skills

Direct quotes regarding the views of secondary school students on their mathematical communication skills and their characteristics that affect their mathematical identity in the social context are given below.

P12: *"It takes effort to learn. He needs to ask questions he doesn't understand. He closes communication when it comes to math. But if I ask him, he communicates. Otherwise, the questions he can't answer just stay there."*

P10: *"I see him successful in mathematics. He asks everything he doesn't understand. The more he asks, the more his success increases. His self-confidence increases."*

When direct quotes are examined, it is seen that students' limited or effective use of communication skills is a factor affecting their mathematical identities. Emphasizing the importance of mathematical communication is accepted as an indicator of a positive change in mathematical identity.

Mathematical Literacy

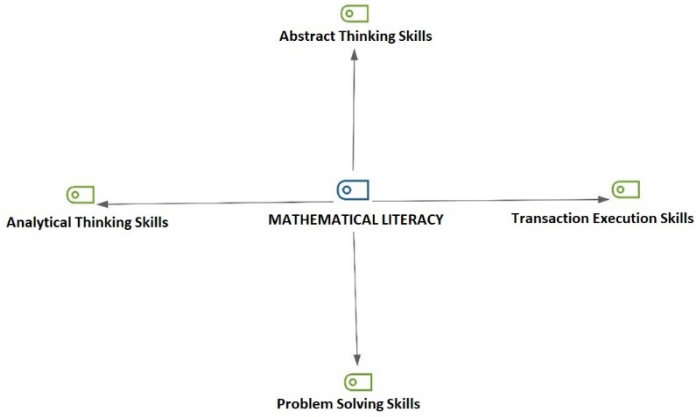

Figure 5.
Mathematical Literacy

Direct quotes regarding mathematical literacy as an individual characteristic affecting middle school students' mathematical identity in a social context are presented below.

P2: *"She is very good at math. She understands everything that is explained. She has analytical thinking skills. Her operational execution skills are very successful because her mathematical foundation is strong."*

P7: *"I think her mathematical foundation is not good. Sometimes she says she understands the topics well, but she makes very simple mistakes in operations. This creates a huge disappointment for her."*

When examining the direct quotes, it is observed that the active use of students' metacognitive skills positively impacts their mathematical literacy, and this situation is a positive factor in their mathematical identity.

Mathematics Attitude

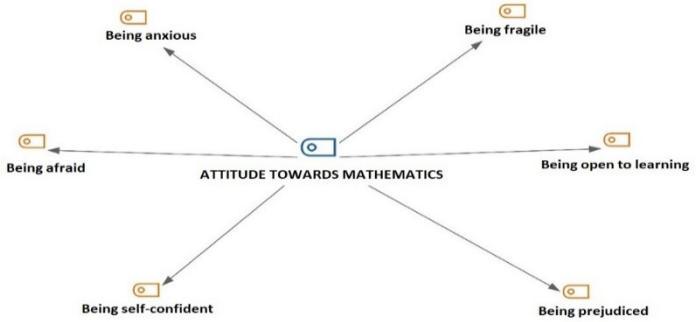

Figure 6.
Mathematics Attitude

Direct quotes regarding attitudes toward mathematics as an individual characteristic affecting middle school

students' mathematical identity in a social context are presented below.

P8: *"My friend is very indifferent toward mathematics. I sometimes suggest that we can study together, but he refuses. He seems a bit scared. I actually think that if he puts in some effort, he could succeed."*

P9: *"She loves mathematics very much. Her interest in math is very high. She values it more than other subjects. I can say that math is her favorite subject."*

When examining the direct quotes, it is evident that students' attitudes toward mathematics are an important factor influencing their mathematical identities. Positive attitudes toward mathematics strengthen students' mathematical identity, while negative attitudes weaken it.

Mathematical Resilience

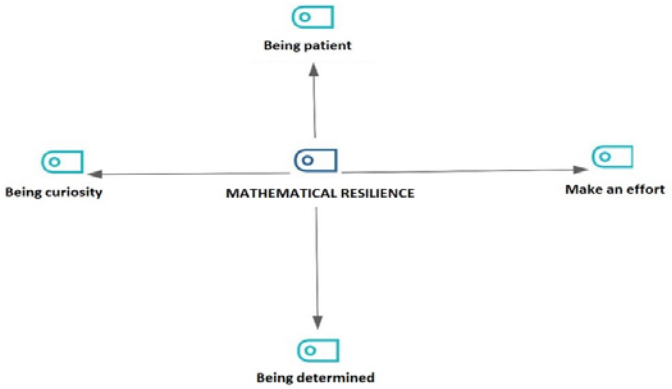

Figure 7.
Mathematical Resilience

Direct quotes regarding mathematical resilience as an individual characteristic affecting middle school students' mathematical identity in a social context are presented below.

P4: *"He is struggling with the math section. He asked us for support. We got help from a university student. Now he is feeling a bit better. We are trying to support him as much as we can."*

P11: *"I think he is good at math. He is very determined. He is a student open to learning. As long as he can focus, he will continue to get very good results."*

When examining the direct quotes, it is evident that the level of students' mathematical resilience is an important factor in their mathematical identity. Students with a high level of resilience tend to develop a more positive identity regarding mathematics, while those with a low level of resilience are at risk of developing a more negative identity related to mathematics.

Discussion

The social environment of middle school students is important in the formation of their mathematical identities. Mathematical identity is not only related to individual cognition but is deeply embedded in social contexts involving interactions with family, peers, and teachers (Nasir, 2002). Family and cultural background have significant impacts on shaping students' mathematical identities, and influencing their attitudes, beliefs, and values regarding mathematics (Grootenboer & Zevenbergen, 2008). Children's motivational beliefs were found to be related to their parents' beliefs about mathematics (Baranauskaitė & Butkienė, 2023). Miller-Cotto and Lewis (2020) state that classroom practices shape mathematics identity. Mathematics identity is especially important in the mathematics domain, as it determines whether students persist and take on advanced mathematics activities or classes. Socio-historical context, community dynamics, family expectations, and peer influences play critical roles in the development of students' mathematical identities (Martin, 2000). Students' mathematical identities are affected by social interactions and the cultural context in which they live (Sfard & Prusak, 2005). Classroom expectations, practices, and the values and beliefs encountered in broader social contexts are shaped by student-teacher interactions (Boaler, 2002). The education system affects mathematical identity through the broad societal meanings attributed to mathematics (Hansen, 1991). The most important elements of the education system are students, teachers, and parents. Participation in various mathematics-related activities contributes to the development of students' mathematical identities (Cobb & Hodge, 2002). Nicolaidou and Philippou (2003) noted that social-environmental factors, such as teacher support and peer interactions, influence students' attitudes toward mathematics and, consequently, their mathematical performance. Ampadu and Anokye-Poku (2022) stated that a supportive educational environment provided by teachers and peers could positively affect students' mathematical identities. A similar statement can be made for students' families. The attitudes of families toward mathematics can influence students' motivation for learning mathematics and how they perceive themselves in this field (Baranauskaitė & Butkienė, 2023). Participation in mathematics-related courses and careers can shape students' attitudes toward mathematics (Watt & Bornholt, 2000). Emotional responses and discourses about mathematics education affect this shaping process (Black et al., 2011). The mathematics activities students participate in may occur both within and outside of school. Out-of-school learning environments can strengthen

mathematical identity (Díez-Palomar et al., 2006). These environments may be critical in creating learning experiences that promote mathematical identity among diverse student populations. The classroom environment and interactions with teachers and peers in mathematics classes significantly affect students' mathematical identities (Roos, 2019). Alternative education programs and curricula can improve students' attitudes toward mathematics by integrating various pedagogical approaches (Hill, 2004). There is a relationship between students' mathematical identities and their cultural identities (Domite & Valle, 2015). Blending mathematics learning with principles of social justice offers opportunities for marginalized students to develop a positive mathematical identity (Miller-Cotto & Lewis, 2020). Students in schools with low and middle socioeconomic status are often grouped at a lower band in terms of mathematical achievement, and these students tend to prefer basic practical activities over in-depth mathematical conceptual understanding (Nicholas & Fletcher, 2017).

Minarti and Wahyudin (2019) found that middle school students' mathematical communication skills are significantly affected by their mathematical inclinations. Kuncoro et al. (2023) demonstrated that students with interpersonal communication skills communicate their mathematical ideas more effectively. Nurwahid and Ashar (2022) stated that there is a strong relationship between mathematical identity and mathematical literacy. Vithal and Bishop (2006) expressed that students should ideally develop their mathematical identity and mathematical literacy simultaneously in mathematics classes. The impMediumnce of components of mathematical literacy, such as mathematical expression skills, in developing students' mathematical thinking and problem-solving skills is emphasized (Yore et al., 2007). Variables effective in mathematical identity include mathematical ability (Graven & Heyd-Metzuyanim, 2019), mathematical problem-solving skills (Ndemo, 2019), mathematical operation skills (Owens, 2008), and mathematical abstract thinking skills (Maddox, 2008). Cribbs et al. (2021) stated that students' feelings of self-efficacy, levels of self-competence, and anxiety toward mathematics affect their mathematical identities, which are determining factors in career choices. Hannula et al. (2016) noted that attitudes toward mathematics are effective in mathematical identity and can lead to significant changes in students' mathematical achievement. Mathematical resilience is part of mathematical identity (Xenofontos & Mouroutsou, 2023). Joseph et al. (2020) noted that students who are determined and patient in mathematics may experience changes in their mathematical identities. Boaler and Greeno (2000) stated that many successful mathematics students experience a conflict between how they see themselves and who they want to be, leading them to choose not to continue studying mathematics.

Conclusion and Recommendations

This study identified several critical social-contextual factors influencing the mathematical identities of middle school students, including the attitudes of the social environment, the educational system, socio-cultural norms, and socioeconomic status. The research demonstrated that these factors significantly shape how students perceive and engage with mathematics.

Moreover, individual characteristics such as mathematical communication skills, mathematical literacy, attitudes toward mathematics, and mathematical resilience were found to profoundly affect students' mathematical identities. Students who actively communicate about mathematics, demonstrate strong mathematical literacy, and possess positive attitudes and resilience are more likely to develop robust mathematical identities, thereby enhancing their engagement and success in mathematics.

Based on these findings, it is recommended that future research explore mathematical identities across various cultural and social contexts to examine potential differences and commonalities. Conducting longitudinal studies could also provide deeper insights into how mathematical identities evolve over time. Furthermore, educational policymakers and educators should prioritize creating supportive educational environments that foster positive attitudes, resilience, and effective communication in mathematics. Encouraging family engagement and providing equitable access to quality educational resources can also strengthen students' mathematical identities. Finally, schools should develop inclusive, student-centered educational practices and extracurricular opportunities to support positive identity formation, particularly among students from diverse backgrounds.

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Secondary School Students' Views on Environmental Pollution

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ABSTRACT

In this study, secondary school students' views on environmental pollution were focussed. The participant group consisted of 5th, 6th, 7th, and 8th grade students (52 girls-55 boys) studying in Hakkâri city centre. In the qualitative study design, the Word Association Test (WAT) was used as a data collection tool. Descriptive analysis technique was used to analyse the data, and frequency and percentage charts were presented in the form of cut-off points (CP). In the results obtained, it can be stated that students have knowledge about the causes and consequences of environmental pollution. Although some answers responded to the types of environmental pollution (air pollution, water pollution, etc.), most answers shed light on the causes of pollution (garbage, ped bottle, etc.). Students' mental construction of environmental pollution is mostly based on wastes that take a long time to disappear in nature. In addition, some expressions that are far from the possible definitions and adjectives of environmental pollution show that they have cognitive knowledge deficiencies. In the study, the importance of education and training services on environmental pollution, especially on the impact of polluting wastes both regionally and globally, starting from early childhood, comes to the fore. Based on the results achieved, identification of misconceptions students have towards environmental pollution and conducting educational activities to eliminate this misconceptions could be recommended. In addition, which metaphors students relate the concept of garbage that they express the most could be researched.

Keywords: Environmental pollution, environmental education, secondary school students.

Introduction

Humans exist in a holistic structure consisting of living environments such as air, water, soil and plant and animal communities (Yavetz et al., 2014). This holistic structure called the environment can be destroyed by humans over time (Bertiz, 2014) and the natural balance can be damaged. These problems (Atalay, 2005, p. 391; Aydın, 2017), which threaten human and living existence such as air, water, soil and noise pollution, solid waste garbage problem in cities and irregular urbanisation, emerge as environmental pollution (Jamali, 2007; Ukaogo et al., 2020; Xu et al., 2022).

Environmental pollution, which has increased due to different reasons in the historical process, has some sociological and economic foundations. For example, the growth of industry in the UK has led to migration and urbanisation (Atalay, 2005; Özdemir, 2014, p. 401). Thus, capital and services overflowed where the population was dense (Lacoste, 2004, p. 101). Over time, increasing urbanisation and globalisation with industry has turned into environmental pollution. It is also clear that this pollution causes climate change and global warming in the long term (Aydın, 2017). Today, especially globalisation has become an effective facilitator of environmental pollution (Kwabena-Twerefou et al., 2017; Nazeer et al., 2016), and global environmental concerns have triggered debates.

Environmental pollution caused by humans leads to the greatest damage to humans (Kuzu, 2008). Current data from the World Health Organization [WHO] show that an estimated 4.2 to 7 million people die from air pollution worldwide each year and nine out of ten people breathe highly polluted air (WHO, 2024). In Africa alone, air pollution from industrial waste and motor vehicles caused 164,000 deaths in 1990 (UNICEF, 2019). A study conducted in 2023 in South Asia revealed that air pollution shortens the life expectancy of people by about 5 years (Antonel & Chowdhury, 2014). Damages affect not only the past and people's physical health, but also our future and psychological health (Rajper et al., 2018; Ullah et al., 2021). The literature shows that environmental pollution causes deterioration in human DNA structure and reduces the life

span and productive life years of the individual (Güney, 2004; Nazeer et al., 2016). Drawing attention to the dangers of prenatal exposure to air pollution, Margolis et al. (2021) state that this situation reduces the academic success of adolescents. Similarly, Thygesen et al. (2020) found that exposure to air pollution at an early age increased the risk of developing ADHD (Attention Deficit and Hyperactivity Disorder). Air pollution also has a wide range of impacts, including a significant negative impact on the quality of life of students with and without allergies (Pisithkul et al., 2024) and low school attendance (Mohai et al., 2011).

Although air pollution, water pollution, wastes and noise pollution are generally observed in Türkiye, these problems vary at the provincial level (Ministry of Environment and Urbanisation, 2020, p. 37). Türkiye Environmental Problems and Priorities Assessment Report (2023) reveals that 41% of provinces have water pollution, 27% have air pollution, 28% have waste pollution and 4% have noise pollution. In addition, Greenpeace's 2021 report states that the annual average air PM2.5 value measured for each province in Türkiye is four times higher than the World Health Organization recommendation (Greenpace, 2021). The main cause of widespread air pollution in the country is the use of poor quality fuel for heating (Türkiye Environmental Problems and Priorities Assessment Report, 2023). Moreover, such environmental pollution is not limited to urban and rural areas. Therefore, it can be stated that the achievement of "sustainable development" in Türkiye is under threat (Akca et al., 2018).

Against this negative picture of the environment in Türkiye, 94% of respondents in a recent survey stated that they feel a responsibility to protect the environment (KONDA, 2021). In addition, the country's politicians play an active role in bilateral, regional, and international cooperation efforts to solve environmental problems (Ministry of Foreign Affairs of the Republic of Türkiye, 2024). However, despite this high awareness (Ağtaş et al., 2019; Erbasan & Ekol, 2020; Gürbüz et al., 2023; Küreci, 2018), increasing environmental pollution has not been prevented (Muşmul & Yaman, 2018). In particular, air, water and soil pollution continue to be among the types of pollution that people need to tackle.

Environment and Education

The increasing importance of environmental problems has led to a closer look at the relationship between educational variables and environmental pollution. Because the most important developer of the process towards environmental awareness is education (Ardoin & Bowers, 2020; Dillon & Herman, 2023; Rickinson, 2001). Some people who are poorly educated and therefore insensitive or uninformed about the environment are not aware that their current activities lead to environmental pollution (Damırova, 2019). Especially the information and education that children receive from their families and teachers have an important place in this sense. At this point, it is important to know what the factors that pollute the environment are and to take precautions accordingly. Supporting this assumption, DeChano (2006) showed that students in Chile, England, Switzerland, and the USA have low environmental knowledge even if they have high environmental attitudes. In this context, to find permanent solutions to environmental problems, it is necessary to raise environmental awareness in children at a very young age (Rebolj & Devetak, 2013; Uludağ, 2012) in order for children to develop a strong bond with the environment and the world they live in (Akdemir & Akengin, 2013, p. 25).

Environmental education presents an effective approach in developing environmental information attitudes, and behaviors of individuals (Van De Wetering et al., 2022). Transformation of environmental education received by an individual to behavior is accepted to be a major step towards protection of the environment (Gülersoy, 2021). Studying graduate studies on environmental education conducted in our country in 2011-2022 period, Karakoyun and Uzun (2022) mentioned that subjects mainly cover environmental attitudes and environmental awareness. Among studies that cover various methods and practices towards environmental education, Kiziroğlu (2023), mentioned environmental education can be supported with development of various projects while Özgel et al. (2018) observed that travel-observation method supported by nature camp were more effective in raising awareness on environmental problems. Babadağ (2022) put forth that activities attended by families improved environmental behaviors of students. Without doubt, students that receive environmental education were more sensitive towards environmental problems and had increased awareness on sustainability (Erdoğan, 2021). At this point, organizing mandatory classes on environment based on a sustainable outlook in the curriculum (Özdemir, 2007), presenting environment-related achievements in all classes by making the required associations instead of a single class (Erten, 2004), and the requirement to increase extension of current digital technologies in environmental education and research settings (Lowan-Trudeau, 2023) came forward in relevant studies.

The main objectives in the relationship between environment and education are to develop awareness and sensitivity of the connection between social, political, economic and ecological events in rural and urban areas,

and to provide opportunities for individuals to acquire the knowledge, responsibilities, attitudes and value judgements necessary to protect and improve the environment (Tbilisi Declaration on Environmental Education; cited in Sevinç, 2009). The aim is to raise awareness in urban and rural areas, to protect and improve the environment, and to change behavioral patterns. Drawing attention to this issue, the United Nations Conference on Environment and Development adopted a global environment and development agenda for the 21st century, called Agenda 21. Agenda 21 has a scope that emphasizes the development of public awareness and education for a sustainable world.

Purpose of the Study

Raising a generation conscious of the environment is more important than all the measures to be taken (Özüpekçe, 2019). In this context, our study focuses on exploring the meanings that students attribute to environmental pollution at an early age. There are many studies on environment and environmental pollution in the relevant literature (Al-Maliki et al., 2021; Dyah-Rahmawati et al., 2020; Hammami et al., 2017; Hinojo-Lucena et al., 2019; Iliopoulou, 2018; Olufemi et al., 2014; Pisithkul et al., 2024; Souza et al., 2020; Ullah et al., 2021; Zsóka et al., 2013). In general, the studies have been handled with quantitative methods that reveal students' knowledge, attitudes, and thoughts towards the environment. However, discovering the meanings and expressions that students attribute to environmental pollution is as important as raising awareness. The correct identification of the factors that pollute the environment will also shed light on possible solutions. Because the high and low rates in students' attitudes and perceptions towards the environment are insufficient to fully explain what they see as polluting substances and actions. For this reason, considering the lack of relevant literature, there was a need to determine the views of secondary school students on environmental problems in our study. The present study was conducted at a school with a low socio-economic level. Therefore, it is important to consider the place of the results in the relevant literature. Because the environmental awareness of students living in villages and cities in the same country or region may differ (Huang & Yore, 2005; Olufemi et al., 2014). The thrust of our study is to provide policy makers with a scientific perspective and deep understanding of potential future conditions in order to find solutions to achieve sustainability goals. Within the framework of this purpose, the question sought to be answered in the study was "What are the views of secondary school students' on environmental pollution?”

Method

Research Design

This study aims to explore the meanings and interpretations that secondary school students' attribute to environmental pollution. Therefore, the study was designed according to the basic qualitative research method that reveals how individuals associate phenomena and events with their own world (Merriam, 2015). Basic qualitative research is concerned with the meaning people attribute to events and the perspective from which they view events (Robson, 2015). Therefore, this study helped to reveal deeper meanings beyond the attitudes and perceptions attributed to environmental pollution by secondary school students' (Hsieh & Shannon, 2005).

Participants

The participant group consisted of 5th, 6th, 7th, and 8th grade students studying in a public school in Hakkâri province of Türkiye in the spring semester of the 2023-2024 academic year. In total, 107 students were interviewed. Of the students, 48.60% were girls and 54.40% were boys. 25.24% of the students study in Grade 5, 31.77% in Grade 6, 26.17% in Grade 7 and finally 16.82% in Grade 8.

Data Collection Tool

In this study, the Word Association Test (WAT) was used to collect students' opinions. While preparing the WAT, which is one of the alternative measurement tools, key concepts related to the subject were determined and students were asked to write the words that came to their minds related to these key concepts. The number of repetitions of word associations, their scientificness and whether they are related to the key concept or not allowed us to comment on the cognitive structure (Bahar & Özatlı, 2003, p. 75). In this direction, information about the implementation of the WAT was also provided to the students before the implementation. In the study, environmental pollution was given to the students as a concept and environmental pollution was written 5 times under each other in order to prevent them from giving the same answer. The participants were given 30 seconds for each line. This duration was based on the average duration given in the studies in the literature (Bahar & Özatlı, 2003). The "Environmental Pollution Word Association Test" was organized as follows.

Environmental pollution.....
Environmental pollution.....
Environmental pollution.....
Environmental pollution.....
Environmental pollution.....
A sentence about environmental pollution.....

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Van Yuzuncu Yil University, Social and Human Sciences Publication Ethics Committee (Date: 23.05.2024, Number: 2024-10).
- Informed consent has been obtained from the participants.

Data Analysis

In the analysis of the data obtained during the study process, firstly, the answers given to the WAT were examined in detail. The frequency table shows the number of words in response to the key concepts and how often each concept was responded to according to the number of words. Concept networks were created with this frequency table and the cut-off point (CP) technique determined by Bahar et al. (1999) was used to clearly reveal the cognitive structure between concepts. In this technique, a certain number of six of the most responded words for any key concept in the WAT are used as cut-off points. In the next stage, the cut-off point was lowered at regular intervals and the process continued until all keywords appeared in the concept network. Using this technique, words related to the key concepts were listed, sorted according to their frequency values and concept networks were created according to the determined ranges. Concept networks were formed according to 71 and above, 30-20, 19-10, 9-5 and 4-1 cut-off points. The concepts written on a colored background among the words shown in the concept networks indicate key concepts. The words in boxes on a colorless background represent the associated response words. The response words associated with the key concepts were transformed into a concept network with colored arrows according to the frequency values given (Table 1). Each arrow represents the number of words whose color repeats at certain intervals:

- Cut-off point 71 and above is coloured blue.
- Cut-off point between 30-20 is coloured red.
- Cut-off point between19-10 is coloured green.
- Cut-off point between 9-5 is coloured brown.
- Cut-off point between 4-1 is coloured navy blue.

Results

In the study in which secondary school students' thoughts about environmental pollution were revealed with the WAT, the frequency value of the words produced by the students was first analyzed. The responses were then divided into various categories and visuals by dividing them into cut-off points. Student responses were not based on the semantic equivalence of the related concept with environmental pollution, but only on student responses.

Table 1.
Frequencies of the Words Produced for the Concept of Environmental Pollution

Answers	f	Answers	f
Garbage	71	Oil	7
Plastic	27	Carbon dioxide	7
Pet bottle	26	Human	7
Air pollution	26	Cutting down trees	6
Glass	25	Space pollution	6
Waste	24	Recycling	6
Nylon bag	23	Sewerage	5
Paper	21	Disorder	5
Smoke	19	Death	5
Trash bin	18	Oxygen	4
Water pollution	18	Forest pollution	4
Extinction	17	Acid	3
Battery	15	Trash cart	3
Disease	14	Homeless	3
Iron	12	Visual pollution	3
Dirty	12	Cigarette	3
Cleaning	11	Radiation	2
Factory smoke	11	Warning signs	2
Irresponsibility	11	Garbage factory	2
Melting of glaciers	10	Torn clothing	1
Odor	10	Garbage dump	1
Forest fire	9	Gloves	1
Global warming	9	Leaf	1
Irregularity	9	Total	535

According to Table 1, the most striking student responses were garbage, plastic, pet bottle, air pollution, glass, waste, nylon bag, and paper. For each of these words, there are at least 20 or more student answers. In addition, it is understood that the least produced concepts for environmental pollution among the responses are torn clothing, garbage dump, gloves, and leaves.

In the study, the words under the concept of environmental pollution were separated according to their cut-off points. Accordingly, the concept network created for cut-off point 71 and above is shown in Figure 1.

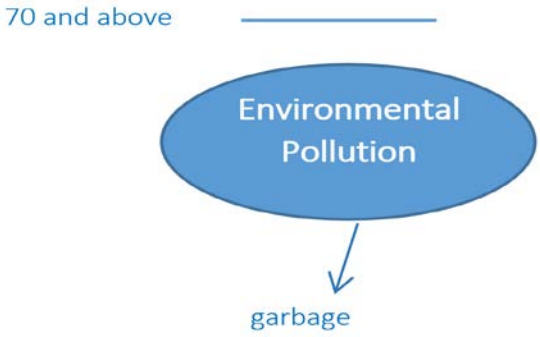

Figure 1.
Concept Network Created for Cut-Off Point 71 and Above

When we look at the concept network created for cut-off point 71 and above in Figure 1, it is seen that the participants associate environmental pollution with the concept of garbage (f=71).

The concept network for cut-off points 30-20 is presented in Figure 2.

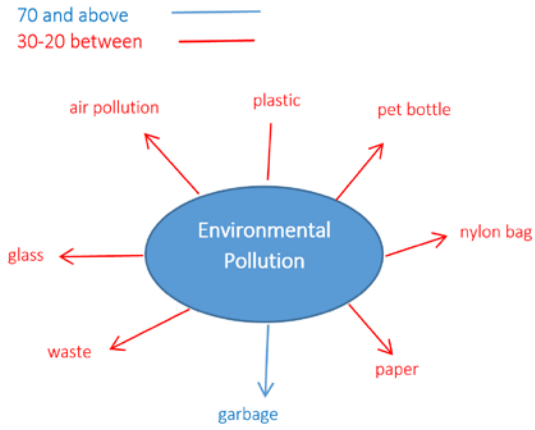

Figure 2.
Concept Network Created for Cut-Off Point 30-20

When we look at the concept network created for cut-off point 30-20, it is seen that the concepts of air pollution, plastic, ped bottle, nylon bag, paper, waste and glass are associated with the concept of environmental pollution.

The concept network for cut-off points 19-10 is presented in Figure 3.

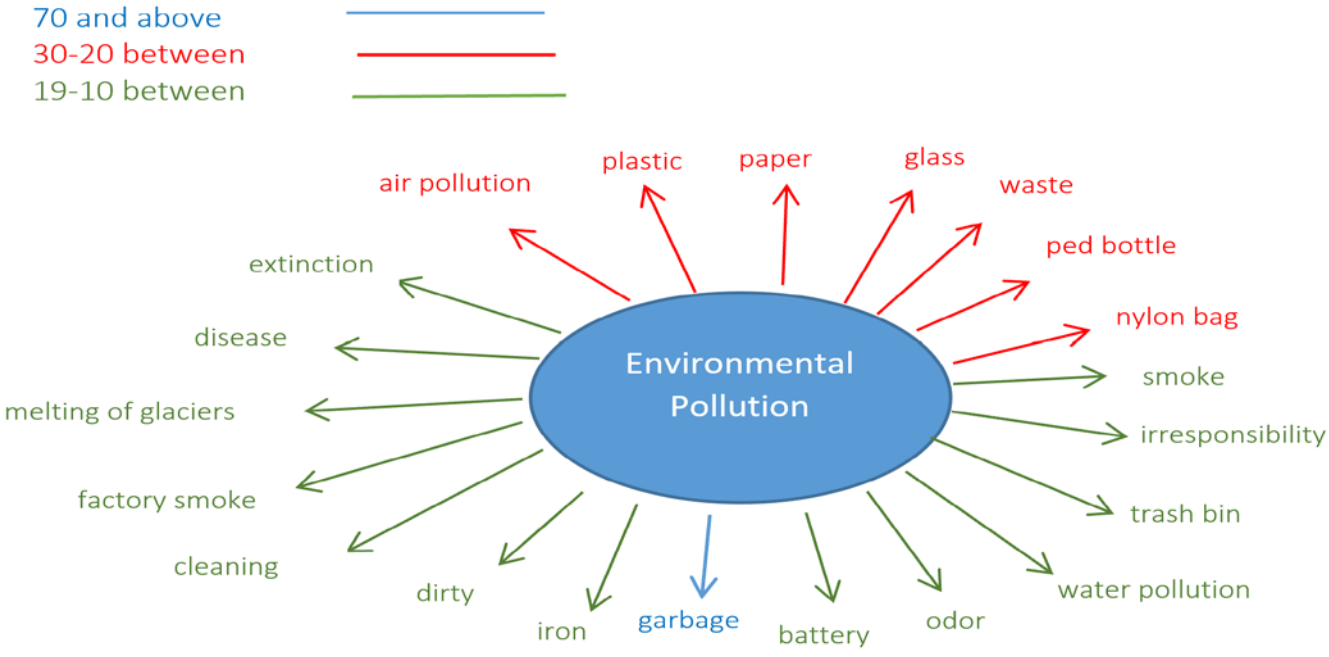

Figure 3.
Concept Network Created for Cut-Off Point 19-10

When we look at the concept network created for cut-off point 19-10, it is seen that the concepts of smoke, irresponsibility, trash bin, water pollution, odor, battery, iron, dirty, cleaning, factory smoke, melting of glaciers, disease, extinction are associated with the concept of environmental pollution.

The concept network for cut-off points 9-5 is presented in Figure 4.

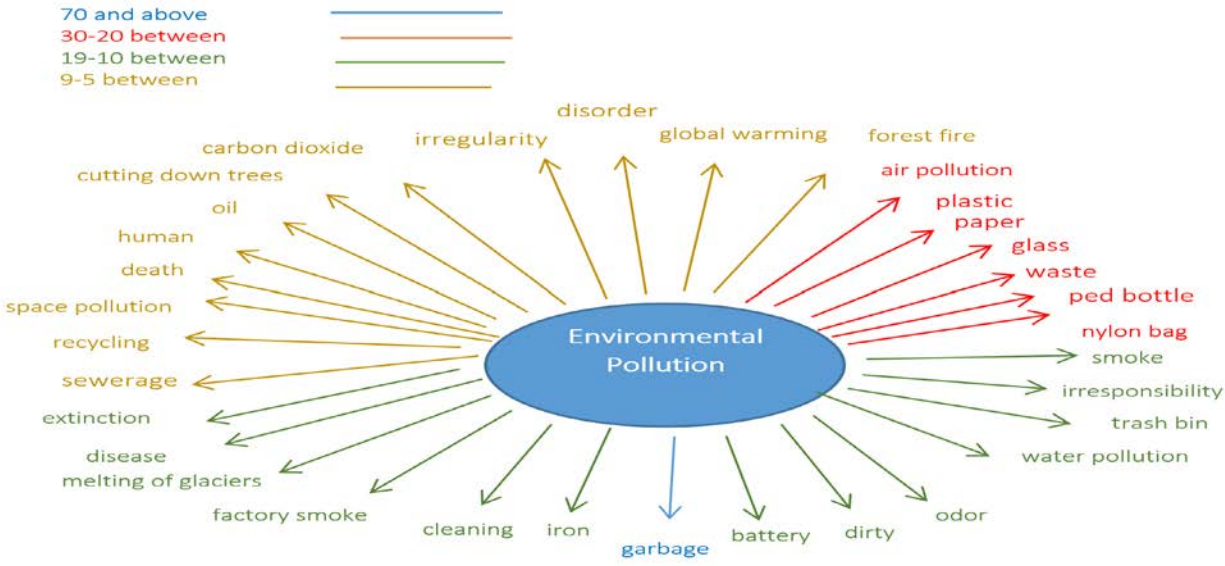

Figure 4.
Concept Network Created for Cut-Off Point 9-5

When we look at the concept network created for cut-off points 9-5, it is seen that the concepts of forest fire, global warming, disorder, carbon dioxide, irregularity, cutting down trees, oil, human, death, space pollution, recycling and sewerage are associated with the concept of environmental pollution.

The concept network for cut-off points 4-1 is presented in Figure 5.

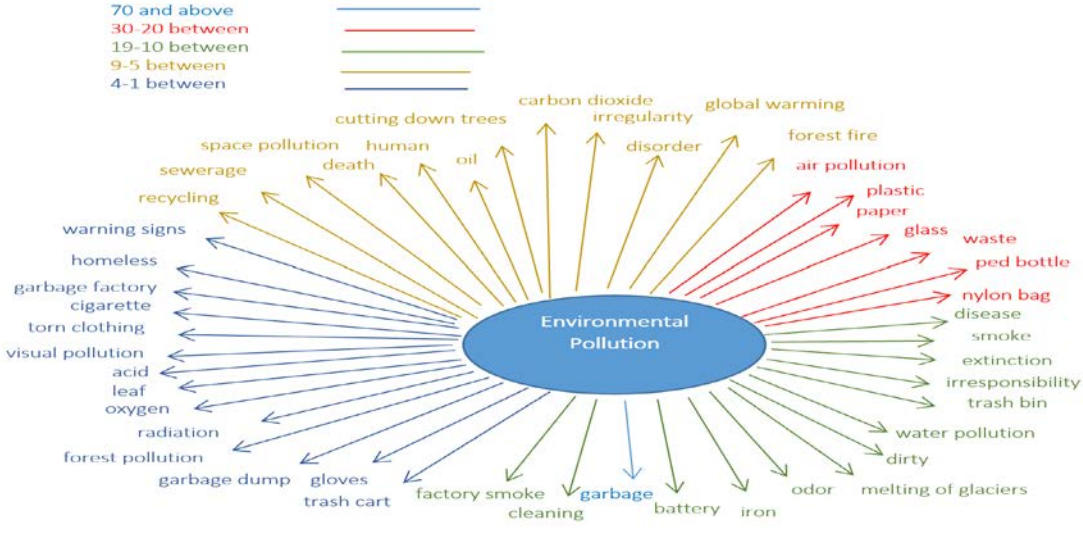

Figure 5.
Concept Network Created for Cut-Off Point 4-1

When we look at the concept network created for cut-off point 4-1, it is seen that the concepts of forest pollution, warning signs, radiation, visual pollution, homeless, trash cart, garbage factory, cigarette, acid, torn clothing, gloves, leaf, oxygen, garbage dump are associated with the concept of environmental pollution.

Discussion

The first noteworthy observation in this study, which focuses on secondary school students' views on environmental pollution, is the evaluation of students' responses in different semantic categories. Although some answers responded to the types of environmental pollution (air pollution, water pollution, etc.), most answers shed light on the causes of pollution (garbage, plastic bags, etc.). Therefore, it can be said that students are aware not only of environmental pollution itself but also of its possible consequences. Students' mental construction of environmental pollution is mostly based on wastes that take a long time to disappear in nature. Moreover, this understanding, which is far from the possible definitions and adjectives of environmental pollution (e.g. leaf, iron), shows that they have cognitive knowledge deficits (Uddin, 2014). A closer look at the results reveals students' assumptions about the solution (e.g. recycling and oxygen) and the long-term consequences (e.g. death) of environmental pollution.

Since human activities and changes in the environment are interconnected, the environment we live in often shapes our thought. It can be said that the concept of "garbage", which the participants frequently emphasized for pollution, responds to this theory (Hinojo -Lucena et al., 2019; Hoban et al., 2011). The fact that there is a rich literature supporting this finding brings a deeper understanding to our results. Related studies point out that students tend to express the problems they encounter more in daily life (Nacaroğlu & Bozdağ, 2020; Pınar & Yakışan 2017; Sağsöz & Doğanay, 2019; Uyanık, 2017). In another study investigating emotions, thoughts, and observations of secondary school students on environmental problems through the comics they draw, it was noted that the most important environmental problem was pollution (environment, air, water, rubbish) (Recepoğlu, 2021).

Another main trend regarding environmental pollution in our research is the presence of responses regarding human-induced pollution (Moradi & Görer-Tamer, 2017; Özcan & Demirel, 2019; Polat & Dellal, 2016). Unfortunately, humans have the biggest share in the emergence of environmental problems today. Humans have transformed from being only one of the factors that make up the environment to the leading role in the increase of environmental problems (Koçarslan et al., 2017). It is also clear that global problems are less frequently mentioned than local problems. In many studies supporting this result in the literature, the participants' statements for environmental problems were grouped around global problems such as water, air, and visual pollution (Ercan, 2011; Ertürk, 2017; Fettahlıoğlu, 2018; Özdemir-Özden & Özden, 2015; Yılmaz et al., 2002). In addition, in our study, it is seen that students mostly gave answers about the problem (environmental pollution) itself and its consequences rather than the solution. This argument could be interpreted as students were aware of long-term consequences of environmental pollution. Students knew that there was an effort for people, animals, plants, and the nature to live more in balance (Dyah-Rahmawati et al., 2020). In this study, responses of students including death, global warming, glacier melting, extinction of species, carbon dioxide, radiation, acid, air and water pollution could be presented as examples of long-term environmental consequences. On the other hand, high levels of anxiety, awareness, and information students had on environmental pollution might not be very promising for attitudes and behaviors towards improving the environment (Thomas et al., 2020). In an experimental study on noise pollution in Brazil, only 55% of students reported being bothered by noise and only half of them tried to solve the problem, even though outdoor noise pollution exceeded WHO recommended levels (Souza et al., 2020). The findings of Hammami et al. (2017) show that individuals think that plastic waste is harmful to the environment, but their knowledge of various aspects of plastic pollution is weak. Iliopoulou (2018), in another study conducted in Greece, says that students exhibit a kind of systematic thinking about pollution that is to a certain extent unconscious. It is possible to see such low levels of knowledge and awareness of environmental pollution in both developed and developing countries. For example, a study on the severity of environmental pollution and remedial measures found that only 39.0% of respondents had clear knowledge about environmental pollution (Nahar et al., 2021).

Lack of understanding of the environment can stem from the individual's family, lack of education or the individual themselves. Although it is possible to hear different voices on this issue, many studies point to the importance and necessity of environmental education (Al-Maliki et al., 2021; Zsóka et al., 2013). For some researchers, this education is explained as improving the curriculum (Brody, 1991; Rebolj & Devetak, 2013), for others as strengthening environmental awareness in teachers and pre-service teachers (Arık & Yılmaz, 2017; Ayeni, 2021; Aznar-Díaz et al., 2019), and for others as people's voluntary protection of the environment (environmental citizenship) (Dobson, 2007).

Conclusion and Recommendations

In the current study a total of 535 responses were received from secondary school students on environmental pollution and these responses were studied over 47 different concept patterns. The relevant responses were visualized with 5 concept network. The developed concept networks were identified as 71 and above, 30-20, 19-10, 9-5, and 4-1. Among results, the concept of "garbage" was expressed as a single response for 71 and above breakpoint. Students gave plastics, pet bottle, air pollution, glass, waste, nylon bag, and paper responses at 30-20 breakpoint. In concept network developed for 19-10 breakpoint, smoke, irresponsibility, trash bin, water pollution, odor, battery, iron, dirty, cleaning, factory smoke, melting of glaciers, disease, and extinction responses drew attention. Lastly, there were many concepts developed for breakpoint 9-5 and 4-1. Among these responses, particularly forest fire, human, space pollution, warning signs, radiation, visual pollution, homeless came to the fore. Based on these findings, it was argued that secondary school students mostly thought pollution was caused by humans. Students perceived humans were mainly responsible for environmental pollution and were interested in results of human behaviors. In addition, it was observed that student responses such as forest pollution, extinction, disease, carbon dioxide, and radiation indicated that students were conscious of results of environmental pollution. On the other hand, it could also be argued that students had some misconceptions on environmental pollution. Particularly, their oxygen, leaf, homeless, and recycling expressions could be listed among these misconceptions. Students drew attention to not only today, but also possibilities for the future and although they had lacking information on environmental pollution, they mostly presented a coherent consciousness. However, this coherent approach could increase with a strong continuity. As a result, a society with high awareness level would have an equally high level of ownership and protection of the nature and environment (KONDA, 2021). In this scope, turning pro-environment ideas to behaviors and policies had a vital importance in the framework of the understanding of sustainability.

Study findings demonstrated that students had some misconceptions particularly on factors causing environmental pollution. At this point, identification of misconceptions and conducting educational studies for their elimination by teachers could be recommended. In addition, what were the items that students defined as garbage was a matter of curiosity. Different studies in this area could investigate which metaphors students related the concept of garbage with. Studies with such depth could lead to informative activities on the concept of recycling that draw attention with its increasing importance, its benefits, and which garbage could be reused with recycling.

Limitations

This study had some limitations in some of its dimensions. Particularly, most of the participants that lived on the east of Türkiye studied at a region that could be defined to have socio-economic disadvantages. Therefore, studies conducted at a different region and city center could provide different results. Secondly, this study includes secondary school students. Results of the study on younger and older age groups are interesting. Finally, the study was limited with structured interview questions to reach more participants.

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The Effect of Reality Therapy-Based Career Counseling Psychoeducation Program on High School Students

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ABSTRACT

Career, which refers to the sum of an individual's experiences, particularly in the process of acquiring a profession, is not limited to the choice of a particular occupation, but is shaped by the skills and achievements acquired by an individual throughout his or her life. In this study, the effectiveness of the Reality Therapy-Based Career Counseling Psychoeducation Program (RTCCP) developed for high school students, which is one of the important processes in career development, on individuals' career engagement, depression, anxiety and stress levels was examined. In the study, a quasi-experimental design with pre-test, post-test, follow-up, control group was used. The research group consisted of 20 11th grade students. 10 individuals were assigned to the experimental group and 10 to the control group. In the experimental group, the researcher administered five sessions, one session per week, of the RTCCP, which was applied as a group. The Career Engagement Scale (CAS) and Depression, Anxiety and Stress Scale (DASS-21) were used as data collection tools. Mann Whitney U Test and Wilcoxon Signed Ranks Test were used to determine the effect of the RTCCP applied to the experimental group. As a result of the study, it was found that RTCCP was effective in increasing secondary school students' career engagement and decreasing their depression, anxiety and stress levels. The findings were discussed within the framework of the related literature and recommendations were presented.

Keywords: Adolescence, anxiety, career engagement, depression, reality therapy, stress.

Introduction

Career refers to the sum of the processes that individuals go through in their professional life and is generally associated with progression, development and experience in a profession or field of work. A career is not limited to the choice of a particular profession but is shaped by the experiences, skills and achievements of the individual throughout his/her life (Savickas, 2002). Although the concept of a career is traditionally associated with a profession or a job, today it has a broader perspective. New career models allow individuals to manage their careers in a more flexible and dynamic way. In this context, the definition of a career may vary according to individuals' goals, values and life circumstances (Çelenk, 2022). However, it is generally accepted that a career is an important element that affects an individual's social identity, social status and quality of life. Therefore, career planning and management play a critical role in both the professional and personal development of individuals (Creed & Hood, 2009).

One of the important roles of a career is to provide financial security and independence (Bea & Yi, 2019). Earning a regular income helps to meet one's own needs and achieve financial freedom. In addition, individuals find the opportunity to realise themselves through their careers. Achieving success by discovering and developing personal talents provides great satisfaction to the individual (Farrugia, 2021). Another important role of career is to expand one's social environment and increase the number of people with whom one interacts (Jiang, 2017). Especially the relationships established with colleagues and professional staff contribute to the social life of the individual. In addition, people find the opportunity to provide useful services to society through their careers. Specializing in their field of work and responding to the needs of society gives meaning and purpose to the individual (Savickas, 2008). This meaning and purpose are sometimes internalized and become part of a person's identity. Through their profession, people define themselves and determine their status in society (Meijers & Lengelle, 2012). These considerations show that a career

has important roles in people's lives in many aspects such as financial security, personal development, social relations, contribution to society and gaining identity.

When the studies on careers are examined, it is noteworthy that these studies are especially related to adolescents. One reason for this may be that adolescence is a critical period in terms of career development as it marks an important transition from childhood to adulthood. During this time, young people begin to explore their interests, values and talents, as well as considering potential career paths (Eriksson et al., 2018). The decisions they make and the experiences they have during adolescence can significantly shape their future career trajectories. Adolescence is a period of identity formation, and career exploration is an integral part of this process (Batool & Ghayas, 2020). As young people begin to understand their unique strengths, weaknesses and preferences, they can begin to envision the types of jobs that match their sense of self. It is also a period of rapid skill development in both academic and extracurricular areas (Munadi et al., 2021).

In addition, during adolescence, young people set goals for their future, both in terms of educational and career expectations. This goal-setting process can provide a sense of direction and motivation that can be particularly useful during the challenging teenage years (Araújo et al., 2007). In particular, young people who participate in career development activities can gain a better understanding of the education and training required for different careers. This knowledge can help them make informed decisions about their future education and career paths. Moreover, career development activities such as personality assessments and interest inventories can help adolescents better understand their unique characteristics and preferences. This self-awareness can lead to more satisfying career choices and a greater sense of purpose (Özek & Ferraris, 2018). Based on these ideas, it can be said that career development during adolescence is important to help young people find their way into adulthood and make informed decisions about their future careers. It can also be stated that by participating in career exploration activities, developing relevant skills and setting goals, adolescents can increase their opportunities to build satisfying and successful careers.

Various career development theories emphasize the importance of adolescence in shaping career choices and aspirations. For example, Super's Life Course, Life Span Theory suggests that career development is a lifelong process and that adolescence is a crucial stage for self-concept development and career exploration (Hartung, 2013). Similarly, Ginzberg's Developmental Theory states that development at this stage, when adolescents begin to explore various career options and evaluate their interests and abilities, is necessary for making informed career choices in adulthood (Ginzberg, 1972). Holland's Career Choice Theory argues that during adolescence, individuals begin to identify personality traits and interests that can guide their career exploration and decision-making processes (Nauta, 2013). Social Cognitive Career Theory emphasizes that adolescents shape their career aspirations and paths by being influenced by their social contexts, especially family and peer support (Kantamneni et al., 2018). As can be understood from these theories, it can be said that adolescence is a critical period for career development and choice, when individuals begin to explore their identities, interests and potential career paths.

There are various factors that can negatively affect career development during adolescence, which involves a process of choice and development; in particular, adolescents' inability to recognize their own characteristics such as interests, abilities, values and personality traits is one of the main factors (Kalafat, 2014). Adolescents often have difficulty in accurately defining their interests and abilities. This inability may result from limited exposure to various career options and lack of information (Dönmezoğulları, 2020). Without a clear understanding of their strengths and preferences, they may find it difficult to explore career paths that align with their true selves. Moreover, when adolescents lack insight into their own characteristics, they may feel overwhelmed by the multitude of career options available (Douglas & Shepherd, 2002). This confusion can lead to indecision or reliance on external influences such as peers or societal expectations rather than making choices that align with their personal values and aspirations.

Adolescents may find it difficult to take responsibility for their career choices, especially if they are unsure of their identity. This avoidance may result in a passive approach to career development. As a result, adolescents may be drawn to careers based on external pressures rather than actively pursuing paths that reflect their true interests (Anderson et al., 2019). Moreover, external factors such as family expectations, peer pressure, and educational environments can further complicate an adolescent's ability to make career decisions (Akkoç, 2009). For example, if family members prioritize certain careers or peers influence choices based on trends, adolescents may feel obliged to conform, which can lead to dissatisfaction and dissonance with their true selves. Adolescents may experience anxiety or fear about their career decisions, especially if they perceive high risk in their choices (Aşık & Akgül, 2022). This psychological pressure may hinder their ability to explore options freely and lead to avoidance behaviors, further complicating their career development.

As a result, adolescents' inability to recognize their own characteristics and external pressures, combined with psychological factors, can create significant challenges in career decision-making. Encouraging self-discovery and providing environments that support mental health can help adolescents develop a clearer understanding of their identity and make more informed career choices.

An important thing to know about adolescents' mental health is that depression, stress and anxiety during adolescence have a significant negative impact on career development (Walker & Peterson, 2012). These mental health issues can create barriers that affect decision-making, self-perception, and overall well-being (Bishop & Gagne, 2018) and ultimately affect career trajectories. Adolescents experiencing depression, stress or anxiety often struggle with self-awareness. They may have difficulty recognizing their own interests, abilities, values and personality traits (Cho, 2023). This lack of self-recognition can lead to career choices that are not aligned with their true selves. Mental health problems can also impair cognitive functions such as concentration, memory and critical thinking. This impairment makes it difficult for adolescents to effectively evaluate career options and make informed decisions (Messersmith et al., 2008).

Adolescents struggling with these issues may avoid taking responsibility for their career choices. They may leave decision-making to their parents, peers or societal expectations. This can lead to a lack of ownership in their career path. Research shows that high levels of stress and anxiety are associated with lower academic performance, which can limit career opportunities (Ahmed & Julius, 2015; Hegenauer, 2018). This suggests that adolescents' inability to recognize their own characteristics, coupled with the challenges posed by depression, stress and anxiety, can significantly hinder their career development (Gao & Eccles, 2020). Adolescence is characterized by the discovery of identity and the beginning of decision-making processes that shape future career paths (Germeijs & Verschueren, 2009; Pellerone et al., 2015). The choices they make help them understand their interests, values and abilities. When adolescents actively participate in decision-making, they gain insight into their preferences, which later supports more informed career choices (Ahmed & Ahmed, 2017; Messersmith et al., 2008). Taking responsibility for career-related choices fosters a sense of agency and autonomy in adolescents. This empowerment can increase their motivation and confidence to pursue their goals (Araújo et al., 2007). When adolescents feel that they have control over their decisions, they are more likely to stick to their chosen paths and make efforts to achieve their career goals (Ahmed & Ahmed, 2017).

Being involved in the decision-making process enables adolescents to develop critical skills such as problem solving, planning and evaluating options (Jonassen, 2012). These skills are necessary to overcome the complexity of career choices and adapt to changing circumstances in the future. The ability to make informed decisions also prepares them for the responsibilities they will face in adulthood (Solberg et al., 2002). Moreover, although making choices is important, external pressures from family, peers and society can complicate this process. Adolescents may feel obliged to conform to the expectations of others instead of pursuing their true interests. This may lead to dissatisfaction, disconnection and lack of authentic decision-making in their careers (Bland & Roberts-Pittman, 2014). These views show that the ability to make choices and take responsibility during adolescence is very important in career development. From this perspective, it can be said that the career development process in adolescence can be examined with Reality Therapy.

Reality Therapy is an approach developed by William Glasser that focuses on helping individuals take responsibility for their own behavior and make better choices to improve their lives (Wubbolding, 2015). Emphasizing that individuals are responsible for their own behavior and choices, Reality Therapy encourages people to realize that they have control over their behavior and can make positive changes in their lives. It also states that all behaviors are chosen when individuals are trying to meet their basic needs. Therefore, it aims for individuals to evaluate their current behaviors and make better choices to improve their lives (Glasser, 2014).

This approach can have a significant impact on career development in several ways. Reality therapy encourages clients to recognize their interests, values and abilities, which is important for making informed career choices (Mason & Duba, 2009). It also emphasizes personal responsibility, empowering individuals to take control of their career decisions and commit to their chosen paths (Hashemi et al., 2019). It helps individuals develop critical skills such as problem solving, planning and evaluating options. In addition, focusing on making better choices in the present, which Reality Therapy emphasizes, can help individuals approach career development in a more positive and proactive manner (Razavi & Sedrpoushan, 2023).

Reality Therapy emphasises personal responsibility, self-determination and the ability to make choices to meet one's basic needs (Glasser, 2014). Adolescents often find it difficult to take responsibility for their career choices due to external pressures (e.g. societal expectations, peer influence) or internal barriers (e.g. indecision, anxiety)

(Punch, 2005). In this context, Reality Therapy has been used to help adolescents recognise their capacity to make informed career choices, to empower them to take ownership of their career paths rather than relying on external influences, and to promote a sense of agency, which is critical for motivation and long-term commitment to career goals.

In addition, Reality Therapy emphasises evaluating one's current behaviour and making better choices to achieve life goals (Lojk & Lojk, 2020). This directly supports career development, including self-assessment, goal setting and decision making. Therefore, in line with the individual's career exploration process, Reality Therapy was used to identify their interests, values, abilities and aspirations, to assess and change behaviours that may hinder career progression (e.g. procrastination, avoidance), to make realistic and achievable plans for educational and career goals, and to align with their sense of self. This attitude can be supported by the findings in the literature.

A study investigating the potential impact of implementing Reality Therapy in schools focused on the impact of the therapy on students' academic achievement, personal/social development and career decision-making skills (Mason & Duba, 2009). In the study conducted by Hong and Park (2018), a career counseling program that includes the principles of Reality Therapy was developed and the positive effects of this program on individuals' career development were revealed. Bedford et al. (2022) emphasized the importance of creativity and self-expression in the career decision-making process and determined the contributions of programs that include these skills to people's careers. Similar findings were found in a mixed-method study. In this study, the role of social-contextual factors in shaping individuals' career interests and aspirations was emphasized (Messersmith et al., 2008). These findings suggest that intervention programs based on Reality Therapy support career development by increasing self-awareness, promoting responsibility, improving decision-making skills, and developing a positive mindset. Although career-related intervention programs using Reality Therapy are limited, the principles of this approach can be effectively applied to support individuals in their career development journey.

Purpose of the Study

As a result of the review of the relevant literature, no career development intervention program based on Reality Therapy has been encountered in Turkey. In this context, in this study, an intervention program content was prepared based on the choice and responsibility consciousness of Reality Therapy, which will enable the individual to realize his/her educational and personal characteristics, create career goals, and options in line with these goals, and make plans in line with these target options. As a result, the problem of the study is to test the effectiveness of the Reality Therapy-Based Career Counseling Psychoeducation Program (RTCCP) prepared to support the career development process of adolescents.

In line with this general objective, the research questions:

- There is a significant difference between the rank means of CAS pre-test and post-test scores, as well as the difference between the rank means post-test and follow-up test scores of individuals who participated in the RTCCP. There is no significant difference between the rank means CAS pre-test and post-test scores of individuals who did not participate in the RTCCP.
- There is a significant difference between the rank means pre-test and post-test scores of the Depression, Anxiety and Stress Scale (DASS-21) and also a difference between the rank means post-test and follow-up test scores of the individuals who participated in the RTCCP. There is no significant difference between the rank means pre-test and post-test scores of the individuals who did not participate in the RTCCP.

Method

Research Model

An experimental design was used in this study. In this context, it was tried to reveal the change in career engagement, depression, anxiety and stress levels of the study group before and after the Reality Therapy-Based Career Counseling Psychoeducation Program (RTCCP) developed by the researcher. The dependent variable of the study was students' career engagement, depression, anxiety and stress levels, and the independent variable was the RTCCP. In this study, a quasi-experimental study was conducted with experimental and control groups using a 2x3 design with pre-test, post-test and follow-up measurements (Büyüköztürk, 2009).

Study Group

The participants were a total of 20 high school students, 10 female and 10 male, who met the inclusion criteria. These were; (1) 11th grade students; (2) students signed the informed consent form; (3) parents signed the informed consent form. In addition, students who received any psychological help and had any psychiatric diagnosis at the time of the study were excluded from the study. Assignments to the experimental and control groups were made by grouping the participants' pretest scores from the Career Engagement, Depression, Anxiety and Stress Scales. These scores were first divided into men and women

according to gender. Then, they were grouped as high, medium and low between men and women. After the groupings were completed, participants from each group were randomly selected and assigned to one experimental and one control group. As a result, five of the participants assigned to both the experimental and control groups were randomly assigned as five women and five men.

Data sources of the research

Reality Therapy Based Career Counseling Psychoeducation Program (RTCCP)

The Reality Therapy-Based Career Counseling Psychoeducation Program (RTCCP) was designed in two stages in line with the stages established by Nazlı (2016):

Phase 1: Preparation of Program Infrastructure

The infrastructure, philosophical and theoretical foundations of RTCCP were prepared by taking into account the career planning programs prepared in the literature. RTCCP was designed on the basis of humanistic philosophy and Reality Therapy. While preparing the substructure of RTCCP, components including self-knowledge, career studies conducted with adolescents (Kracke, 2002; Patton & Porfeli, 2007), self-knowledge, career recognition, making choices, taking responsibility and developing social relations skills were added. Considering the fact that the focus on short-term counseling processes is more effective in seeking relevant solutions (Corey, 2012) and the low rate of participation in long-term help services (Bloom et al., 1982), the RTCCP was planned as a total of five sessions, one session per week. In addition to the fact that semi-structured programs provide a certain level of standardization and flexibility, they are more suitable for social science research thanks to the flexibility they provide (Türnüklü, 2000), the outlines of the sessions are maintained with a pre-structured protocol, and they provide more systematic and comparable information (Yıldırım & Şimşek, 2008).

Phase 2: Identifying the Four Elements of the Program

The RTCCP design has four main elements. These are acquisition, content, process and assessment. The learning outcome component was prepared in line with Wellman and Moore's taxonomy. In this context, the knowledge, skills and attitudes to be gained are determined by learning outcomes (Nazlı, 2016). The learning outcomes of the RTCCP were written at the level of "perception" and "comprehension" for the educational and personal characteristics, future expectations, preferences and decisions of adolescents. The RTCCP consists of a total of five sessions, each lasting an average of 60 minutes, one day a week. In the first session of the RTCCP, in addition to introductions and structuring, educational background, educational strengths, areas of difficulty, advantages and challenges were discussed. The second session covered personal characteristics such as interests, abilities, needs and personality traits, the third session covered future expectations, the fourth session covered preferences, and the fifth session covered closure and decisions. In addition, homework assignments were given at the end of each session, enabling students to experience the gains of the session in their daily lives.

Data Collection Tool

Career Engagement Scale (CAS)

The Career Engagement Scale developed by Hirschi et al. (2014) consists of a single dimension including 9 items ("Taking initiative to achieve my career goals", "Being interested in my career development"). The scale items are in 5-point Likert type ranging from 1 (Almost Never) to 5 (Very Often). An individual's high score on the scale means that he/she performs career management behaviors proactively. In the Career Engagement Scale (CAS) adapted into Turkish by Korkmaz et al. (2020), the participants are asked to indicate the behaviors that show the extent to which they are engaged in career development tasks that they have observed in the last six months. The Cronbach's Alpha internal consistency coefficient of the Turkish version of the scale was .88 and the correlation obtained as a result of the test-retest method was found to be moderate and significant (r = .67, p<.001). In addition, item-total correlations ranged between .49 and .80. Furthermore, it was reported that the scale demonstrated positive and moderate correlations with career exploration, career planning and career decision self-efficacy scales. In this study, the Cronbach's alpha value of the scale was found to be 0.88.

Depression, Anxiety and Stress Scale (DASS-21)

The Depression, Anxiety and Stress Scale (DASS-21) developed by Lovibond and Lovibond (1995) measures negative states observed in depression, anxiety and stress. The scale consists of three subscales: depression, anxiety and stress. There are a total of 21 items with 7 items in each subscale. The DASS-21was adapted into Turkish by Yıldırım et al. (2018). The high score obtained from each subscale indicates the excess of complaints related to the relevant subscale. Cronbach alphas of the scale vary between .87 and .90. Unweighted least squares (ULS), generalised least squares (GLS), partial least squares (PLS) and diagonal weighted least squares (DWLS) were used together. The scale values show that the loadings of all statements are statistically significant and have an acceptable level of loading on the relevant construct. Therefore, construct validity is established according to these 3 methods. In this study, the Cronbach's alpha coefficients of the DASS-21 were .89 for depression, .89 for anxiety and .91 for stress.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Erzincan Binali Yıldırım University Educational Sciences Ethics Committee (Date: 26.04.2024, Number: E-88012460-050.04-353423)
- Informed consent has been obtained from the participants.

Data Analysis

In the analysis of the quantitative data of the study, nonparametric analysis methods were used because the data were not normally distributed and the number of participants was not sufficient for parametric tests (Büyüköztürk, 2009). In this context, the Wilcoxon Signed-Ranks Test was used to determine whether there was a significant difference in the pre-test and post-test scores of the groups, and the Mann Whitney-U test was used to analyze the differentiation between the pre-test and post-test scores of the groups. When the difference between the scores was found to be significant, the formula $r = z/\sqrt{N}$ was used to calculate the effect size. For the "r" value levels calculated as a result of the formula, .1 was interpreted as "small", .3 as "medium" and .5 as "large" effect size (Coolican, 2014).

Procedure

In order to conduct the study, approval was first obtained from Erzincan Binali Yıldırım University Ethics Committee. Then, a literature study was conducted to develop the RTCCP. In order to ensure the expert validity of the resulting program, two academicians who are experts in the field were consulted. In line with the opinions received, the program was updated and finalized. The finalized program was applied to five secondary school students and a pilot study was conducted. After the pilot study, permission was obtained from the Provincial Directorate of National Education for the implementation of the finalized program. The research announcement was made by the researcher by visiting the classes and reaching the students and parents with the help of the brochures prepared. The 28 individuals who applied to the study were evaluated according to the inclusion criteria, 20 individuals who met the criteria were identified and the pre-test (T1) application was carried out. From the groups formed after T1, random assignments were made to the experimental and control groups, respectively. The researcher administered a post-test (T2) to the students in the experimental group after the application of the RTCCP and a follow-up test (FT) three months after this application. After the implementation process, T2 was applied to the students in the control group. The data obtained as a result of these studies were interpreted using quantitative analysis methods. There was no loss of subjects in the study. The implementation part of the research was carried out in the activity room of the school with the permission of the secondary education institution. After the application with the experimental group, the RTCCP was also applied to volunteer individuals from the control group.

Results

The mean and standard deviation values of the participants' scores from T1, T2 and FT are presented in Table 1. When Table 1 is examined, it is seen that the mean T1 scores of the individuals in the experimental and control groups are close to each other, while the mean career engagement T2 scores of the experimental group increased and the mean depression, anxiety and stress scores decreased. This situation is also the case in the mean scores of FT. In the control group, the increase in the mean career engagement T2 score was less, the mean depression T2 score decreased slightly, and the mean anxiety and stress T2 scores did not increase slightly.

When it was examined whether the T1 scores of the participants differed according to the groups, no significant difference was found between all T1 scores of the experimental and control groups (U_{CAS}= 42.50, p > .05; $U_{Depression}$= 42.00, p > .05; $U_{Anxiety}$= 41.00, p > .05; U_{Stress}= 47.00, p > .05; Table 2).

Table 1

Mean and Standard Deviation Values for the CAS and DASS-21

Variable	Group	T1		T2		FT	
		x̄	sd	x̄	sd	x̄	sd
CAS	Experiment	17.20	4.02	32.60	3.56	30.50	5.95
	Control	17.90	3.81	18.10	4.53	-	-
	Total	17.55	3.83	25.35	8.43	30.50	5.95
DASS-21 Depression	Experiment	16.10	3.38	7.00	2.98	5.30	2.41
	Control	15.10	3.45	14.00	3.05	-	-
	Total	15.60	3.36	10.50	4.64	5.30	2.41
DASS-21 Anxiety	Experiment	11.60	3.67	5.90	3.94	4.00	1.94
	Control	12.30	2.91	14.60	1.51	-	-
	Total	11.95	3.25	10.25	5.22	4.00	1.94
DASÖ-21 Stress	Experiment	15.20	3.01	6.10	3.28	4.10	2.33
	Control	15.00	2.71	15.30	1.49		
	Total	15.10	2.79	10.70	5.33	4.10	2.33

Note: n= 20 (Experimental group = 10, Control group = 10); CAS: Career Engagement Scale; DASS-21: Depression, Anxiety, Stress Scale

This shows that the experimental and control groups were similar to each other in terms of career engagement, depression, anxiety and stress levels before the experimental procedure.

Table 2

Mann-Whitney U Test Results Regarding CAS and DASS-21 T1 Scores of Experimental and Control Groups

	Group	*n*	Rank Mean	Rank Total	*U*	*p*
CAS	Experiment	10	9.75	97.50	42.50	.567
	Control	10	11.25	112.50		
DASS-21 Depression	Experiment	10	11.30	113.00	42.00	.540
	Control	10	9.70	97.00		
DASS-21 Anxiet	Experiment	10	9.60	96.00	41.00	.491
	Control	10	11.40	114.00		
DASS-21 Stress	Experiment	10	10.80	108.00	47.00	.819
	Control	10	10.20	102.00		

Note: CAS: Career Engagement Scale, DASS-21: Depression, Anxiety, Stress Scale

The results of the Wilcoxon Signed-Ranks Test for the T1 and T2, T2 and FT scores of the experimental and control groups from the CAS and DASS-21 scales are presented in Table 3. When Table 3 is analyzed, the following findings were obtained.

Career engagement. Participants in the experimental group had a significantly higher CAS score at T2 with a statistically large effect size compared to T1 (z= -2.51, $p < .05$). In addition, there is no statistically significant difference between the FT scores of the experimental group and T2 scores (z= -1.25, $p > .05$). On the other hand, there was no statistically significant difference between the T2 and T1 (z= -.18, $p > .05$) scores of the participants in the control group. In this context, it can be stated that RTCCP was effective in increasing the participants' career engagement scores and maintaining this difference.

Depression, anxiety and stress. The scores of the individuals in the experimental group on the DASS-21 T1 were significantly higher than their scores on T2 and the difference had a large effect size ($Z_{depression}$= -2.81, $p < .05$; $Z_{anxiety}$= -2.81, $p < .05$; Z_{stress}= -2.67, $p < .05$).

Similarly, there is a significant difference between T2 and FT ($Z_{depression}$= -2.33, $p < .05$; $Z_{anxiety}$= -1.98, $p < .05$; Z_{stress}= -2.53, $p < .05$) with a large effect size. This shows that the RTCCP was not only functional in reducing the depression, anxiety and stress scores of the participants, but also effective in the permanence of this change.

In the control group, there was no significant difference between the depression, anxiety and stress T1 and T2 total scores of DASS-21 ($Z_{depression}$= -.42, $p > .05$; $Z_{anxiety}$= -2.12, $p > .05$; Z_{stress}= -.49, $p > .05$). This shows that the depression, anxiety and stress levels of the control group did not change.

Table 3

Wilcoxon Signed-Ranks Test Results of the Experimental and Control Groups' CAS and DASS-21 T1 and T2, T2 and FT Scores

			T2 – T1					FT – T2				
			n	Rank Mean	Rank Total	*Z*	*p*	*n*	Rank Mean	Rank Total	*Z*	*p*
CAS	Experimental Group	Negative	0	.00	.00	-2.81	.005*	6	5.50	33.00	-1.25	.212
		Positive	10	5.50	55.00			3	4.00	12.00		
		Equal	0	.00	.00			1				
	Control Group	Negative	5	4.20	21.00	-.18	.857					
		Positive	4	6.00	24.00							
		Equal	1									
DASS-21 Depresyon	Experimental Group	Negative	10	5.50	55.00	-2.81	.005*	9	5.56	50.00	-2.33	.020*
		Positive	0	.00	.00			1	5.00	5.00		
		Equal	0					0				
	Control Group	Negative	5	5.20	26.00	-.42	.676					
		Positive	4	4.75	19.00							
		Equal	1									
DASS-21 Anksiyet	Experimental Group	Negative	10	5.50	55.00	-2.81	.005*	6	5.33	9.00	-1.98	.048*
		Positive	0	.00	.00			2	2.00	27.00		
		Equal	0					2				
	Control Group	Negative	1	1.50	1.50	-2.12	.054					
		Positive	6	4.42	26,50							
		Equal	3									
DASS-21 Stres	Experimental Group	Negative	9	5.00	45.00	-2.67	.008*	9	5.78	52.00	-2.53	.011*
		Positive	0	.00	.00			1	3.00	3.00		
		Equal	1					0				
	Control Group	Negative	4	4.63	18.50	-.49	.625					
		Positive	5	5.30	26.50							
		Equal	1									

Note: CAS: Career Engagement Scale; DASS-21: Depression, Anxiety, Stress Scale; *= $p < .05$; [a]= Large impact size

Discussion

According to this study, when compared to the control group, the career engagement of the students who underwent RTCCP increased significantly, while their depression, anxiety and stress levels decreased significantly. These findings are consistent with previous studies showing that assistance programs offered to students regarding career development during adolescence positively affect career development (Konuk, 2020; Mahmud et al., 2022; Pambudi et al., 2019).

Some previous studies in Turkey have also found that assistance services that support career development during adolescence increase adaptation by reducing negative situations in career development (Atasever & Yeşilyaprak, 2022; Eryilmaz & Kara, 2020; Konuk, 2020; Seker & Çapri, 2022). However, it is seen that previous studies in Turkey were prepared on the basis of hope-oriented and lifelong development. This study, which prioritizes making choices, planning one's own future and taking responsibility on the basis of Reality Therapy, differs from previous studies in Turkey. In addition, it was determined that the studies on career development in Turkey were mostly conducted with university students. This study, which was conducted with secondary school students, differs from other studies in this respect. This situation shows that there is a need for more research on programs supporting career development at different levels in Turkey.

The positive change in the individuals in the experimental group as a result of RTCCP can be explained in several ways. First, the fact that the participants shared about themselves in the first sessions of the RTCCP and felt unconditionally accepted during these sharing sessions may have helped them realize their own roles and responsibilities in their career development by making them aware of their feelings, thoughts and behaviors related to their career development. The effect of being aware of the roles and responsibilities in a situation on the negative attitude towards that situation is known (Jamalabadi et al., 2022). The related sessions of the RTCCP may have increased the self-awareness of the participants in the experimental group and enabled them to perceive their choices and responsibilities in the process.

Second, the participants' realization of their educational backgrounds, advantages and disadvantages, and working on these situations in the RTCCP sessions may have supported their choices that are effective in career development. Considering that individuals experience significant problems while making choices during adolescence (Albert & Steinberg, 2011), it can be thought that increasing effective choice-making skills contributes to positive changes in individuals' engagement to career choices, depression, anxiety and stress. In particular, the difficulties and indecisions that individuals experience in the face of choices can be a trigger for mental problems such as depression, anxiety and stress (Lauderdale et al., 2019).

One explanation for the positive change in individuals as a result of the RTCCP may be the change in their problem solving skills. Especially in the third and fourth sessions of the RTCCP, sharing about self-knowledge, knowing the profession and making a choice by thinking about their responsibilities may have supported individuals to struggle more actively, more rationally and more concretely with the problems they faced in their career choices. The struggle with the problems encountered in this direction may have increased the adaptation and engagement to the career process by reducing the uncomfortable situations and decreased the depression, anxiety and stress reactions that occur in problem situations. This idea can be supported by previous research findings. For example, the study conducted by Dowrick et al. (2004) revealed the effectiveness of individuals' problem solving skills on career development. In addition, there are many studies emphasizing that problem solving behaviors are related to depression, anxiety and stress (Ahmadi, 2013; Michelson et al., 2022). These findings reveal that helping services that support problem-solving skills such as RTCCP support positive change in an individual's career engagement, depression, anxiety and stress levels.

Another explanation for the change in the experimental group may be related to the individuals' knowledge about career goals. The activities related to collecting information about career goals, which were included in the last sessions of the RTCCP, may have supported individuals who did not have sufficient information about these goals before the implementation and who generally acted with the information they obtained from their environment to make choices in the light of the information they acquired. It can be expected that individuals with an increased level of knowledge in this direction will increase their level of career engagement and decrease their level of depression, anxiety and stress by making more informed choices. Kamoche et al. (2011) supported this view and reported that having knowledge supports positive changes in career development.

In addition, having knowledge about career was emphasized by Watts et al. (2019) and revealed that individuals with knowledge and awareness about their career experience a more positive career development process. In addition, it has been determined that having

career-related knowledge is negatively related to depression, anxiety and stress (Karaoğlu & Şeker, 2010). Based on these findings, it can be said that having knowledge about career goals increases career engagement levels of the participants by reducing depression, anxiety and stress. Finally, the short-, medium- and long-term goals created to achieve the career goals set in the RTCCP may have motivated the participants by concretizing their choices and responsibilities and demonstrating that the goal was achievable. This motivation may be another explanation for the observed positive change. The desire and effort to achieve career goals is considered an important psychological tool for career development and mental health (Araújo et al., 2007).

In this context, the motivation that emerged through the possible impact of the RTCCP sessions may have had an impact on the participants' mental health. The indirect effect of the RTCCP on individuals' motivation may have led to more dedication to their career and realizing their responsibilities in this way. Because motivation is related to determining one's choices and acting in line with these choices (Bayrakçeken et al., 2021). Finally, the professional counseling environment based on unconditional acceptance may have supported the participants' positive views about themselves by making them feel understood (Baitar et al., 2012). Therefore, participants whose self-perception was supported may have increased their level of career engagement by realizing their roles and responsibilities in the career development process during adolescence, while decreasing their levels of depression, anxiety and stress.

Another striking finding of the study is that there was no significant change in the scores of the participants in the control group. This finding shows that individuals who do not receive any help services during the career development process in adolescence continue to have complaints about their mental health. This situation reveals the importance of career development assistance services offered to students who are close to making a career decision.

Conclusion and Recommendations

The results of this study reveal that professional help services received during adolescence increase individuals' career engagement and decrease their complaints such as depression, anxiety and stress. In this context, it is important to develop programs that will structure such professional help services in future studies.

This study shows that it is important for experts working on the career development process with adolescents to construct realistic and rational process structures, examine the individual's educational experiences, recognize personal characteristics, identify career alternatives, set goals among these alternatives, determine short, medium and long term actions to achieve these goals, and most importantly, recognize the individual's roles, choices and responsibilities in this process. This study was conducted in the form of group sessions and the participants actively participated in these sessions. It is considered useful for field experts to include group sessions in their practices, to support the active participation of individuals in the process in these sessions and to allow them to express themselves. While individual sessions are organized especially with individuals with high-level problems, group sessions with individuals with medium and low-level problems can be useful. For this reason, it is important that programs aiming to support career development in adolescence should be staged according to the level of need and risk, and the effectiveness of such staged programs should be tested and disseminated.

The RTCCP, which lasted a total of five sessions, shows that effective results can be obtained in a short time. Finally, the fact that there was no loss of subjects during the RTCCP process with ten participants shows the need for professional help in this process. In this context, it can be said that it is important to encourage and persuade individuals who are in the process of career development during adolescence to seek professional help. All these situations show that it is important for field experts to include group sessions in their studies on the subject, to create these sessions for both genders, to keep the number of sessions low, and to include gains such as restructuring, analysis of educational background, realization of personal characteristics, setting goals, making plans for the goals set, and making the individual realize his/her choices and responsibilities in this process. Future research can be conducted by paying attention to these situations. In addition, the effectiveness of two different applications can be tested by including individual sessions as well as group sessions. In addition, in future studies, the effectiveness of this situation can be examined by including sessions in which students will participate together with their parents.

This study has some limitations. One of the limitations of this study is that it does not meet the assumptions of parametric statistics. In future studies, studies that meet the assumptions of parametric statistics can be studied. Another limitation of this study is that the data examining whether the effect of RTCCP continued after the implementation could not be collected from the control group. In future studies, longer follow-up studies of the individuals in the experimental group as well as the control group can contribute to the findings on the effectiveness of help interventions in this area. Third, in the selection of the

study group, individuals who did not receive a clinical diagnosis and whether they had problems in career development or not were taken into consideration. Future studies can be conducted with individuals who expressed that they had problems with career development during adolescence and who were clinically diagnosed with depression, anxiety or stress, and the findings can be compared. Finally, one of the characteristics of evidence-based intervention programs is that different researchers determine the effectiveness of the intervention program (Chambles & Hollon, 1998). Therefore, different practitioners can evaluate the effectiveness of the RTCCP. An important strength of this study is that it provides the Turkish literature with an intervention tool for putting the awareness of choice and responsibility emphasized by Reality Therapy to work in the career development process. In this respect, RTCCP is a semi-structured and short-term group program with tested effectiveness that can be used especially by experts in the fields of guidance and psychological counseling, career counseling and educational counseling.

Implication

The findings of this study provide valuable information for educational practitioners, counsellors, and policy makers interested in supporting young people's career development. Firstly, the findings suggest that integrating Reality Therapy principles, such as promoting responsibility, self-awareness and informed decision-making, into programmes such as RTCCP may be a practical approach to career counselling. Guidance and career counsellors may wish to consider incorporating similar frameworks into their own career development programmes.

Furthermore, the reduction in depression, anxiety and stress levels among participants highlights the importance of addressing mental health in career counselling. As mental health problems can interfere with decision-making and goal-setting processes, career development interventions can include components that support young people's mental well-being. In addition, the group format of the RTCCP has proven effective in creating a supportive environment where participants can share their experiences and reflect on their choices. Schools and counselling services can benefit from group-based interventions as a cost-effective and scalable solution for addressing career concerns among adolescents. The study also highlights the importance of career interventions during adolescence, a critical period for identity formation and career exploration. Schools can implement structured career development programmes as part of their curricula from early secondary education to equip students with the knowledge and skills needed to make informed career decisions.

Limitation

A total of 20 participants took part in this study, 10 in the experimental group and 10 in the control group. A larger sample size may increase the generalisability of the findings and the statistical power of the results. The study was conducted with 11th-grade students in a specific educational setting. Therefore, the results may not be generalisable to other age groups, educational levels or cultural contexts. The use of non-parametric statistical methods due to the small sample size and non-normal data distribution limits the robustness of the results. Future studies could aim to meet parametric assumptions by increasing sample size and ensuring normality. The intervention was delivered by a single researcher. Although this ensures consistency, it may also introduce biases related to the practitioner's approach. Replication by more than one practitioner will increase the reliability of the intervention. The study relies on self-report instruments for data collection, which may be subject to social desirability bias or inaccuracies in self-assessment. The inclusion of objective or behavioural measures may provide more robust evidence.

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The Opinions of Academics on the Usage of Artificial Intelligence Tools in Primary Schools

ABSTRACT

Within the scope of this research, it is aimed to obtain academician opinions on the use of artificial intelligence applications such as ChatGPT in the teaching-learning process and classroom applications in primary schools. In this research, the case study method, which is one of the qualitative research approaches, was used. The study group of the research consists of 10 academicians working in state and foundation universities. A semi-structured interview form prepared by the researchers was used as a data collection tool. The data obtained were analyzed by content analysis method. The findings reveal that artificial intelligence tools make significant contributions to the teaching-learning process in areas such as measurement and evaluation and material preparation; to teachers in terms of saving time and understanding the curriculum; to professional development in terms of following the literature and improving field knowledge; and to students in areas such as increasing motivation and supporting individual learning. However, negative aspects such as ethical and security issues, weakening of higher-order thinking skills in students, and mislearning were also pointed out. In addition, it was stated that artificial intelligence tools can be used effectively in various classroom applications in social studies, Turkish, mathematics and science courses. The study emphasizes the importance of balanced and conscious integration of artificial intelligence in education.

Keywords: Academic opinions, ChatGPT, artificial intelligence.

Introduction

The rapid development in technology has led to the expansion of information and communication networks at a similar pace to the beginning of the 21st century; in this period, the use of artificial intelligence technologies in many fields, like the business world, social media, and health research has led to significant changes in education systems. The habits of the new generation called digital natives, who have been interacting with computers, the internet, and social media tools since childhood, are naturally affected by these developments. In this context, the need for new tools and methods in education is increasing.

Innovations in education, intelligent applications, and learning platforms equipped with mobile infrastructure have started to be preferred by teachers (Xiaogang, 2018). Artificial intelligence opens personalized spaces for both the learner and the teacher. These applications play an important role in improving the quality of education in various areas, like personalized education programs, preparation of course content, selection of teaching models, and monitoring student performances (Meço & Coştu, 2022). Artificial intelligence technology is thought to be used in more applications in the coming years by providing feedback to learners and receiving support as a learning assistant (Kır & Şenocak, 2022). In addition, artificial intelligence systems can create visual, text, and different content without human intervention. This feature of artificial intelligence also causes discussions on the use of various methods in terms of measurement and evaluation.

The momentum of studies on using artificial intelligence in education has been increasing recently. Studies show that these technologies have positive effects on education. In the research by Meço and Coştu (2022), it is stated that artificial intelligence facilitates individual learning in education and helps teachers to use their time more efficiently. In addition, studies conducted in computer education, classroom education, distance education, foreign language learning, and museum education also emphasize the importance of this field. Similarly, Aslan (2022), in his research examining the effectiveness of the use of artificial intelligence in museum education,

concluded that artificial intelligence enables students to discover and develop their learning skills in different subjects instead of memorizing information. Thus, it was determined that it supports students in a way that they can use the information they have learnt throughout their lives.

The use of ChatGPT in education offers opportunities to overcome geographical barriers imposed by national and international boundaries, as educational resources are now easily accessible via the internet and the global web (Chen et al., 2020). This provides teachers resources, innovative teaching methods, cutting-edge technologies, and materials. So, these resources enable teachers to stay informed about the latest developments in education (Kasneci et al., 2023). Liu et al. (2022), found that AI tools such as GPT and chatbots had a positive effect on children's reading experiences, leading to increased interest and participation in reading activities. Liu et al. (2022), found that is has a positive effect on children's reading experiences, leading to increased interest and participation in reading activities. Another positive feature of using artificial intelligence models like ChatGPT is that it supports students' knowledge, development, and creativity (Bozkurt et al., 2023). In addition, there are also studies showing that tools like ChatGPT contribute to foreign language teaching. In their study on foreign language learning, Liu and Ma (2023) emphasized that artificial intelligence tools like ChatGPT provide instant feedback by involving students in interactive conversations, allowing them to apply what they have learned and use their creativity. Considering the effect of need generation and exposure to the target language on language learning in foreign language teaching, it can be said that ChatGPT creates a great opportunity. In studies focusing on foreign language teaching, dialogue-based applications are used by providing practice with oral and written interactions with chatbots (Belda-Medina & Calvo-Ferrer, 2022a). In addition, Pradana et al. (2023), in their literature review study discussing ChatGPT in education, stated that these tools can contribute to educational efficiency plans using ChatGPT as a data collection tool.

There are also some studies showing that textual communication-based tools like ChatGPT may have negative effects in the field of education. Steele (2023), in his study on the use of GPT models, mentioned that teachers experience some dilemmas regarding these applications and emphasized that they may sometimes have uneasiness in the assessment and evaluation process. In addition, Zhou et al. (2023) underlined that the world has evolved from algorithmic intelligence to linguistic intelligence with the use of ChatGPT but emphasized that these robots, which develop with purely textual and conversational features, may lead to ethical problems, various academic problems, and abuse in the future (Chomsky, 2023).

Based on literature findings, teachers' needs and preferences should be carefully approached in using different tools. The use of ChatGPT for learning and education brings along various controversies (Luo et al., 2023). Whereas it is emphasized in many studies that the integration of ChatGPT into education may have possible benefits like facilitate personalized learning, develop or adjust instructional materials and evaluation process in education (Baldoo-Anu & Ansah, 2023; Chiu, 2024), some of them mentions the drawbacks of using ChatGPT like checking the accuracy of the sources, not providing in-text references, checking the suitability of plagiarism, and being far from originality (Sallam, 2023). Based on this dilemma, Farrokhnia et al. (2023) evaluated the effects of ChatGPT with SWOT analysis in their study. Accordingly, while the strengths of ChatGPT include the use of advanced natural language, self-improvement ability, and personalized real-time answers, the weaknesses include lack of in-depth understanding, inability to measure the quality of answers, and lack of higher-order thinking skills. In the same study, while the threats to education include not understanding the context and normalization of plagiarism, the education opportunities include reducing the teacher's workload, supporting personalized learning, and accessibility of information. In addition, Su and Yang (2024), in their study on kindergarten teachers' views on the use of ChatGPT, stated that some kindergarten teachers saw ChatGPT as a powerful tool, while others described it as mediocre. Liu et al. (2022), stated the reasons for these differences as teachers' perceptions of ChatGPT use, pedagogical beliefs, technological skills, and openness to innovation.

As a result, the growth of the new generation, called the digital natives of the 21st century, intertwined with technology and the integration of these technologies into educational processes has led to radical changes in learning and teaching methods. Artificial intelligence applications have many advantages, like providing personalized learning experiences to students, helping teachers to prepare course content more efficiently, and increasing overall efficiency in education. However, it should be remembered that these technologies also bring ethical, pedagogical, and technical challenges. The OECD publication on the opportunities created by digital transformation and the risks it poses to human well-being has stated that the use of digital resources by teachers who do not have appropriate digital skills can actually distract teachers and students and therefore have a negative impact on learning outcomes (OECD, 2019). The teacher's digital competence is an integral part of their professional practices (McGar, 2024).

When the literature is examined, it is emphasized that

academicians should have knowledge about current developments in technology-integrated courses, but studies have yet to be found to determine their views on the use of artificial intelligence tools like ChatGPT in primary school. This study aims to provide valuable insights and guidance for educators, policy makers, and technology developers by examining in detail the applicability and impact of tools like ChatGPT in primary school education. In this way, while shaping the educational environments of the future, it will contribute to the adoption of a balanced and conscious approach in the integration of technological developments into education. Within the scope of the research, by focusing on the use of artificial intelligence technologies like ChatGPT in primary school education, it is aimed to reveal the potential and challenges of technological innovations like ChatGPT in education. Within the scope of this purpose, the research question is as follows:

1. What are the academicians' views on using artificial intelligence tools like ChatGPT in the teaching-learning process in primary school?

Method

A case study design, one of the qualitative research approaches, was used in this study. The case study involves the researcher's detailed and in-depth examination, description (Creswell, 2013), and evaluation of the factors related to that situation from different perspectives with a holistic approach by using various data collection tools (observation, interview, document, etc.) within the limited context of one or more situations (Patton, 2014; Yin, 2009). In this study, the only situation analyzed was determined as academician opinions on the application of artificial intelligence tools like ChatGPT in primary school courses. The reflections of these applications in terms of teacher, student, and teaching-learning process in line with the opinions of academicians, which is a single unit of analysis, were tried to be examined with a holistic approach to obtain more detailed and in-depth information about this situation. Therefore, this research was designed as a holistic single-case design. In the holistic single-case design, it is aimed to examine situations that have not been sufficiently examined and to provide an opportunity to form a basis for further research (Yıldırım & Şimşek, 2013).

Participants

The participants of this research are academicians working in the field of teacher education (classroom education). Criterion sampling, one of the purposeful sampling techniques, and maximum diversity sampling were used together to determine the study participants. The basic understanding in using the criterion sampling method is to examine situations that meet a set of predetermined criteria. The criteria or criteria mentioned here can be determined by the researcher (Yıldırım & Şimşek, 2013). In this context, actively using artificial intelligence applications like ChatGPT was determined as a criterion for the participants. Participants working in the department of classroom education were included in the study. These participants were diversified according to their scientific research in different fields of expertise at the primary school level (primary literacy and Turkish teaching, life science and social studies teaching, mathematics teaching, science teaching). The main purpose of maximum diversity sampling is to maximally reflect the diversity of individuals who may be parties to the problem being studied in a small sample (Yıldırım & Şimşek, 2013). In order to obtain opinions on the in-class applications of ChatGPT application in different courses, diversity was tried to be provided by including participants working in different fields of science. This sampling method provides heterogeneity among the participants and allows for revealing the standard dimensions and experiences of a situation (Patton, 2014). Codes like P1, P2, P3, etc., were used for each participant to protect the confidentiality of the participants included in the study. Demographic information about the participants is given in Table 1.

Data Collection Process

The data of the study were collected in the autumn term of the 2023-2024 academic year with a semi-structured interview form prepared by the researchers. According to Packer (2011), semi-structured interviews are the most common and useful qualitative research interview technique. In such interviews, the interview questions are prepared within the framework of the research questions. However, different questions may need to be asked according to the course of the interview and the course of the interview may need to be managed. In this context, the interview form, developed as a data collection tool, was prepared within the framework of the research questions. The interview form generally includes questions aimed at identifying the potential positive and negative aspects of artificial intelligence tools concerning teachers, students, and the teaching-learning process. Based on the interview questions, data were sought regarding the contributions of artificial intelligence tools to teachers' professional and personal development, their impact on students' cognitive, emotional, psychomotor, and social development, and their appropriateness for use in primary schools in terms of safety, ethics, and privacy. Additionally, questions were included about how artificial intelligence tools can be integrated into classroom practices in primary school lessons. Through the interview questions prepared in this context, efforts were made to gather data on how artificial intelligence tools can be utilized in the teaching-learning process in primary

schools for learning outcomes, content delivery, instructional materials, learning environments, methods, techniques, strategies, and assessment and evaluation activities. The interviews were conducted face-to-face by the researchers. Each interview lasted approximately 25 minutes and the interviews were completed within 2 weeks. During the development of the interview form, an extensive review of the literature on the subject was initially conducted. Expert opinions were sought to ensure that the prepared questions were capable of addressing the research questions effectively. Moreover, in order to ensure the content and opinion validity of the data collection tool by evaluating its suitability for the purpose, language expression, and technical adequacy, the opinions of a subject area expert, a measurement and evaluation expert, and an expert working in the field of Turkish education who have scientific research on the use of artificial intelligence tools and technologies like ChatGPT in education were consulted. A pilot interview was conducted with an academician to test the prepared interview questions. The instructor included in the pilot study was excluded from the participant group. In line with the feedback received from the expert opinions and after the pilot interview, two questions were removed from the interview form, the instructions for the questions with similar content were changed, and one question was added. In addition, some adjustments were made to the sequence of the questions to ensure the smooth flow of the interview. The finalized and restructured interview form was used as the data collection tool in this study.

Table 1.
Participant Information

Participant	Gender	Title	Professional Seniority	University	Area of Expertise
P1	Female	Dr.	7	Foundation University	Primary Education/ First Reading and Writing Education
P2	Male	Research Assistant	5	Foundation University	Primary Education/ Mathematics Education
P3	Female	Research Assistant	3	Foundation University	Primary Education/ Turkish Education
P4	Male	Dr.	6	State University	Primary Education/ Social Sciences Education
P5	Male	Dr.	11	State University	Primary Education
P6	Female	Prof. Dr.	21	State University	Primary Education/ Turkish Education
P7	Female	Prof. Dr.	35	Foundation University	Primary Education/ Science Education
P8	Male	Dr.	17	Foundation University	Primary Education/ Science Education
P9	Male	Dr.	11	State University	Primary Education/ Literacy, Digital Literacy
P10	Male	Dr.	11	State University	Primary Education/ Use of Technology in Education

In addition, some changes were made in the order of the questions to ensure the interview's fluency. The finalized and restructured interview form was used as a data collection tool in this study.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from the Ethics Commission of Fatih Sultan Mehmet Foundation University. Committee (Date: 07.12.2023, Number: 30/25)
- Informed consent has been obtained from the participants.

Data Analyses

The content analysis method was used to analyze the qualitative data obtained in this study. Different researchers have tried to carry out content analysis in a holistic manner. The main purpose of content analysis is to examine and interpret a certain amount of data in a detailed, in-depth, and systematic manner to extract meanings to explain the collected data (Berg & Latin, 2008). In the first stage of content analysis, firstly, the interview records were converted into a regular written text. Then, codes were analytically created within the framework of the research questions, and data were determined inductively. Meaningful relationships were established between the codes and categorical labels were created. Similar structures, relationships and differences were identified, and these categories were classified and explained under certain themes. In the last stage, in order to give meaning to the codes, categories and themes obtained, a cause-effect relationship was tried to be established between the data and findings, the findings were interpreted, and some conclusions were reached.

Validity and Reliability

By the nature of qualitative research, the procedures carried out in this research were tried to be explained with credibility, transferability, consistency, and confirmability

strategies (Shenton, 2004). In order to ensure the credibility of the research, information about the participants was presented (Johnson & Christensen, 2004), and expert opinions were consulted in the preparation of the interview forms (Merriam & Tisdell, 2015) in order to reach the saturation point regarding the collection of data, the number of participants interviewed in the study groups was increased and the interaction time during the interview was extended. Again, to ensure credibility, data sources were tried to be diversified by selecting lecturers working in different fields of science in the field of classroom education. Diversification of data sources is considered necessary in terms of including participants with different characteristics in the research and reaching multiple realities by revealing different experiences and perceptions (Yıldırım & Şimşek, 2013). In order to ensure transferability, participant opinions were supported with direct quotations while presenting the findings, a purposeful sampling technique was used in determining the participants, and the research process was explained in detail. In order to ensure the consistency of the findings obtained as a result of qualitative data analysis, the data obtained were coded by the researchers conducting the research, similarities and differences were compared, and inter-coder reliability was applied. The consistency of the research was calculated using Miles and Huberman's (1994) formula (Reliability= Consensus/ [Consensus + Disagreement] x 100) by determining the number of "consensus" and "disagreement" for each code made by each researcher. For the cases where there was disagreement, the researchers met and reached a consensus. The percentage of agreement on the coding made by the researchers was determined as 92%. According to Miles and Huberman (1994), the agreement percentage of the code lists created by the researchers being 70% and above indicates a sufficient reliability value. In order to ensure the confirmability of the research, the quotations of the participants were given directly in the relevant sections and the readers were allowed to comment on the inferred situations (LeCompte & Goetz, 1982; Silverman, 2010).

Results

In this section, an answer to the research question "What are the academicians' views on using artificial intelligence tools like ChatGPT in the teaching-learning process in primary school?" was sought. The codes formed in line with the findings obtained in the research were categorized and the themes of "Contributions" and "Negative Aspects" were determined. Secondly, an answer was sought to the question "How are the academician views on the use of artificial intelligence tools like ChatGPT in classroom applications in primary school lessons?" and the codes and categories obtained within the scope of the findings were grouped under the theme of "Using in Classroom Applications". In the figures, the arrows of the codes with high frequency are shown as thicker and the arrows of the codes with low frequency are shown as thinner.

Contributions of Using Artificial Intelligence Applications like ChatGPT in Primary School

Firstly, within the scope of the findings obtained from the questions asked, the theme of potential of using Artificial Intelligence (AI) applications like ChatGPT for the education-training process was reached. The data obtained are categorized under the theme of contributions and shown in Figure 1.

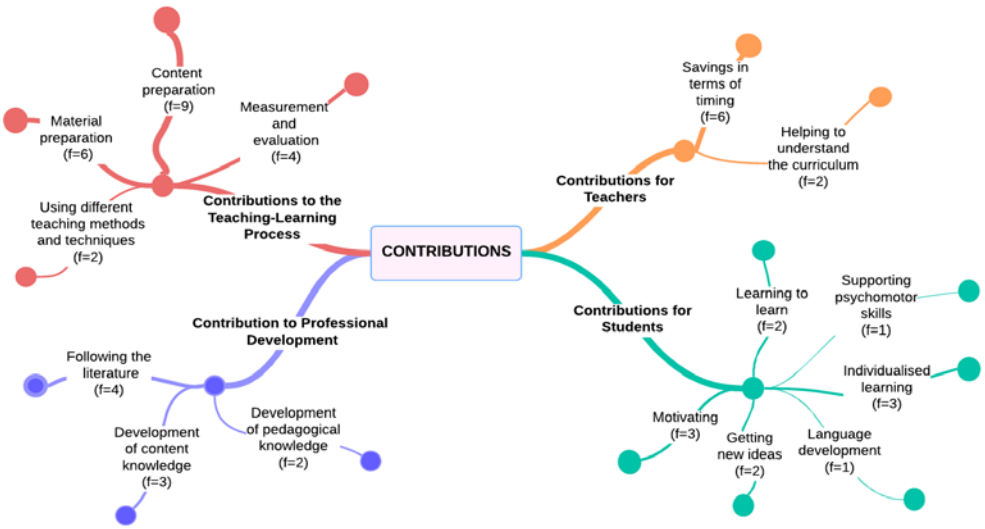

Figure 1.
Contributions to Using AI Applications like ChatGPT in Primary School

Figure 1 shows that ChatGPT applications consist of four categories of codes for teachers, students, teaching-learning process, and professional development. It was determined that it contributed to teachers mostly in terms of time. One of the participants, P2, expressed this view by saying *"It will enable the teacher to use his/her time more efficiently and to reach various environments quickly."* The other contribution to the teacher is to ensure that the curricula are understood. P1 of the participants expressed this view by saying *"Teachers who have deficiencies about what the curriculum is, its limitations and explanations can benefit from artificial intelligence. It can help the teacher to make sense of that outcome. It can ensure that the gains are examined, and appropriate content is prepared."*

Another category contributed by artificial intelligence applications like ChatGPT is students. Within the scope of the data obtained, it was determined that these applications contribute to the development of students' psychomotor skills, individualized learning, motivation, learning to learn, language development, and discovering new ideas. P5 said, *"Artificial intelligence provides the opportunity for the learner to learn at his own pace, independent of time and space."* and *"The student is looking for answers to his questions there. Everyone's way of asking questions may be different. This will lead to personalization."* The answer is that these applications support individual learning, P10 *"It makes their learning process more fun, more motivating. When you define the answers given in use well, it reflects exactly what you have in your head and this situation motivates the child."* The answer reveals that it supports motivation. In addition, P1 emphasizing that artificial intelligence applications use natural language processing said, *"Language can be used as a very effective tool in such applications. A child who has difficulty in communicating with a person in communication and interaction, a child with speech difficulties, a child who has problems with self-confidence can support a child with language development."*

It has been determined that these applications are most beneficial in the teaching-learning process category. All participants mentioned that content could be prepared with the help of ChatGPT applications. P4 shared their view on the topic as follows: *"Preparing lesson plans feels burdensome to our teachers in terms of time. During this process, artificial intelligence can come as a relief to teachers, aiding in the preparation of plans."* It is also believed that these applications significantly contribute to material preparation. One participant highlighted their contribution to material preparation by stating, *"During the concrete operational stage, we need to present visuals to help children visualize certain things. Finding visuals related to every learning outcome can be challenging. If you ask artificial intelligence to draw a sad cat, it can easily do so, even though we can't use existing visuals due to copyright issues."* In addition, it is thought that in large classes, the assessment and evaluation process take time, and can be challenging for teachers, and AI applications like ChatGPT could offer solutions to these problems. A participant, identified as P5, expressed their thoughts on this matter by saying, *"Using it for at least preliminary evaluations of portfolios, project reports, and lengthy written assignments can be beneficial."*

The data obtained indicate that AI applications like ChatGPT also contribute to professional development. The most significant contribution of these applications to professional development is enabling teachers to follow developments more easily in their field's literature. Participant P4 has expressed their views on this topic as follows: *"When you ask what the current competencies of a teacher are, it generates a few points for you. For example, a teacher who graduated 10 years ago knows the theoretical framework of pedagogical knowledge, while now, ChatGPT will bring up technological pedagogical content knowledge. I think this will lead to awareness and a search for seminars, webinars, etc.*

Negative Aspects of Using AI Applications like ChatGPT in Primary Schools

Secondly, within the scope of the findings obtained from the questions asked, the theme of negative aspects of AI applications like ChatGPT in education was reached. The data obtained were categorized under the theme of negative aspects and presented in Figure 2.

In Figure 2, the negative characteristics related to teachers, students, the teaching-learning process, and professional development categories of AI applications like ChatGPT, as identified by academics, have been coded. According to the data obtained, these applications most negatively affect teachers in terms of ethical concerns. The use of data by teachers without citing any source or the failure to investigate the source of the obtained data is indicated among the ethical violations. P1 has articulated this violation by stating, *"The teacher does not know where the information source is coming from. This is an ethical issue."* Additionally, another significant negative aspect of AI applications is causing teachers to feel inadequate. It is thought that students obtaining information from AI leads to questioning the necessity of the teaching profession. Participant P2 expressed their opinion on this matter as follows: *"After using these applications, a teacher might once ask themselves, 'What need is there for me?' If the student can get all the answers from AI, it might be considered that there is no need for a teacher."*

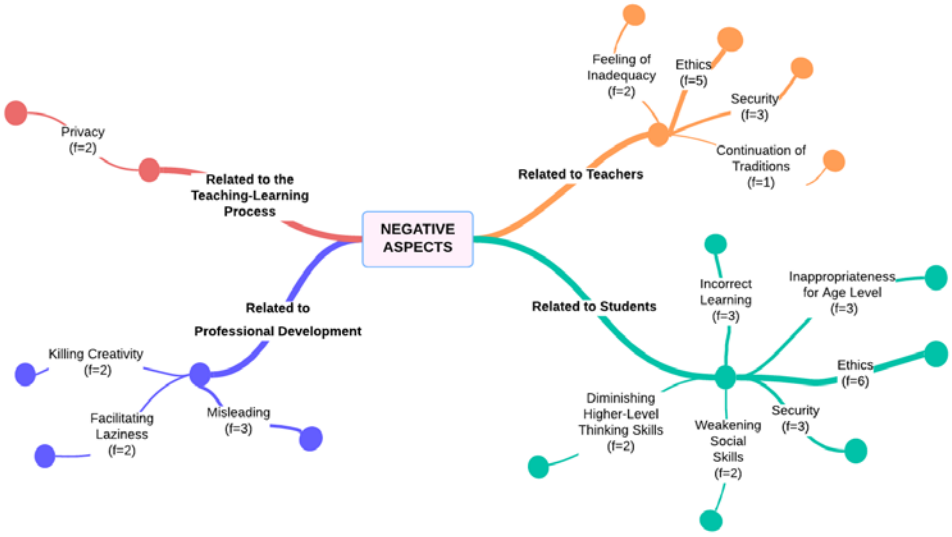

Figure 2.

Negative Aspects of Using AI Applications like ChatGPT in Primary Schools

According to the data obtained, it has been determined that students are the most negatively affected by AI applications like ChatGPT. As P3 put it, *"When students copy something and bring it, they are not aware that it's a form of theft. They unwittingly fall into ethical issues."* This highlights that students can unintentionally commit ethical violations. Additionally, some academics emphasized the need to question the accuracy of the information provided by these platforms, noting that accepting information without scrutiny can lead to incorrect learning. Regarding this issue, participating academician P7 shared their thoughts, *"If students ask ChatGPT about a topic they do not know and trust its response as correct, it can lead to incorrect learning."* and *"Students are not proficient enough to filter and use the information from ChatGPT. They accept whatever comes as correct."*

The applications have been identified to negatively affect the teaching-learning process solely in terms of privacy. The negative impact in this area is described as, *"A student can open up to their teacher, share an incident, and exchange feelings. However, when narrating an incident to ChatGPT, it cannot reflect emotions. Teacher-student interaction is more tangible and emotional, which ChatGPT cannot provide. Moreover, ChatGPT could use this data elsewhere.* (P1)"

Lastly, it has been found that there are negative effects related to professional development. These applications could lead to incorrect learning in students and, at the same time, provide misleading information for teachers' professional development. This conclusion is supported by P9 *"One should not be too trusting in obtaining information. If you ask for a summary about a topic you know nothing about, you could encounter problems because it can insert absurdly incorrect information. It's unreliable in providing accurate information."* and *"It has the potential to cause confusion by giving wrong information and data to many people indeed."*

The Use of AI Applications like ChatGPT in Classroom Applications in Primary Schools

Lastly, within the scope of the findings obtained from the questions asked, the theme of potential uses of ChatGPT applications in classroom applications in primary schools was reached. The data obtained were categorized under the theme of usage in classroom applications and presented in Figure 3.

In Figure 3, the use of artificial intelligence applications like ChatGPT in classroom applications is divided into codes in four categories: social studies, Turkish, mathematics, and science. P4 stated that these applications can be used to present a case study in a social studies course. He expressed his opinion on this as follows:

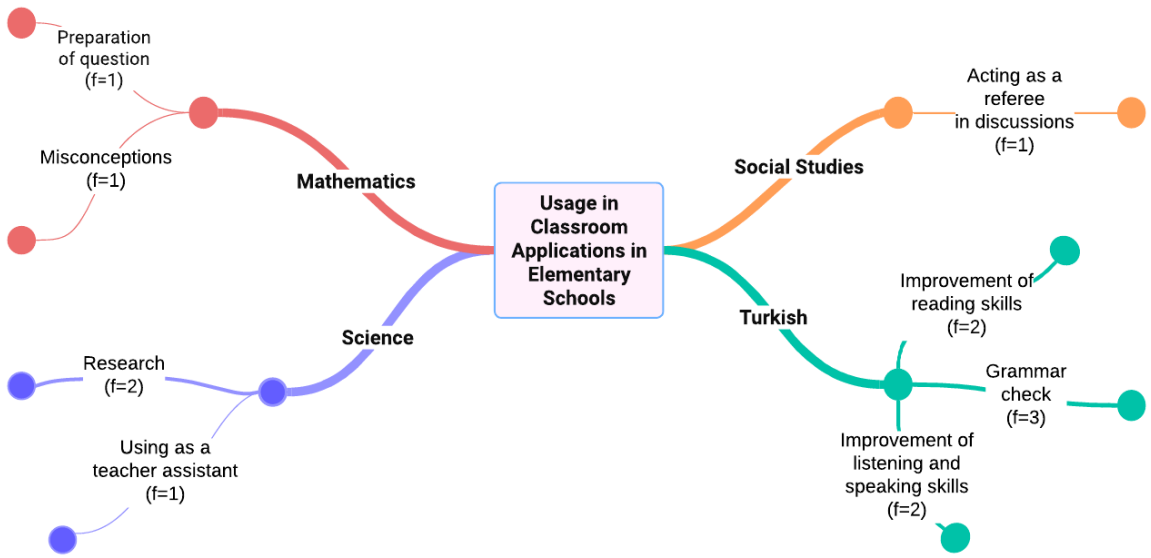

Figure 3.
Using AI Applications like ChatGPT in Classroom Applications

"Since social studies courses are not clear lessons, they are very suitable for our lessons because they are open to interpretation and interpretation. We generally use methods like case studies. In these case studies, we always give situations that create dilemmas so that their views can emerge. For example, if we create a discussion in the classroom about whether nuclear energy should be established or not, we can appoint ChatGPT as an arbitrator. Some of the students presented the following reasons and some of them presented the following views, and they can evaluate these with the share of reality and say which one is the thing. Or we can use ChatGPT at the beginning and ask him to present evidence for both cases without revealing his opinion, as we are going to discuss about whether nuclear energy should or should not be used in our class. We can discuss it."

These applications are also used in classroom applications in Turkish lessons. The participant academician P1, who is an expert in the field of Turkish education, stated that such applications can be used for grammar control during the Turkish lesson: *"When the student writes a paragraph, he can ask artificial intelligence to check it grammatically."* P9, on the other hand, supported P1 by saying *"We can provide feedback to the sentences formed by children."* Within the scope of the mathematics course, two different areas of use were identified: preparing questions and learning misconceptions. The participant stated that it can be used during the writing of sample questions to be solved during the lesson with the words *"We can get sample question types to be done in the class from artificial intelligence."* At the same time, it was determined that it can be used to learn what the misconceptions in literature are in mathematics subjects where misconceptions are high. Finally, within the scope of the data obtained, two codes, namely conducting research and using it as a teacher's assistant, were reached for use in classroom applications in the science course. P7 stated that these applications can be used while conducting research in the science course: *"If I want students to conduct scientific research, where and what will they research, what key concepts will they use? I can set up and use a system that will guide them ChatGPT on such issues".*

Discussion

The study aimed to obtain academician opinions on the application of artificial intelligence tools like ChatGPT in primary school lessons. Within the scope of this purpose, semi-structured interviews were conducted with academicians working in the field of classroom education at different universities. Findings were obtained after the semi-structured interviews with the participants. Codes were created with the findings obtained, categories were determined with the codes created and themes were reached as a result of these. As a result of the interviews, the themes of a) the contributions of using artificial intelligence applications like ChatGPT in primary school, b) the negative aspects of using artificial intelligence applications like ChatGPT in primary school, c) the use of artificial intelligence applications like ChatGPT in classroom applications in primary school were obtained. In this section, the themes in the findings section are summarized and compared with the literature.

Theme 1: Contributions to Using Artificial Intelligence Applications like ChatGPT in Primary School

"The academics in the study group explained the contributions of using ChatGPT and similar artificial intelligence applications to teach in four categories: "for teachers, for students, for the teaching-learning process, for professional development".

The category for teachers consists of two codes: "saving in terms of timing" and "helping to understand the curriculum". In this category, the code "saving in terms of timing" was the code in which academicians presented similar opinions. This result coincides with literature. In the literature, there are findings that the use of artificial intelligence tools in education saves time for teachers by preparing lesson plans, accessing teaching resources (Luckin et al., 2016), facilitating the work of teachers (İşler & Kılıç, 2021) and alleviating the workload of teachers (Gao & Hu, 2018). It is similar to the findings of Sumakula et al. (2022), who concluded that it could help the teacher prepare content and guide the teacher.

It can be said that the teaching profession includes studies like preparing for the lesson, preparing for evaluation, student follow-up, making plans for individuals with special needs, material preparation, and social activities with students who are not directly related to education. All these activities increase the workload of the teacher. Therefore, the most frequently mentioned issue in this category by academics was that artificial intelligence can be used to reduce teachers' workload.

The category for students consists of the codes of supporting psychomotor skills, individualized learning, motivating, learning to learn, language development, and acquiring new ideas. Academicians stated that the use of artificial intelligence can support psychomotor skills. The researchers could not find a study supporting this finding in the literature on the code of supporting psychomotor skills. The individualized learning code obtained from the interviews is similar to the findings in the literature. The findings that artificial intelligence will individualize the learning experience and materials (Fadel et al., 2019; Sumakula et al., 2022); provide students with individualized learning experience (Khosvari & Misra, 2019) and facilitate the learning process (Erdemir & İngenç, 2014) support the "individualized learning" code in the study. The "motivating" code expressed by the academics in the study overlaps with the results found in the studies of Dinçer and Doğanay (2016) and Sumakula et al. (2022) in the literature. The codes of learning to learn and acquiring new ideas are like the findings of Williams et al. (2019) on planning, improving learning skills, and facilitating the acquisition of new ideas. There were no findings in the literature regarding the opinion expressed by the participants regarding the language development code. It is seen that the findings in the literature on language development are generally aimed at facilitating students' foreign language learning (Belda-Medina & Calvo-Ferrer, 2022b).

It is thought that the use of artificial intelligence will have positive aspects for students as well as teachers in the education process. It was observed that the results obtained in the category of students in the theme of contributions were very different from each other. It is thought that this difference may be because the fields of study and subjects of the academicians participating in the study are different from each other

The category for the teaching-learning process consists of four codes: content preparation, material preparation, using different teaching methods and techniques, measurement, and evaluation. The content preparation category obtained in the study is supported by the results of Luckin et al. (2016), who concluded that artificial intelligence tools will provide advantages in preparing lesson plans and creating content. Participants mentioned that the content visualization feature of the artificial intelligence application could be used in "material preparation". However, it is seen that the findings obtained in the studies about material are in the form of individualization of teaching materials (Fadel et al., 2019; Luckin et al., 2016). It is seen that the opinions of academicians in the measurement and evaluation code are like the result of Gao and Hu (2018) that artificial intelligence tools can be used for monitoring and evaluating student progress.

Teaching-learning process consists of content, teaching process and method, and evaluation dimensions. In the teaching-learning process category, it was seen that the codes obtained from the answers received from academicians were related to these dimensions. However, it is seen that the codes are not in a holistic structure and different codes are formed. It is thought that these differences may be since academicians are not in a common field of study.

The category for professional development consists of three codes: following the literature, development of content knowledge, and development of pedagogical knowledge. The academicians in the study group mentioned that artificial intelligence applications can provide convenience for teachers to follow the literature. Luckin et al. (2016) reached a similar finding in the code of following the literature in this category in their study. It was found that artificial intelligence applications would be beneficial for the development of content knowledge and pedagogical knowledge. In this code, a similar finding was found in the study conducted by Demir-Dülger and Gümüşeli (2023).

Demir-Dülger and Gümüşeli (2023) concluded in their study that artificial intelligence applications provide opportunities for teachers in terms of professional development.

Professional development can be considered as an important part of career development in all professions. In this category, the view that academicians can be used to follow the literature came to the fore. In this category, various codes were reached due to the different fields of study of the academicians in the study group.

Theme 2: Negative Aspects of Using Artificial Intelligence Applications like ChatGPT in Primary School

Academics in the study group explained the negative aspects of ChatGPT and similar artificial intelligence applications in four categories: "for teachers, for students, for the teaching-learning process, for professional development".

The category for teachers consists of four codes: ethics, security, continuation of traditions, and feeling of inadequacy. In the results obtained from the studies conducted by obtaining opinions on the use of artificial intelligence tools, the most frequently mentioned difficulty was ethics and safety. The ethical and security codes obtained in the study are similar with the findings of Huang (2023), Fadel et al. (2019) that artificial intelligence will create ethical, security, data security and privacy problems. Findings supporting the continuation of traditions and feeling of inadequacy codes obtained in the study could not be found in the literature. In the studies in the literature where teachers' views on the use of artificial intelligence are taken, it is seen that the results of the studies show that the level of curiosity about artificial intelligence is high, they are curious about using it and they believe that artificial intelligence should be used today (Sumakula et al., 2022).

The category for students consists of six codes: ethics, safety, blunting high-level thinking skills, wrong learning, inappropriate for age level, and weakening social skills. When we look at the frequency distribution of these six codes, it is seen that academicians have different opinions within themselves. In the literature, it is stated that there will be ethical, security and pedagogical problems for students in the studies where the use of artificial intelligence and opinions on artificial intelligence are taken. In this context, the ethical and security codes reached in the category of students in the research are similar with the results obtained in the studies of Huang (2023), Fadel et al. (2019). In the study, it was found that artificial intelligence applications blunt higher-order thinking skills and the code of blunting higher-order thinking skills was obtained. This result contrasts with the findings obtained in the study conducted by Caro et al. (2014), which suggest that "artificial intelligence will increase metacognition in students". No findings were found to support the wrong learning code obtained in the study. There is no finding that supports the code "not suitable for the age level" and does not overlap with this code. In studies conducted in countries like the USA and China, there are findings showing that age level is not important in the use of artificial intelligence, provided that pre-school and primary school students are taught ethical rules and safety rules regarding the use of artificial intelligence. In the study conducted by Su and Yang (2024), some of the kindergarten teachers considered this application as strong for the age group they work with, while others evaluated it negatively. These findings show that there are many question marks about the age level. The data obtained with the code of weakening social skills in the study are similar to the findings of a study (Saengudomlert & Wongwanich, 2019), where the result showed that students would weaken their social relationships with both their peers and teachers (Saengudomlert & Wongwanich, 2019) However, it is seen that it does not overlap with the result of the study stating that it will contribute positively to the social skill development of students who come together on the same platforms with artificial intelligence applications (D'Mello & Grasser, 2012).

The category for the teaching-learning process consists of a single code, the privacy code. In the findings obtained, the expressions in the answers given regarding the "privacy" code are "the classroom is a general privacy area and this privacy area will be disturbed". The researchers could not find any studies in the literature that would support or contrast the views stated in this code.

In the category of professional development, there are three codes: killing creativity, simplicity, and misleading. These codes obtained in the research coincide with the findings obtained by Luckin et al. (2016) in the literature that "it will make the teacher lazy as a result of easy access to information as a result of fast access to information". The misleading code is like the result of the study conducted by Luo et al. (2023) in the literature, which is similar to the result of presenting data suitable for plagiarism and not confirming the accuracy of the sources used.

Theme 3: Using Artificial Intelligence Applications like ChatGPT in Classroom Applications in Primary School

Academics in the study group explained the use of ChatGPT and similar artificial intelligence applications in classroom applications in four categories: "Life Science/Social Studies course, Turkish course, Mathematics course, Science course".

The Social Studies course category consists of a single code with the code of acting as a referee in discussions. The Turkish course category consists of a single code, grammar control. It was observed that the studies on grammar control were mostly related to foreign language teaching and

grammar issues in foreign language learning (Sumakula et al., 2022; Virvou et al., 2000). The category of mathematics course consists of two codes: preparing questions and knowing misconceptions. The category of science lesson consists of two codes: conducting research and using as a teacher's assistant. Although there is no study directly related to the science course in the research conducted in this category, the results obtained suggest that students can facilitate research with artificial intelligence (Khosvari & Misra, 2019; Williams et al., 2019). In the studies conducted in the literature, the use of "teacher assistant" was not encountered. In particular, no study was found in which this concept was associated with the Science course. In the studies, the results of alleviating the teacher's workload and facilitating the teacher's work were generally emphasized (Gao & Hu, 2018; İşler & Kılıç, 2021). In general, it can be said that the codes of undertaking the role of referee in the discussion, grammar control and preparing questions obtained from the answers obtained from the lessons are related to the code of "using as a teacher assistant".

It is seen that the answers given by academicians regarding the use of artificial intelligence in the classroom do not exhibit a holistic structure. This may be due to the specialization of academicians in different fields. For this reason, it is thought that academicians give answers based on their own areas of expertise and their own experiences in classroom applications.

It can be thought that academics' specialization in different disciplines is related to how much they are interested in artificial intelligence and their attitudes towards artificial intelligence. The limited number of academics reached in the research and the fact that only interviews were conducted in the data collection process constitute the limitation of the research. The fact that the views of academics differ from each other may be a reflection of the different views and experiences of each academician regarding the use of artificial intelligence. This situation is both positive in terms of drawing attention to different dimensions of the use of artificial intelligence, but at the same time, it is negative in terms of the fact that the answers received do not form a holistic perspective.

Conclusion and Recommendations

It is seen that the academicians included in the research have more positive opinions about the use of artificial intelligence during interviews. The findings of the study indicate that participating academics expresses positive views regarding the use of artificial intelligence in classroom environments and the teaching-learning process. One of the positive aspects mentioned that artificial intelligence could be used to reduce teachers' workload. Additionally, artificial intelligence usage has been highlighted as a tool for providing students with personalized learning experiences and assisting in lesson planning and content preparation. Another positive feature noted by the participants has been the ability of artificial intelligence to generate visual content which could be useful in material preparation.

However, academics also pointed out some challenges related to the use of artificial intelligence in the classroom and teaching- learning process. One major concern of the teachers' perspective was ethical and security issues. The negative aspects mentioned from the students' perspective included the weakening of social skills, the potentional hindrance of higher-order thinking skills and the risk of misinformation. It was stated by the participants that the artificial intelligence application which we have started to see more frequently in all areas of our lives, has started to take its place in the classrooms and that studies should be carried out on how it can be used positively in the classrooms. It was stated by the participants that the artificial intelligence application, which we have started to see more frequently in all areas of our lives, has started to take its place in the classrooms and that studies should be carried out on how it can be used positively in the classrooms.

Based on the findings of the research, the following recommendations are suggested for researchers, policy makers and teachers:

Recommendations for Researchers

1. In the study, ethical and security problems related to the use of artificial intelligence technologies in education were addressed. In order to solve these problems, it is recommended that experts from different disciplines like education, law, engineering and psychology could work in cooperation.
2. Academics stated that artificial intelligence technologies have been used for various purposes in different courses. It is recommended to investigate the effectiveness of these applications used in future research.
3. Academicians stated that artificial intelligence applications may have negative effects on students like killing creativity and wrong learning within the scope of the research. With experimental research to be conducted by primary school students, it can be examined whether artificial intelligence applications have a negative effect or not as stated by academicians.

Recommendations for Policy Makers

1. Academics stated that one of the biggest challenges encountered for the use of artificial intelligence tools is ethical and security issues. Therefore, comprehensive ethical and safety regulations should be developed for the use of AI technologies in education.
2. Research findings show that artificial intelligence tools offer significant advantages for teachers and students. However, in order to use these tools effectively, teachers need to receive adequate training and support for these technologies. In this context, in-service trainings can be organised for the use of artificial intelligence in education.

Suggestions for Teachers

1. Academics think that artificial intelligence technologies provide significant advantages to teachers in preparing course materials. So the teachers can be encouraged to enrich their course content by using artificial intelligence tools.
2. Research findings reveal that the ability of artificial intelligence tools to track student performance and provide individual feedback supports the teaching-learning process. Teachers can support students' learning processes more closely by using these tools.

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Informed Consent: Participant consent was obtained.

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The Relationships Between Five Factor Personality Traits and Self-Control and Self-Management

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ABSTRACT

This study examines the relationships between the Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) and self-control and self-management (SCM) among university students. Using a correlational design, data were collected from 207 undergraduate students at a public university in Istanbul. Participants completed the Big Five Personality Inventory and the Self-Control and Self-Management Scale, both validated for Turkish samples. Findings indicated significant correlations between SCM and personality traits. Conscientiousness was the strongest positive predictor of SCM (r = .55, $p < .01$), highlighting its role in goal-directed behavior and self-regulation. Neuroticism exhibited a moderate negative correlation (r = -.33, $p < .01$), suggesting adverse effects on emotional stability. Extraversion (r = .42, $p < .01$) and openness to experience (r = .39, $p < .01$) showed moderate positive associations, emphasizing sociability and adaptability. Agreeableness had a weaker but significant positive correlation (r = .36, $p < .01$), reflecting cooperative tendencies. Gender differences emerged in personality traits: females scored higher in conscientiousness and neuroticism, while males had slightly higher extraversion. However, no significant gender differences in SCM were found. These results have implications for psychological counseling and education. Enhancing time management and emotional regulation may support self-regulation, particularly for students with high neuroticism or low conscientiousness. Future research should explore cultural influences and longitudinal changes to deepen insights into these relationships. This study contributes to the growing evidence on personality's role in self-regulation and well-being.

Keywords: Big-five, personality traits, self-control, self-management.

Introduction

Personality has long been a focal point in psychological research, providing insight into the unique patterns of thoughts, emotions, and behaviors that differentiate individuals. Among the various theoretical frameworks, the Five Factor Model (FFM), or the Big Five Personality Factors, stands as one of the most empirically validated and widely adopted models (Doğan, 2013; McCrae & Costa, 2008). The FFM conceptualizes personality along five broad dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (Burger, 2006; McCrae & Costa, 2008). These factors have been shown to remain relatively stable over time and across cultural contexts, reflecting core components of individual differences (Boyacı, 2019; Buecker et al., 2020; Dağlar, 2020).

Each of these dimensions carries distinct implications for behavioral tendencies and psychological outcomes. Extraversion is associated with sociability and assertiveness, while agreeableness highlights trust and cooperativeness. Conscientiousness emphasizes organization and persistence, neuroticism pertains to emotional instability, and openness to experience encompasses creativity and intellectual curiosity (Horzum et al., 2017; Rammstedt & John, 2007). Research demonstrates that these factors not only shape individual behaviors but also significantly influence academic performance, interpersonal relationships, and psychological resilience (Dağlar, 2020; McCrae & Costa, 2008).

Self-management and self-control, central constructs in the domain of self-regulation, are equally critical in understanding adaptive human functioning. Self-management involves goal setting, monitoring progress, and implementing strategies to achieve desired outcomes, often emphasizing planning and self-reinforcement (Mezo,

2009). In contrast, self-control focuses on the capacity to resist short-term temptations and maintain behaviors aligned with long-term objectives (Bandura, 1991). Together, these constructs underpin an individual's ability to navigate complex environments and align actions with personal and societal standards (Ercoşkun, 2016; Neck & Houghton, 2006).

The interplay between personality factors and self-regulatory behaviors has been a topic of growing interest in psychological research. For instance, conscientiousness is strongly associated with disciplined behaviors and effective self-control, whereas neuroticism often undermines self-regulation through heightened emotional reactivity and impulsivity (Dağlar, 2020; McCrae & Costa, 2008). Factors such as openness to experience and extraversion have been linked to innovative problem-solving and adaptability, enhancing self-management capabilities (Horzum et al., 2017). Meanwhile, agreeableness promotes cooperative behaviors and facilitates the alignment of personal and collective goals (Burger, 2006).

Empirical findings highlight the importance of these relationships in shaping individual outcomes. For example, individuals high in conscientiousness exhibit greater academic success and resilience, as their disciplined approach supports goal achievement (Dağlar, 2020; Özhan & Boyacı, 2018). Conversely, high neuroticism often correlates with challenges in emotional regulation, making self-control interventions particularly vital for these individuals (Horzum et al., 2017). Extraverted and open individuals leverage social support and creativity, further strengthening their self-regulatory strategies (Mezo, 2009).

Understanding these dynamics is particularly relevant within the context of university students, who navigate critical developmental transitions marked by increased autonomy and responsibility. The integration of personality factors with self-management and self-control offers a comprehensive framework for addressing the unique challenges faced by this population (Horzum et al., 2017).

Such insights are invaluable for psychological counseling, where tailored interventions can be developed to enhance self-regulation and promote academic and personal success (Ercoşkun, 2016).

Despite extensive research demonstrating the relationship between personality traits and self-control and self-management (SCM), there remains a gap in understanding how these associations manifest in specific cultural and academic contexts. While previous studies have established that conscientiousness is a strong predictor of self-regulation and neuroticism negatively affects self-management (Dağlar, 2020; McCrae & Costa, 2008), most research has been conducted in Western settings, with limited evidence from non-Western or university student populations in Turkey. Additionally, existing studies often focus on individual personality traits rather than exploring the combined predictive power of all five factors on SCM. Furthermore, gender differences in SCM remain inconclusive, with conflicting findings regarding whether males and females exhibit different self-regulatory behaviors. This study aims to address these gaps by examining the relationships between the Big Five personality traits and SCM within a Turkish university student sample, offering new insights into the cultural and contextual nuances of self-regulation. By doing so, this research contributes to the existing literature by providing empirical evidence that can inform psychological counseling and educational interventions tailored to diverse student populations.

This study aims to explore the connections between the Big Five personality factors and the constructs of self-management and self-control among university students. By examining how these personality dimensions influence self-regulatory capacities, this research seeks to provide evidence-based insights that inform counseling practices and educational interventions, ultimately fostering resilience, adaptability, and overall well-being in academic settings.

Purpose of the Study

The primary purpose of this study is to investigate the relationships between the Big Five personality factors, self-management, and self-control among university students. Specifically, it seeks to determine how individual differences in personality factors influence the development and effectiveness of self-regulatory behaviors. The study will focus on identifying whether factors like conscientiousness and neuroticism significantly predict variations in self-management and self-control.

University students represent a population undergoing critical developmental transitions, marked by increasing autonomy and academic pressures. By understanding how personality factors shape their self-regulation capacities, this research aims to provide valuable insights for fostering psychological resilience and academic success. Furthermore, these findings hold significant implications for counseling psychology, offering a foundation for designing targeted interventions that enhance self-regulatory skills in educational and personal development contexts. In this context, the reasearch question of this study is:

- What is the impact of the Big Five personality traits on self-regulation processes among university students, and how do these personality factors predict self-control and self-management?

Method

Research Design

This study adopts a quantitative, correlational research design to explore the relationships between the Big Five personality factors, self-management, and self-control among university students. The correlational design is suitable for examining the degree and direction of associations between variables without manipulating them (Creswell, 2012). By focusing on naturally occurring variations in personality factors and self-regulatory behaviors, the study aims to identify patterns and predictive relationships.

Study Group

The study was conducted with a total of 207 university students, comprising 116 females (56%) and 91 males (44%), with an average age of 19.08 years (SD = 1.23). Participants were enrolled in various academic programs at a public university in Istanbul. The distribution of participants by year of study included 30% first-year students, 28% second-year students, 25% third-year students, and 17% fourth-year students.

The sample represented diverse academic disciplines, including engineering, social sciences, natural sciences, and humanities, reflecting a broad spectrum of student experiences and backgrounds. The majority of participants (72%) reported living in university dormitories, while 28% resided with family or in private accommodations.

Participants were selected using a convenience sampling method to ensure accessibility and feasibility. Inclusion criteria for participant selection included the following:

Enrollment in Undergraduate Programs: Participants were required to be actively enrolled as undergraduate students at the selected public university.

Willingness to Provide Informed Consent: Only students who voluntarily agreed to participate after being informed about the study's purpose, procedures, and confidentiality measures were included.

Age Range: Participants were aged 18–25, representing the typical developmental range for undergraduate students.

These criteria ensured that the sample accurately reflected the study's target demographic, providing a suitable context for investigating the relationships between personality factors, self-management, and self-control.

Data Collection Tool

The research involves the administration of validated instruments, including the Big Five Personality Inventory (BFPI) and the Self-Control and Self-Management Scale (SCMS), both of which have established reliability and validity in Turkish samples (Ercoşkun, 2016; Horzum et al., 2017). Data will be collected through self-reported questionnaires, ensuring that participants' subjective experiences are captured accurately.

Big Five Personality Inventory (BFPI)

The Big Five Personality Inventory (BFPI), originally developed by Rammstedt and John (2007), is a concise tool designed to measure the five major dimensions of personality: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. This inventory is composed of 10 items rated on a five-point Likert scale, allowing participants to express the extent to which they agree with various statements about their personality factors. Examples of items include statements like "I see myself as someone who is talkative" (extraversion) or "I see myself as someone who is dependable and self-disciplined" (conscientiousness).

The Turkish adaptation of the BFPI by Horzum, Ayas, and Padır (2017) involved rigorous validation procedures, including linguistic equivalence testing, exploratory and confirmatory factor analyses, and reliability assessments. The Turkish version demonstrated strong psychometric properties, with internal consistency values ranging from .81 to .90 across the five dimensions. Additionally, significant correlations were observed between the Turkish and original English versions, confirming the instrument's cross-cultural validity.

For this study, the BFPI serves as a reliable and efficient tool to capture the core personality factors of participants. Its brevity and validated psychometric properties make it particularly suitable for research involving large, diverse samples, ensuring both precision and participant engagement.

Self-Control and Self-Management Scale (SCMS)

The Self-Control and Self-Management Scale (SCMS), developed by Mezo (2009), is an in-depth instrument designed to measure self-regulatory behaviors through three interconnected components: self-monitoring, self-evaluation, and self-reinforcement. These components reflect the processes by which individuals set goals, track their progress, and reward themselves for meeting objectives. The scale consists of 16 items rated on a six-point Likert scale, ranging from 0 (not at all descriptive of me) to 5 (very descriptive of me).

The Turkish adaptation by Ercoşkun (2016) involved a meticulous translation and back-translation process to ensure linguistic and cultural equivalence. Validation procedures included exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), with results indicating that the three-factor structure explained 54.09% of the total variance. Reliability analyses showed high internal consistency, with Cronbach's alpha values above .80 for all sub-dimensions (self-monitoring: .84, self-evaluation: .81, self-reinforcement: .80).

The SCMS is particularly valuable for its focus on the practical aspects of self-regulation, such as identifying behaviors to change (self-monitoring), assessing progress toward goals (self-evaluation), and implementing rewards or corrective actions (self-reinforcement). In this study, the SCMS will provide critical insights into participants' self-regulatory strategies and how these align with their personality factors, offering a comprehensive view of the interplay between personality and behavior.

Ethical Considerations

The ethical process in the study was as follows:

- Ethics committee approval was obtained from İstanbul Medeniyet University University Educational Sciences Ethics Committee (Date: 04.01.2021, Number: 2021/01-09)
- Informed Consent: Participants were provided with a detailed information sheet outlining the study's purpose, procedures, potential risks, and benefits. Written informed consent was obtained from each participant prior to data collection.

Anonymity and Confidentiality: Data were collected anonymously, and all responses were securely stored. Identifiable information was excluded to ensure participant privacy.

Voluntary Participation: Participants were informed of their right to withdraw from the study at any point without any penalty or explanation required.

Minimization of Risks: The study involved minimal risk to participants, as it consisted solely of self-report questionnaires. Any discomfort or concerns raised during participation were addressed promptly by the research team. These measures ensured the ethical integrity of the study, prioritizing participant welfare and the credibility of the research findings.

Data Analysis

The data analysis for this study involved a series of quantitative statistical procedures to investigate the relationships between the Big Five personality factors, self-management, and self-control. The steps in the data analysis process were as follows (Tabachnick & Fidell, 2013).

Data were checked for accuracy, missing values, and outliers. Descriptive statistics (e.g., mean, standard deviation, skewness, and kurtosis) were calculated to ensure normality and identify any irregularities.

Reliability Analysis:

The internal consistency of the Big Five Personality Inventory (BFPI) and the Self-Control and Self-Management Scale (SCMS) was re-evaluated using Cronbach's alpha coefficients.

For the BFPI, Cronbach's alpha values ranged from .82 (agreeableness) to .91 (conscientiousness), indicating excellent reliability across all dimensions. For the SCMS, Cronbach's alpha values for its sub-dimensions were .85 (self-monitoring), .83 (self-evaluation), and .87 (self-reinforcement), demonstrating strong internal consistency.

Descriptive Statistics: Frequencies and percentages were computed for demographic variables (e.g., gender, age, year of study). Means and standard deviations for the BFPI and SCMS subscales were reported.

Inferential Statistics: **Correlation Analysis**: Pearson correlation coefficients were computed to examine the strength and direction of the relationships between personality factor, self-management, and self-control.

Group Comparisons: Independent samples t-tests and one-way ANOVA were conducted to explore differences in personality factors and self-regulation scores across demographic subgroups (e.g., gender, year of study).

Effect Size and Statistical Significance: Effect sizes were calculated to quantify the strength of observed relationships and group differences. A p-value of less than 0.05 was considered statistically significant.

Software: All analyses were conducted using SPSS (Version 26), ensuring robust and reliable statistical computations. The results of these analyses provide a comprehensive understanding of the interplay between personality factors, self-management, and self-control, offering valuable insights for interventions aimed at fostering psychological and academic well-being among university students.

Results

Gender Differences in SCM and Big Five Personality Traits

This study examines gender differences in self-control and self-management (SCM), as well as the dimensions of the Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience). The goal is to identify whether male and female participants differ significantly in these psychological constructs.

Descriptive Statistics

Table 1.

Descriptive Statistics for SCM and The Big Five Personality Traits Across Genders

Variable	Gender	N	Mean	SD
SCM	Female	116	58.24	10.63
	Male	91	56.87	11.12
Extraversion	Female	116	8.42	1.03
	Male	91	7.85	.97
Agreeableness	Female	116	8.25	1.12
	Male	91	8.10	1.05
Conscientiousness	Female	116	8.45	1.08
	Male	91	8.20	1.03
Neuroticism	Female	116	7.65	1.15
	Male	91	7.30	1.12
Openness to Experience	Female	116	8.10	1.09
	Male	91	8.00	1.01

Table 1 presents the descriptive statistics for self-control and management and the Big Five personality traits across genders, including means and standard deviations for each variable. Based on these descriptive statistics, an independent samples t-test was conducted to examine gender differences for each variable. The results of the t-test are summarized in Table 2. Table 1 summarizes the updated descriptive statistics for self-control and management, as well as the Big Five personality traits.

Table 2.

T-Test Results for Gender Differences Across SCM and The Big Five Personality Traits.

Variable	t	df	p
SCM	1.25	205	.21
Extraversion	2.42	205	.02**
Agreeableness	1.89	205	.06
Conscientiousness	2.91	205	.004**
Neuroticism	2.15	205	.03**
Openness to Experience	1.31	205	.19

**p > .05, **p < .05.*

Self-Control and Management: The mean scores for self-control and management are slightly higher for females (M = 58.24, SD = 10.63) compared to males (M = 56.87, SD = 11.12), but the difference was not statistically significant.

Extraversion: Female participants scored higher on extraversion compared to males, suggesting greater sociability and assertiveness.

Conscientiousness: Females reported higher scores on conscientiousness, reflecting greater organization and goal orientation.

Neuroticism: Females exhibited higher scores on neuroticism compared to males, highlighting greater emotional sensitivity among women.

Agreeableness and Openness: While females scored slightly higher on agreeableness and openness to experience, the differences were not statistically significant.

These findings highlight gender-specific trends in personality traits, with notable differences in extraversion, conscientiousness, and neuroticism, while self-regulatory capacities remain comparable across genders.

Correlation Analysis

The correlation analysis examines the relationships between self-control and management (SCM) and the Big Five personality traits. This analysis aims to identify patterns and associations that align with theoretical frameworks and existing research in the field.

Table 3.

Pearson Correlation Coefficients Among SCM and The Big Five Personality Traits.

Variable	1	2	3	4	5	6
(1)SCM	-					
(2)Extraversion	.42*	-				
(3) Agreeable.	.36*	.28**	-			
(4)Conscient.	.55*	.31**	.40**	-		
(5)Neuroticism	-.33*	-.25*	-.22*	-.38*	-	
(6) Openness	.39*	.29*	.27*	.43*	-.21*	-

**p < .05.*

SCM and Conscientiousness: A strong positive correlation was observed (r = .55, $p < .01$), indicating that higher conscientiousness is associated with better self-control and management. This suggests that individuals who are organized, disciplined, and goal-oriented tend to have stronger self-regulation capabilities.

SCM and Neuroticism: A moderate negative correlation was found (r = -.33, $p < .01$), highlighting that emotional instability and susceptibility to stress hinder self-regulatory capacities. Individuals with higher neuroticism scores may struggle with maintaining consistent self-control and management behaviors.

SCM and Extraversion: A moderate positive correlation (r = .42, $p < .01$) suggests that sociability and assertiveness support better self-regulation. Extraverted individuals may leverage their social networks and proactive tendencies to enhance self-management.

SCM and Openness: A moderate positive correlation (r = .39, $p < .01$) indicates that creativity and intellectual curiosity contribute to effective self-regulation. Individuals open to new experiences may use their adaptability to develop better self-management strategies.

SCM and Agreeableness: A weaker but significant positive correlation (r = .36, $p < .01$) suggests that cooperative and empathetic tendencies modestly enhance self-management capabilities. Agreeable individuals may utilize their interpersonal skills to maintain better self-regulation.

These findings emphasize the interconnectedness of self-regulation and personality traits, with conscientiousness emerging as the strongest predictor of self-management and control, while neuroticism serves as a significant hindrance. SCM and Conscientiousness: A strong positive correlation was observed, indicating that higher conscientiousness predicts better self-control and management. SCM and Neuroticism: A moderate negative correlation suggests that emotional instability hinders self-regulatory capacities. SCM and Extraversion/Openness: Both traits showed moderate positive correlations, reflecting their supportive roles in self-regulation. SCM and Agreeableness: A weaker but significant positive correlation highlights the role of cooperative tendencies in enhancing self-management.

Discussion

This study explored the relationships between self-management and self-control (SCM) and the Big Five personality traits among university students, examining both gender differences and correlations among the variables. The findings provide significant insights, aligning with and extending existing literature on self-regulation and personality traits.

Relationships Between Personality Traits and SCM

The results highlight the strong predictive role of conscientiousness in SCM, consistent with research emphasizing its association with goal-oriented behaviors and effective self-regulation strategies (Horzum et al., 2017; Wang, 2023). Conscientious individuals are disciplined, organized, and highly capable of managing their time and efforts, which facilitates better self-regulation in both academic and personal contexts (Ercoşkun, 2015). This finding is supported by Zhao et al. (2024), who identified conscientiousness as a cornerstone trait influencing task-oriented behaviors and resilience in challenging environments.

In contrast, neuroticism exhibited a moderate negative correlation with SCM, corroborating findings that emotional instability and heightened stress responses undermine self-control (Wu, 2024). This aligns with prior studies suggesting that neurotic individuals struggle with maintaining focus and resilience under pressure, impacting their ability to regulate behaviors effectively (Busseri, 2023). The association between neuroticism and maladaptive behaviors, such as procrastination and emotional reactivity, further highlights its detrimental effects on self-management (Wenzel, 2023).

Extraversion and openness to experience showed

moderate positive correlations with SCM, suggesting that social engagement, adaptability, and creativity enhance self-regulatory capacities (Angelini, 2023; Zhao, 2024). Extraverted individuals may utilize their social networks for support, while those high in openness leverage cognitive flexibility to navigate complex tasks (Horzum et al., 2017). Gao (2023) emphasized that openness fosters innovative problem-solving strategies, enabling individuals to adapt to dynamic environments.

Agreeableness was positively but weakly correlated with SCM, highlighting its secondary role in self-regulation. Cooperative and empathetic tendencies may contribute to improved interpersonal interactions, indirectly supporting self-management (Kırdök & Doğanülkü, 2018). This finding complements Rodriguez-Ruiz's (2024) work, which noted that agreeable individuals are more likely to engage in prosocial behaviors, fostering collaborative environments conducive to self-regulation.

Gender Differences

Gender differences observed in this study align with existing research. Females demonstrated significantly higher scores in conscientiousness and neuroticism, while males exhibited slightly higher levels of extraversion. These patterns reflect cultural and psychological trends, where females are often more organized and emotionally expressive, whereas males may prioritize assertiveness and exploratory behaviors (Kang, 2023; Wu, 2024). However, no significant gender differences in SCM were observed, contrasting with studies suggesting superior self-regulation among females (Ercoşkun, 2015). Angelini (2023) proposed that the absence of gender differences in self-regulation might be attributed to situational factors, such as shared academic pressures and responsibilities, which homogenize behavioral patterns.

Practical Implications

The findings underscore the importance of integrating personality assessments into psychological counseling and educational interventions. Tailored strategies can be designed to enhance conscientiousness and mitigate the effects of neuroticism, improving self-regulation among students (Yılmaz & Karaoğlan-Yılmaz, 2023). For example, structured workshops focusing on time management and emotional regulation may be particularly beneficial for students with low conscientiousness or high neuroticism (Wenzel, 2023).

Additionally, leveraging traits such as extraversion and openness to experience can foster adaptive problem-solving and resilience in academic settings. Group-based activities that enhance social and collaborative skills may further support self-regulation (Rodriguez-Ruiz, 2024). Moreover, fostering openness through creative and experiential learning opportunities can provide students with the tools to navigate complex and uncertain scenarios effectively.

Conclusion

The findings of this study emphasize the intricate interplay between self-management and personality traits, with conscientiousness emerging as the strongest predictor of self-regulation. Neuroticism, by contrast, presents a significant challenge to maintaining consistent self-control. These insights contribute to the growing body of evidence on the role of personality in shaping self-regulation, providing a foundation for practical interventions aimed at fostering academic and personal success among university students. By integrating personality-focused strategies into counseling and educational practices, stakeholders can better support students in achieving their full potential.

Recommendations

Educational Interventions:

Incorporate structured programs focusing on time management, emotional regulation, and stress management to address weaknesses in self-regulation, particularly among students with high neuroticism or low conscientiousness.

Psychological Counseling:

Utilize personality assessments as part of counseling processes to tailor interventions. For instance, students high in conscientiousness could benefit from advanced goal-setting techniques, while those with high neuroticism may need targeted support in managing emotional volatility.

Collaborative Learning:

Develop group-based activities that leverage extraversion and agreeableness to foster cooperative learning environments. These can support students in enhancing their self-management through peer interactions.

Research Directions:

Conduct longitudinal studies to examine how personality traits and self-regulation capacities evolve over time, particularly during transitional periods such as entering university or starting a career.

Explore cross-cultural differences to understand the influence of sociocultural norms on the relationship between personality traits and self-management.

Use mixed-method approaches to gain deeper insights into the mechanisms underlying these relationships, combining

quantitative analysis with qualitative data from interviews or focus groups.

Institutional Policies:

Advocate for policies that integrate personality development into academic curricula, ensuring students receive holistic education that encompasses both cognitive and behavioral skill-building.

These recommendations aim to bridge the gap between theoretical findings and practical applications, ensuring that the insights gained from this research are effectively utilized to enhance student well-being and performance.

The findings of this study emphasize the intricate interplay between self-management and personality traits, with conscientiousness emerging as the strongest predictor of self-regulation. Neuroticism, by contrast, presents a significant challenge to maintaining consistent self-control. These insights contribute to the growing body of evidence on the role of personality in shaping self-regulation, providing a foundation for practical interventions aimed at fostering academic and personal success among university students. By integrating personality-focused strategies into counseling and educational practices, stakeholders can better support students in achieving their full potential.

Limitations and Future Research Directions

This study's reliance on self-reported measures introduces potential biases, including social desirability effects. Additionally, its cross-sectional design limits causal inferences. Future research should employ longitudinal methodologies to examine the developmental trajectories of SCM and personality traits over time (Nweke, 2024). Incorporating objective measures of self-regulation, such as behavioral tasks or physiological assessments, could also enhance the robustness of findings.

Cultural influences on the relationships between personality traits and self-regulation warrant further exploration. Cross-cultural studies could uncover how sociocultural norms shape these dynamics, enhancing the generalizability of findings (Gao, 2023). For instance, Yılmaz and Karaoğlan-Yılmaz (2023) highlighted the role of collectivist versus individualist orientations in moderating the expression of personality traits in self-regulation.

Finally, future studies should consider integrating qualitative methodologies, such as in-depth interviews or focus groups, to gain richer insights into the lived experiences of individuals navigating self-regulation challenges (Boyacı, 2016). Such approaches could complement quantitative findings and provide a more nuanced understanding of the interplay between personality and behavior.

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Determining the Career Expectations of Teachers Related to the Profession

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ABSTRACT

The success of the education system is based on the cooperation of education stakeholders and the continuous renewal of the education system. Teacher career systems are acknowledged as systems that allow teachers to renew themselves in order not to be left behind by the rapid change and development in the world. The purpose of the research is to reveal the current career perceptions and expectations of teachers regarding the profession. The research was conducted in public schools affiliated with the Ministry of National Education in Kütahya during the 2023-2024 academic year. 32 primary and high school teachers participated in the research. In the research, phenomenological design, one of the qualitative research methods, was used to determine the current situation. Data were analyzed using descriptive analysis. According to the research findings, the majority of teachers think that a professional career is important in providing a better education to students. Many teachers think that professional career development contributes to the profession. In particular, teachers are of the opinion that career development will increase the quality of the education offered and the professional readiness of the teacher. Based on the research results, informing teachers about the career planning and development process, explaining to them the increase in career development with justificationand clarifying the benefits of career development, establishing incentive systems that increase the career performance of recovery, increasing the performance characteristics of recovery, contributing to physical professions and supporting the specialization of skills is recommended.

Keywords: Teacher, career, occupational expectation.

Introduction

The most important factor affecting the education system is the adaptation of education stakeholders to the changing speed and complexity of the world. Educational institutions are closely affected by these changes (Başaran, 2008). Today, the speed of change in living conditions and the complexity of relationships force the education system, and therefore teachers, to adapt to this process and change (Bakioğlu & İnandı, 2001; Eryılmaz & Kara, 2018).That's why teachers are trying to renew themselves professionally in order not to fall behind social and technological change.Development in terms of professional qualifications refers to a systematic process for achieving and maintaining progress.Not only in-service professional practices, but also in the pre-service teacher training system, changes are constantly being reviewed with innovations aimed at meeting the needs of the system (Aktan, 2020; Gömleksiz et al., 2010; Gündüz, 2013). Education, which is a system open to change, must adapt to the changing conditions of society in order to provide knowledge and skills to individuals. For this reason, it is an important requirement for teachers to keep their knowledge and skills constantly updated and to ensure their professional development in order to increase the quality of education (Bümen et al., 2012; Eroğlu & Özbek, 2020; Mutlu et al., 2019; Ozan et al., 2014). In other words, teaching is a profession that must always be carried out with up-to-date knowledge and skills. For this reason, the Ministry of National Education is making career application plans regarding the teaching profession.

The concept of "career", which is of French origin, is defined as the experiences, skills and achievements that must be acquired in a professional field. Career is the success and expertise gained in the profession with time and effort (Gündüz, 2010; Minaz, 2019). In other words, career is the continuous progress of an individual in his/her working life and gaining experience and skills. Professional development stages that occur throughout the teaching career stages consist of a teacher's knowledge and skills, professional expectations, and changing educational approaches (Aydın, 2018).

Career development is considered within professional development. According to Blandford (2000), professional development is providing professional competencies,

increasing teaching performance and making educational policies easier to implement. According to Wells (2014), professional development is a long process that includes systematically planned professional experiences. According to Guskey (1997), it is a comprehensive set of achievements aimed at increasing the success of students. According to Avalos (2011), it is the completion of professional deficiencies for students to learn better. According to Darling-Hammond et al. (2017 as cited in Can, 2019), it is the improvements between the requirements of the age and teacher competencies (Cited by Can, 2019). As a result, professional development is more comprehensive than career development. The main factor that distinguishes career development from professional development is the expectation of professional results. In other words, it is the status and gains that one will gain from career development. In other words, it is about the answers to the question "What will I gain from my career?"Outcome expectation is effective in reinforcing a behavior. Therefore, the relationship between career competence expectation and career outcome expectation suggests that career development may be an important factor (Bakioğlu & Kirişçi-Sarkıaya, 2018; Gürpınar et al., 2021).

Proper planning and management of the career development process of the teaching profession is important from a professional perspective. Career planning includes a clearer understanding of the duties and positions related to the work that the teacher will perform. Although the career development process is perceived as a personal process, it should be evaluated within the framework of professional expectations and outcome relationships (İnandı & Gılıç, 2020).

In the 2010-2014 Strategic Plan of the Ministry of National Education, it is stated that the career development of teachers will be supported within the scope of "Development of Institutional Capacity". The basic professional development expected from teachers is determined as increasing the professional competence and individual development of teachers (Alabaş et al., 2012).

The Ministry of National Education aims to support the improvement of the quality of teaching in the teaching profession, to increase the function and efficiency of teachers, and to make the teaching profession a career profession by reducing professional burnout (Demir, 2011).

Since 2005, many studies have been conducted on promotion in the Teaching Career Ladder (Artan, 2007; Bakioğlu & Banoğlu, 2013; Cımbız & Küçüker, 2015; Çelikten, 2008; Gündoğdu & Kızıltaş, 2008; Nartgun & Ural, 2007; Özan & Kaya, 2009; Sag, 2004; Turan, 2007; Tosun & Yengin, 2014). According to the research results; career practices will increase the motivation of teachers, increase their social status, contribute to the professional and individual development of teachers, increase their institutional and professional commitment, improve their teaching efficiency, increase their self-confidence, and as their salaries increase, their success and development will also increase. Therefore, unless teaching is professionalized, quality in education cannot be achieved (Bakioğlu, 1996).

In Turkey, the professional development of teachers is directly associated with their careers, and professional and career outcome expectations are perceived as interconnected (Can, 2019). While institutional management mechanisms produce the services necessary for professional development, they may be inadequate for more individual career development. According to the the Scientific and Technological Research Council of Turkey education and human resources final report (2015); perhaps one of the most important problems of the education system is that the teaching profession cannot be turned into a career profession. The document also mentions that the results of the 'Teacher Career Ladder' application, which came into effect at the time the report was published, have not yet been fully obtained. In support of this, according to the OECD (2005) report, it is emphasized that support should be given to the professional development activities that teachers will participate in according to their expectations. These can be wage increases and social status (Sevim & Akın, 2021).

The career ladder application of the teaching profession, which was first launched by the Ministry of National Education in 2005, was updated and redefined in 2022. With the decision numbered 31750 in the Official Gazette dated February 3, 2022, the procedures and principles regarding the promotion of teachers in their careers have been rearranged. Its scope is to ensure that teachers gain the necessary competencies to advance to expert teaching and head teacher positions. The teaching career stages include titles ranging from candidate to expert and head teacher. The purpose of the law is to regulate the appointment, professional development and career progression of teachers who carry out education and training services. For this purpose, the ministry has introduced the prerequisites of taking 180 hours of distance vocational courses, not receiving a grade advancement penalty, receiving 70 points or more from the exam, having 10 years of experience as anexpert teacher, 20 years of experience as a head teacher, and completing a 240-hour training program for head teachers. Apart from this, it exempted teachers with master's and

doctorate degrees from the exam but limited them to their seniority years. Career applications were also made in the past years but could not be continued for many reasons. In addition, there are no studies in which the positive and negative consequences of the implementation of the regulation are evaluated by teachers at different career stages (Artan, 2007; Aydın, 2018). In addition, there are very few studies designed with qualitative research methods on this subject.

The research includes obtaining teachers' views on their career aspirations for professional development and their current institutional career planning. This research is important in terms of evaluating the programs made for teacher career by teachers in different branches and examining the positive or negative results that the proposed programs will have according to teachers' expectations. In addition, considering the topicality of the subject and its interest to a wide range of teachers, it is thought that the study will contribute to the relevant literature and the education-training process. The application of teacher career ladder is also very important in terms of increasing the attractiveness of the profession and teacher productivity (Akdaş et al., 2023).

For this reason, it is necessary to determine the career expectations of teachers who teach in public schools, and to provide data to the ministry about their own career plans and developments as teachers who are the implementers of the system. The research was designed to achieve this purpose. For this purpose, answers to the following questions were sought.

1-What is the importance that teachers give to professional careers?
2- What are the career paths preferred by teachers?
3- According to teachers, what kind of contributions does career development provide to the profession?

Method

Research Model

The research was designed in the phenomenological pattern of qualitative research methods. Qualitative research is the activity of examining some data in a natural environment through observation and interviews. In the phenomenological design, it is aimed to determine the perceptions, attitudes and experiences of individuals regarding any phenomenon that they notice but do not know in detail (Özdemir, 2010; Yıldırım & Şimşek, 2016). The research was conducted in a phenomenological design to reveal teachers' professional career perceptions and expectations.

Study Group

The study group of the research consists of teachers working in basic educational institutions in the city center of Kütahya in the 2023-2024 academic year. The sample of the study is easy accessibility sampling. This method, which provides convenience in sampling, was preferred as a convenient sampling method. In convenience sampling, participants who will form the study group are selected from individuals who are easy to reach- according to time, money, location, and availability of location - and who are suitable and volunteers for the research (Gravetter & Forzano, 2012; Merriam, 2013). The research was conducted with 32 teachers working in public schools.

Data Collection Tool and Data Collection

Data were obtained by the researchers through a semi-structured interview form according to the existing literatüre and research purpose. Interview forms used in qualitative research are intended to understand people's feelings and thoughts about any situation or phenomenon (Patton, 2014). With this form, it was tried to determine the views of teachers on the career phenomenon. While preparing the semi-structured interview form, similar studies were first examined, a conceptual framework was created and questions were prepared. Afterwards, two science education an done mathematics education expert opinions were sought and the interview form was finalized. A preliminary application was made to three teachers to measure the understandability of the questions. Since no negative feedback was received, the interview form was considered ready for implementation. In addition to demographic information such as seniority, graduation status, etc., three questions were asked about the participants' career expectations or corporate career ladder evaluations. Permission was obtained from all participating teachers to participate via consent form in this study.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Eskişehir Osmangazi University Social Sciences and Humanities Research Ethics Committee (Date: 22.02.2023, Number 2023-03)

- Informed consent has been obtained from the participants.

Analysis of Data

Descriptive analysis method was used in the analysis of the obtained data. The recorded data was written down by giving a separate code (T1, T2, T3,...) for each participant.

The reason for using descriptive analysis is that themes and codes can be prepared before the analysis and it provides the opportunity to summarize and interpret the determined themes and codes. In this technique, the data is easily interpreted without going into detail (Sönmez & Alacapınar, 2014; Yıldırım & Şimşek, 2021). In terms of the reliability of the research, interviews with the participants were recorded in writing and data loss was prevented. Interviews were completed within an average of 20-30 minutes after the purpose of the research was informed to the participants and their volunteering was ensured. The data were analyzed by two separate researchers and codes were created. The coders identified points of agreement and disagreement, and reached a consensus on disagreements. Data were appropriately discussed and related to the findings. In order to ensure the credibility of the research, tables were created by establishing meaningful relationships in the findings. In order to verify whether the interview transcripts obtained accurately represented the teachers' thoughts, the answers given were shown to the participating teachers and confirmed. For the external validity of the research, sufficient information about the research was given to the participants. Before the research, the interview form was tested with a preliminary application and then made ready for the actual application to ensure its confirmability. For this purpose, the raw data obtained during the study process is kept confidential.

Results

Within the scope of the research, questions were asked to teachers to reveal their perceptions of career expectations. The analysis of the interviews is given in the tables below.

When Table 1 is examined, the importance of career in the teaching profession consists of two sub-themes: yes and no.

"Yes" and "no" sub-themes about whether a career is necessary or not, and codes were created from the reasons given for these opinions. According to the codes related to the theme of yes it is important, teachers think that career is important for the increasing change and transformation of knowledge (n=28), the career expectations of the teacher (n=24), the changing and varying needs of the student (n=19), changes and innovations related to the branch (n=18), the speed of technological advancement (n=15), and understanding generation/generation differences (n=11). Only three teachers think that the teaching profession is not a career profession and that a career is contrary to the nature of the job. Some of the participant opinions regarding these findings are given below.

T13-Career development is important. Because the training received in one's own field will increase professional success and student success. It will contribute to their knowledge, skills and competencies.

T28-Yes, I do care. I always want to improve myself and achieve good things in my profession. I think I need to improve myself in terms of my career in order to give the best education to my students.

T36- Teaching is a very important profession that requires reorganization and development according to the needs of each time. For this, we need to renew and develop ourselves. Our age is the information age and since we need to carry the new generation further, we should be ahead of them.

T10-I don't care. Teaching is done for the society, not for the title.

Table 1.
Teachers' Level of Importance Given to Professional Career

Theme	Sub-theme	Codes	f	%
Is a career necessary?	Yes	Change and transformation of information	28	87.5
		Personal development and career prospects	24	75
		The pace of technological advancement	15	46.9
		Generational differences	11	34.4
		Student needs and achievement	19	59.4
		Changes and innovations related to the branch	18	56.2
	No	It is against the nature of the profession	3	9.4
Total			118	100

When Table 2 is examined, two sub-themes, institutional and individual, were determined as teachers' career path preferences in the teaching profession. Institutional career choice is central exams (n=30) and in-service training (n=28), personal career path choice is postgraduate education (n=29) and following professional publications (n=5). Some participant opinions regarding these findings are given below.

T22-Central exams will be more fair for career development and promotion and will solve the merit problem. In my opinion, career planning in education must be merit-based.

T3-Both face-to-face and in-service training can be useful in career development. Central exams can be held afterwards.

T12- In my opinion, the closest professional career path to the field is in-service training. Since the others are academically measured and knowledge-centered, the quality of in-service training should be increased and made practice-oriented.

T44-I followed the postgraduate education path. I do not think that other paths are based on merit in career development. In-service training can be useful, but when it is mandatory, it does not contribute much to the teacher.

T21- I think that in-service training and central exams are effective in the development of teachers. In addition, following current developments, keeping up with technology, and using modern teaching techniques in the classroom contribute greatly.

Table 2.
Professional Career Paths Preferred by Teachers

Theme	Sub-theme	Codes	f	%
Career Choice	Institutional	In-service trainings	28	87.5
		Central exams	30	93.8
	Personal	Professional publications	5	15.6
		Postgraduate education	29	90.6
Total			92	100

Based on the findings, it was determined that the majority of teachers viewed central examinations, postgraduate education and in-service training as career development paths.

When Table 3 is examined, it is determined that there are two sub-themes, "yes" and "no", regarding whether teachers' career development contributes to the profession. Teachers who think that there is, stated that career development increases professional qualifications (n=26), increases the quality of education provided (n=24), and provides economic etc. rights (n=4). Teachers who think that career development does not contribute to the profession stated that if the professional career effort is not accepted by the institution (n=7), does not target intellectual development (n=2), and does not provide economic support (n=7), it does not contribute to the profession.

Table 3.
Contribution to Professional Career Development

Theme	Sub-theme	Codes	f	%
Contribution to the profession	Yes	Increasing the quality of education provided	24	75.0
		Increasing the professional qualification of teachers	26	81.2
		Economic and personnel increase	4	12.5
	No	If not appreciated and rewarded by the institution	7	21.9
		If intellectual development is not targeted	2	6.25
		If economic support is not given	7	21.9
Total			70	100

Some participant opinions regarding these findings are given below.

T7- I think that career development efforts will increase the professional qualifications of the teacher, keep up with innovations, and contribute to his/her personal development.

T13-Yes, I think so. Any education that is beneficial to the teacher will also be reflected on the students. Professional development has an important role in teachers' adaptation to the changing student and educational conditions every year.

T29-Yes, I think so. The quality of education provided will increase with career development.

T52-I don't think so. Teaching is not a profession that can be developed by working in a certain field. It requires a holistic approach and an intellectual perspective.

T33-No, I don't think so. Unless financial opportunities are improved and teachers are rewarded for their efforts, career development will be of no use.

Based on the findings, the majority of teachers think that professional career development contributes to the profession. Teachers are of the opinion that the quality of education provided will increase the professional quality of the teacher. Some teachers, on the other hand, stated that professional development would not have a concrete contribution if economic support was not provided, intellectual development was not targeted, and teachers were not appreciated and rewarded by the institution.

Discussion

In order to meet the increasing knowledge and expectations, teachers need to renew and improve themselves. Knowledge and expectations increase every year. The majority of teachers participating in the research think that a professional career is important in terms of providing a better education to students. However, the view that very few teachers do not attach importance to professional career development on the grounds that it is against the nature of the profession and that this profession is done for the society is not consistent with the research findings of Altan and Özmusul (2022) and Çelikten (2008). Teachers view professional career not as a title or personal superiority, but as a professional prerequisite. Teaching is already a career profession. An arrangement according to career ladder will not contribute to teacher development. The view of some teachers that the training they receive during their career development process will contribute to student success is supported by the statement in İlğan's (2013) study that professional development activities will increase student learning as well as teacher learning. The justification of many teachers in the study for the necessity of career development activities is consistent with Buldu's (2014, p.130) assessment that teachers need to develop and renew themselves and ensure their professional development in order to keep up with the social change that has accelerated with scientific and technological developments. Changes in science and technology require changes in both the content of disciplines in education and training and the ways of access and application. This situation is important in teaching career stages and professional development (Aydın, 2018). Statements supporting this view were found by the teachers in the study. The statements of the teachers in the study that their professional development is necessary to understand the changing and varying needs of the new generation and generation differences show that they adopt Tozlu (2022)'s view that for the success of the teacher, they should be nourished with in-service training according to the changing society, world and generation conditions, and follow, adopt and assimilate the changes.

While the majority of teachers see central examinations, postgraduate education and in-service training as ways to develop their professional careers, only a few adopt professional publications. While these results are parallel to the research findings in this field (Çelikten, 2008; Gündoğdu & Kızıltaş; Nartgün & Ural, 2007; Sag, 2004), they do not overlap with the results of very few studies (Dağlı, 2006).

The view that individual teachers can determine their careers through postgraduate education is supported by the research findings of Tekışık (1989), Kaplan and Aslan, (2023) and Akçay (2005).

The application of career ladder of teachers has been addressed in many studies as problems in the teacher selection process, problems related to the scope of exam subjects, and structural problems related to career ladder. Among the evaluation criteria used in the promotion of teachers in career ladder, record grades, exams and lack of job descriptions between career ladder are not seen as objective criteria (Ozdemir et al., 2022; Tosun & Yengin, 2014). In this research, central exams are perceived as a fair, traceable, controllable and recorded inspection system. In the research, in the teacher evaluations regarding the format and content of the exam, it was mostly encountered that both the format and the content of the exam did not serve the purpose and were not correct. Bakioğlu and Banoğlu (2013) and Gülcan (2020) criticize the examination practice in the career ladder application.

According to the research results of Turan (2007) and Gündoğdu and Kızıltaş (2008), it was determined that the career ladder promotion practice did not contribute sufficiently to school development, student development and relations between teachers and provided only a small financial increase in teachers' salaries. In the research conducted by Kurt (2007), it was concluded that career ladder sometimes negatively affects the relationships between teachers and that lack of continuity causes injustice. The teachers' views in the study that career development will not be beneficial unless financial opportunities are improved and teachers are not compensated for their efforts are consistent with the findings in other studies. Based on the findings, teachers think that career ladder increases the quality of the profession and their personal development. This situation is consistent with the findings of Gülcan (2020) that it will contribute to professional development. In line with the findings of the research, in the study conducted by Erdoğan and Elma (2023), while some of the school administrators expressed a positive opinion that career ladder would motivate teachers and make economic contributions, some of them had a negative attitude towards the exam and wages.

In the research, an attempt was made to determine teachers' career perceptions and expectations. According to the research results, the majority of teachers think that professional careers are important in terms of providing

better education to students, increasing their personal and professional development, and professional updating.

Another result obtained from the research is that the paths followed for career development, whether institutional or individual, should be aimed at gaining knowledge and skills and should have a control mechanism and pass a certain exam or stage, and these career arrangements should be made with objective criteria.

Conclusion and Recommendations

In the study, some of the teachers expressed the opinion that there should be career advancement through in-service and postgraduate education. For this purpose, teachers are expected to be equipped with different professional skills both before and during service and to be competent enough to transfer these skills to other fields. The importance of teachers with these skills in the system is increasing once again, both in terms of professional development and career and in terms of adapting to the targeted program. However, for this to happen, the teacher must be trained as a skill development specialist and must be competent enough to teach different skills at an institutional level. The research shows that teachers limit their career planning to postgraduate education, in-service training or central exams. However, teachers can be paved the way for individually discovering and specializing in the skills targeted in the curriculum without limiting themselves to the content presented to them. They can have practically usable educational content that will contribute to their professional development, and they can also specialize in skills and expand their professional scope.

Every year, knowledge and expectations increase. In order to meet the increasing knowledge and expectations, teachers need to renew and improve themselves. Teachers view professional career not as a title or personal superiority, but as a professional prerequisite. When the draft of the new curriculum (2024) is examined, we see an emphasis on increased skill-oriented, competent and virtuous people. A flexible structure has been adopted in the curriculum that will be rearranged according to the changing situation and needs in the world, and it is seen that there is a holistic education model approach and the content will allow for both simplified and in-depth learning according to student interests and needs. What has increased significantly in the curriculum is the 17 field skills included in addition to the 21st century skills. The program includes many innovations such as students being more active, individual differences being focused on, skills being discovered, inter-program components and skills being increased, opportunities being provided for activities outside the program, process-oriented measurement and evaluation approaches instead of results, and workshop activities being included in schools. It is also known that the Ministry shares different models in teacher training and education with the public and receives opinions. The main reason for such studies may be the effort to achieve a higher quality and functional education designed at a universal level. In this context, teachers' career expectations and professional development are inevitable. However, in order for the current teacher training system and the teachers in the system to implement this targeted skill-based program, they must first have these skills at a competency level (Demir, 2011). For example, it can be considered as determining career fields in many areas such as intelligence game instructor, drama instructor, play therapy coach, storyteller, artistic discovery expert, value reinforcement, nature educator, life coach, green energy expert, career coach, financial literacy expert, sports and activity instructor, memory and attention developer, social media guide, cyber security consultant, book writer, content producer, etc. Based on the research results, it is recommended that teachers be informed about the career planning and development process, its importance be explained with justification, the concrete benefits of career development be clarified and explained, incentive systems that increase teachers' career expectations be established, teachers' professional skills be increased, these skills be qualified to a level that can be transferred to different areas, teachers be supported to specialize in these skills that will contribute to their professions, in-house employment areas be created for teachers in these areas of expertise, skill-based areas of expertise that they can teach in education be determined, and teachers be trained in these areas both in-house and by universities.

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Informed Consent: Permission was obtained from all participating teachers to participate via consent form in this study.

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Classroom Teachers' Competencies in Using Web 2.0 Tools: Predictive Roles of Individual Innovative Characteristics and Socio-demographic Variables

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ABSTRACT

This study aims to examine the level of competence in using Web 2.0 tools and individual innovativeness of classroom teachers and to determine the relationship between these variables. The sample of this relational survey-type study consisted of 309 classroom teachers working in two districts of Şırnak province in the 2023-24 academic year. Individual Innovation Scale and Web 2.0 Tools Usage Competence Scale were used as data collection instruments. In the data analysis, classroom teachers' Web 2.0 Tools Usage Competence and Individual innovativeness levels were examined using descriptive statistics, also the total Web 2.0 Tools Usage Competence scores were modeled in a linear regression equation. The study revealed that both the classroom teachers' competency levels in using Web 2.0 tools and their individual innovativeness levels were at a moderate level. While male teachers had a higher average in terms of competence in using Web 2.0 tools, female teachers had a higher average in terms of individual innovativeness levels. Another noteworthy finding is that both of the average scores of the competency levels in using Web 2.0 tools and individual innovativeness levels for teachers with postgraduate education were higher than all other categories. As a result of the regression analysis, it was concluded that individual innovativeness was not a significant predictor affecting the Web 2.0 tools usage competence score. However, having postgraduate education, teaching 4th grade, and receiving in-service training were significant predictors that positively affected the Web 2.0 tools usage competence. Some suggestions were made in the context of the findings.

Keywords: Web 2.0 tools, individual innovativeness, classroom teachers.

Introduction

Emerging technologies such as blockchain, artificial intelligence, 5G networks, the internet of things, augmented reality, quantum computing, and virtual reality are expected to significantly impact society in the near future. Currently, rapid technological developments have led to rapid transformations in education and training. This causes rapid transformation of societies and individuals. With these changes and developments, the effective use of technology, one of the basic skills of the 21st century, in educational environments has become indispensible. Competent teachers are essential for the effective integration of technology in education. It is claimed that a teaching approach that is not reflected in the educational environment and lacks technology negatively affects success (Nurzhanova et al., 2024). Raising well-equipped and successful individuals in their fields is possible using effective, accurate, and active classroom education practices in education and training environments. It can be said that, especially with technology integration in education, many applications have begun to be used in the learning-teaching process. Many emerging applications facilitate access to information and make both learning and the learning process enjoyable. For these reasons, it has become inevitable for teachers to include technological opportunities in their educational processes effectively and efficiently (Burmabıyık, 2014).

Recent educational trends have introduced new responsibilities for teachers. It is important for teachers to follow the developments in technology and to what extent they ensure the integration of technology into lessons. In other words, teachers need to adapt to technological developments and for students to benefit from technology effectively in terms of learning-teaching processes (Safa & Arabacioğlu, 2021).

Recently, Web 2.0 tools have become one of the frequently mentioned phenomena in education. Web 2.0 tools are websites, online software, and applications where users

share data, improve their ability to interact in education and training activities, increase collaboration and sharing, and enable them to produce content (Kavasoğlu, 2020). It is known that when the integration of Web 2.0 tools into the learning-teaching process is carried out effectively, it contributes to the development of students' basic skills as well as higher-order thinking skills (Fidan, 2012). Web 2.0 tools support students in providing permanent learning by enabling them to be active with interactive applications. In order to introduce the production of new information and raise the individuals since primary school who will be able to develop technology in the future, Web 2.0 tools are thought to be the most suitable technology (Akbaş & Yünkül, 2024). Therefore, it can also be said that Web 2.0 tools have an important place in making lessons more interactive.

Teachers' individual innovativeness is as important as their ability to integrate Web 2.0 tools in educational environments. In addition, teachers must have individual innovative qualities in addition to their many roles in terms of various activities employed in the learning-teaching process (Gökbulut, 2019). Teachers need to benefit from technological tools for the learning-teaching process to proceed more effectively and efficiently. Rawlins and Kehrwald (2013) stated in their study that using technology in the teaching context is effective in increasing cooperation and facilitating learning. It has become increasingly important for teachers to use the knowledge and experience they have gained in innovative and contemporary education in lessons and other teaching processes in terms of skills (Xu & Chen, 2010). An innovative teacher is someone who improves himself professionally, can transfer new information through new approaches, changes habits for new skills, and puts these new skills into practice (Ritchhart, 2004). Accordingly, it is important for teachers to be innovative individuals who are competent in using Web 2.0 tools and technology to facilitate the progress of learning in classroom and out-of-class learning environments.

Another issue addressed within the scope of this study is the individual innovativeness characteristics of teachers. Innovativeness has also been defined as an individual's ability to adopt new ideas and adapt to innovation (Rogers, 2003), or willingness to change (Hurt et al., 1977). However, Kılıçer and Odabaşı (2010) emphasized that the concept of innovation is a comprehensive concept such as risk-taking, openness to experience, creativity, and thought leadership. Rogers (2003) divides individuals into five different categories in terms of the characteristics they possess, depending on their acceptance of the innovation in the process. They are, "innovators", "pioneers", "questioners", "skeptics" and "traditionalists". The study was also discussed in this context.

The competencies of classroom teachers regarding the use of Web 2.0 tools in their lessons, in meeting the learning needs of the individual, increasing the permanence of learning, ensuring meaningful learning, and developing different skills in many areas, creating and enriching learning environments, producing different contents, have increased their importance with technological developments. With this increasing importance, the individual characteristics that classroom teachers should have to manage learning-teaching processes more effectively and efficiently have become one of the issues that need to be emphasized.

It can be said that the relationship between the competencies in using Web 2.0 tools and individual innovativeness characteristics contributes to classroom teachers' creative thinking, collaboration, revealing innovative ideas, and sharing these ideas. In this regard, it becomes important to examine the relationship between classroom teachers' Web 2.0 tools usage competencies and their individual innovativeness characteristics. Although prior research has addressed teachers' Web 2.0 tool competencies and their innovativeness, this study uniquely contributes by exploring the predictive roles of socio-demographic variables.

Purpose of the Study

This study was conducted to examine classroom teachers' proficiency levels in using Web 2.0 tools and their individual innovativeness levels and to reveal the relationship between these variables. Within the framework of this general purpose, answers to the following questions were sought in the study.

1. What are the classroom teachers' proficiency levels in using Web 2.0 tools?
2. What are the classroom teachers' innovativeness levels?
3. Do individual innovativeness levels and gender, age, graduated level of education, professional seniority, grade level taught and previous in-service training on the use of Web 2.0 tools predict the proficiency levels of using Web 2.0 tools?

Methods

Research Model

This relational survey-type study examines the relationship between classroom teachers' competencies in using Web 2.0 tools and their innovativeness characteristics, gender, age, graduated level of education, professional seniority, grade level taught, and previous in-service training (Fraenkel et al., 2012).

Such research studies are characterized to identify relationships between two or more variables and to gather insights into cause-and-effect connections. (Büyüköztürk, et al., 2023).

Population and Sample

1066 primary school teachers employed at Ministry of National Education (MoNE)-affiliated public schools in the Silopi and Cizre districts of Şırnak province during the 2023–2024 school year made up the study's population. 309 teachers made up the research sample, which was chosen from this population using convenience sampling among non-probability sampling techniques. In this method, which adds speed and practicality to the research, the researcher selects a situation that is nearby and easily accessible and continues until the number of participants in the sample reaches the desired sample size (Büyüköztürk et al., 2023). In this research, a power-based sampling calculation was made to determine the sample size to be studied. G-Power (Faul et al., 2009) software was used for this calculation. Since regression analysis was planned, the G-Power program was used to estimate the required sample size, assuming a medium effect size (0.15), at least 95% power at the $p < .05$ error level, and 6 predictive variables will be used in the regression equation. Accordingly, the program recommended working with a sample of at least 146 participants. In line with this, the number of participants reached with 309 primary school teachers within the scope of the research exceeds the sample size suggested by the program.

Table 1.

Demographic Properties of Participants

Variables	Category	n	%
Gender	Female	201	65.05
	Male	108	34.95
Age	25 years & under	68	22.01
	26-30 years	135	43.69
	31-35 years	52	16.83
	36-40 years	54	17.48
Graduation	Bachelor's Degree	273	88.35
	Postgraduate	36	11.65
Seniority/Professional Experience	1-5 years	142	45.95
	6-10 years	103	33.33
	11-15 years	64	20.71
Grade Level of Teaching	1st grade	60	19.42
	2nd grade	86	27.83
	3rd grade	93	30.10
	4th grade	70	22.65
In-service Training	Yes, I've attended	143	46.28
	No, I haven't attended	166	53.72
Total		309	100

When Table 1 is examined, 201 (65.05%) of the participants in the research were female and 108 (34.95%) were male. Considered by age, 68 (22.01%) of the participants in the study are 25 years old and under, 135 (43.69%) are between 26 and 30 years old, 52 (16.83%) are between 31 and 35 years old, and 54 (17.48%) are between 36 to 40 years old. In terms of education level, 273 of them (88.35%) have a bachelor's degree and 36 of them (11.65%) have a postgraduate education. When examined according to professional seniority, 142 (45.95%) of the participants in the study have professional seniority between 1 and 5 years, 103 (33.33%) have seniority between 6 and 10 years, and 64 (20.71%) have professional seniority between 11 and 15 years. In terms of the grade level they are teaching, 60 (19.42%) of the participants are teachers of 1st grade, 86 (27.83%) 2nd grade, 93 (30.10%) 3rd grade, and 70 (22.65%) are teaching the 4th graders. When the classroom teachers were examined in terms of receiving in-service training on Web 2.0 tools, it was seen that 143 (46.28%) received in-service training and 166 (53.72%) did not receive in-service training.

Data Collection Tools

Permission for use was obtained from the researchers who carried out development and adaptation studies for the scales to be used in the study. With the permission of the ethics committee, a research request was presented to the Silopi District Directorate of National Education, and data collection, and scale forms were prepared to be applied after the necessary approval was obtained. Data collection tools were delivered electronically to the teachers who would participate in the research and the data were collected in this way.

Web 2.0 Tools Usage Competency Scale (WTUCS)

The first of the data collection tools is the Web 2.0 Tools Usage Competency Scale (WTUCS), developed by Çelik (2021). The scale has a one-factor structure, is prepared in a 5-point Likert type, and consists of 39 items. The highest score on the scale is 195 and the lowest is 39 points. Within the scope of the development study, the Cronbach Alpha coefficient was found to be .98. This value was obtained from 160 teachers in the study group, and it is a scale with high reliability. At the same time, it has been determined that it distinguishes the sample in terms of the behaviors to be measured and that the items in the scales are items intended to measure the same behavior within the scale (Çelik, 2021, p.19).

Individual Innovativeness Scale (IIS)

In collecting data, the Individual Innovativeness Scale (IIS), developed by Hurt et al. (1977) and adapted into Turkish culture by Kılıçer and Odabaşı (2010), was used to determine the innovativeness characteristics of classroom

teachers. The scale consists of a total of 20 items. It consists of 12 positively worded items and 8 negatively worded items. It was rated on a 5-point Likert scale. The innovativeness score is calculated by adding 42 points to the score obtained by subtracting the negative items' score from the positive items' score. The lowest score can be 14, while the highest score can be 94. If the total scores obtained from the scale are below 46 points, the individual is called a "Laggard/Traditionalist"; if the score is between 46 and 56 points, the individual is called a "Late Majority"; if the scores are between 57 and 68 points, the individual is called an "Early Majority"; if the scores are between 69 and 80 points, the individual is called an "Early Adopters"; and if the score is above 80 points, the individual is called an "Innovator". According to the calculated scores of individuals' innovativeness levels, individuals below 64 were considered low in innovativeness, while individuals above 68 were considered highly innovative. Test-retest reliability was found to be 0.87 and the internal consistency coefficient was 0.82 as a result of the adaption study.
The study's ethical procedure was as follows:

- Şırnak University Scientific Research Ethics Committee gave its consent for this study to be carried out on 08/12/2023 with the document issue number: 605.01-87070
- Informed consent has been obtained from the participants.

Data Analysis

Classroom teachers' Web 2.0 Tools Usage Competence and Individual innovativeness levels were analyzed using descriptive statistics (mean, standard deviation, and minimum-maximum scores). The effect of individual innovativeness level, gender, graduated level of education, taught grade level, and previous in-service training on using Web 2.0 tools on the proficiency levels of using Web 2.0 tools was determined by multiple linear regression analysis. In line with the aim of the study, together with a continuous variable such as the individual innovativeness level on the Web 2.0 Tools Usage Competence of classroom teachers; The effects of categorical variables such as gender, level of education graduated, grade level taught, and previous in-service training on the use of Web 2.0 tools were also examined. A dependent (outcome) variable is examined by means of multiple independent (explanatory, predictive) variables through the use of multiple linear regression modeling. Both continuous and categorical variables can be used as independent variables; however, only continuous variables should be considered as a dependent variable. (Cohen et al., 2003; Field, 2018; Pedhazur, 1997).

The regression model in regression analysis typically incorporates data gathered from several groups as variables that explain or predict the outcome. However, the variables included in the model need to be continuous or categorical with two categories. Simple regression relies on Pearson correlation. The Pearson correlation between a continuous variable and a dichotomous variable, where the two categories are denoted by 1/0, is called point-biserial correlation. Therefore, in multiple linear regression analysis, if a categorical variable is used as an explanatory or predictive variable, It should be mentioned that only explanatory/predictive variables with two categories can be used to build the model (Field, 2018). After being transformed into two-level variables, discrete variables with qualitatively distinct categories are examined. Dummy coding is the technique of categorizing a discrete variable to produce a dichotomous variable. Limiting the relation between binary variables and other variables to linear relationships is the goal. A discrete variable with more than two categories can be related to another variable in some way, and the relationship may arbitrarily change when the numbers given to the categories are varied. However, binary variables, having only two points, can only have linear relationships with other variables; thus, they are appropriately analyzed using methods that utilize correlation and focus solely on linear relationships (Tabachnick & Fidell, 2013). The categorical variables included in the analysis of this study were converted into dummy variables, and one of the categories in each variable was selected as the reference group. The number of dummy variables created for each variable is one less than the number of its categories (k-1). The category of interest is coded as 1, while other categories are coded as 0. The goal is to exclude the impacts of other categories by only analyzing one category of a variable at a time. This allows for the interpretation of the impact of the category that is part of the analysis in relation to the reference category that is kept outside (Büyüköztürk et al., 2023; Xie & Powers, 2000).

Web 2.0 Tools Usage Competency Scale (WTUCS) is a measurement tool consisting of one dimension. WTUCS total scores of the participants were obtained for Web 2.0 Tools Usage Competence, which was used as the outcome variable in the study. This total score obtained is a continuous variable. In order to be subjected to regression analysis, it was tested whether the total scores of the scale were distributed normally and it was seen that the scores were normally distributed.

WTUCS total scores were modeled in a linear regression equation. In this model, the explanatory/predictor variables are the *"individual innovativeness level"* determined by the IIS and *"gender, the level of education graduated (undergraduate* or *graduate), the grade level taught (1st,*

2nd, 3rd and *4th grade)* and *previous in-service training on the use of Web 2.0 tools."* However, among the predictive variables, gender, graduated level of education, grade level taught and previous in-service training are categorical variables measured at the nominal scale level.

These categorical variables were therefore added as dummy variables to the regression model. Categorical variables can be included as dummy variables in regression models (Keith, 2019; Warner, 2008). Multicollinearity between the explanatory and predictive variables was investigated in the regression analysis. The calculated VIF (Variance Inflation Factor) values were found to be near 1. Consequently, it was determined that the explanatory and predictive factors did not exhibit autocorrelation (Demaris, 2004; Pedhazur, 1997).

Results

Findings on the Levels of Web 2.0 Tools Usage Competency and Individual Innovativeness (1st and 2nd questions of the study)

Regarding the 1st and 2nd research questions of the study, teachers' Web 2.0 Tools Usage Competency and Individual Innovativeness levels are given in Tables 2 and 3.

Table 2.

Web 2.0 Tools Usage Competence Levels of Classroom Teachers

Variables	Category	n	%	Mean	Sd	Min	Max
Gender	Woman	201	65.05	90.54	41.49	39	195
	Man	108	34.95	94.00	42.59	39	184
Age	25 years and under	68	22.01	85.49	41.18	39	170
	26-30 years	135	43.69	91.33	41.76	39	192
	31-35 years	52	16.83	94.40	37.16	39	15
	36-40 years	54	17.48	98.11	46.83	39	195
Graduation	Bachelor's Degree	273	88.35	86.73	40.03	39	192
	Postgraduate	36	11.65	129.83	35.58	39	195
Professional Seniority	1-5 years	142	45.95	85.73	38.40	39	170
	6-10 years	103	33.33	95.76	44.45	39	192
	11-15 years	64	20.71	98.63	43.62	39	195
Grade Level of Teaching	1st grade	60	19.42	79.22	39.95	39	192
	2nd grade	86	27.83	96.23	44.45	39	184
	3rd grade	93	30.10	90.42	39.74	39	17
	4th grade	70	22.65	98.74	41.92	39	19
In-service Training	Yes, I've attended	143	46.28	115.97	37.44	39	195
	No, I haven't attended	166	53.72	70.87	33.37	39	160
Total		309	100	91.75	41.84	39	195

According to the total points that can be obtained from WTUCS, and Table 2 is examined, the average total score was found to be 91.75 and it was determined that the classroom teachers' competency in using Web 2.0 tools was moderate level. When the total scores were examined according to the variables discussed in the study, the most striking results were observed in the subcategories of the variables of teachers' graduation levels and their status of receiving in-service training on the use of Web 2.0 tools. Regarding graduation, the average of teachers with a postgraduate degree (129.83) is significantly higher than the average of teachers with a bachelor's degree (88.35); Regarding the status of receiving in-service training, those who received training scored considerably higher (115.97) than the average of those who did not receive training (70.87). When other variables are examined, it is determined that the average scores obtained according to the subcategories of the variables are generally close to each other; According to gender, male teachers (94.00) have a higher average score than female teachers (90.54), and as age and professional seniority increase in parallel with each other, older and more experienced tend to score higher. It was observed that 4th-grade teachers had the highest average score according to the grade level taught.

According to the item-by-item examinations, the answers given by the classroom teachers to all items were below the scale's average item score, and considering the response categories of the scale (1-Never, 2-Rarely, 3-Occasionally, 4-Frequently and 5-Always), the use of the tools in question increased. It is seen that the levels are stuck between *"Rarely"* and *"Occasionally"*. The findings determined to be more important and the statements in the relevant items were shared, and for copyright reasons, the findings for all items in the scale were not reported. Accordingly, from the answers given, *"I can make the lesson fun with Web 2.0 tools." (Item 19)" and "I can ensure student participation in lessons with Web 2.0 tools.* It was determined that the level of agreement with the statements "(Item 34)" was slightly higher than the other items. On the other hand, the statements with the lowest participation were "I can prepare cartoons with Web 2.0 tools." (such as Make Beliefs Comix, Toondoo…) (Item 7)" and "I can design augmented reality events with Web 2.0 tools (such as Quiver, Morpho, Urasma…) (Item 22)".

Table 3.
Individual Innovativeness Levels of Classroom Teachers

Variables	Category	n	%	Mean	Sd	Min	Max
Gender	Woman	201	65.05	67.71	10.29	46	94
	Man	108	34.95	64.76	10.58	43	89
Age	25 years and under	68	22.01	67.01	9.90	47	89
	26-30 years	135	43.69	67.40	10.02	46	89
	31-35 years	52	16.83	64.13	10.34	47	90
	36-40 years	54	17.48	66.91	12.21	43	94
Graduation	Bachelor's Degree	273	88.35	66.23	10.16	43	90
	Postgraduate	36	11.65	70.08	12.26	46	94
Professional Seniority	1-5 years	142	45.95	67.49	9.82	46	89
	6-10 years	103	33.33	66.07	10.26	43	89
	11-15 years	64	20.71	65.86	12.12	46	94
Grade Level of Teaching	1st grade	60	19.42	67.80	11.88	46	89
	2nd grade	86	27.83	66.11	9.72	46	86
	3rd grade	93	30.10	66.37	10.09	43	90
	4th grade	70	22.65	66.83	10.73	47	94
In-service Training	Yes, I've attended	143	46.28	67.38	10.53	46	94
	No, I haven't attended	166	53.72	66.08	10.42	43	89
Total		309	100	66.68	10.47	43	94

According to the total scores obtained from the Individual Innovativeness Scale, the innovativeness levels of individuals are considered to be low in innovativeness for those who score below 64, while those who score above 68 are considered to be highly innovative. As shown in Table 3, the total score average of IIS obtained from the classroom teachers (n=309) was determined as 66.68, indicating a moderate level of innovativeness. This correspondes to the "questioning" category defined by scores from 57 to 68. Similarly, all groups—except those with postgraduate education—were also found to fall within the "questioning" category of innovativeness. It was determined that the average IIS score (70.08) of classroom teachers with postgraduate education was higher than all other categories and that teachers in this category were at an innovative level and were in the "pioneering" individual category. According to the item level analysis, the answers given by the classroom teachers to all items were below the average, and considering the response categories of the scale (1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Agree and 5-Strongly Agree), the individual innovativeness levels in question are " It seems that he is stuck between "I disagree", "I am in the middle" and "I agree". Among the answers given, "Before I consider innovations, I must see that other people are using that innovation." (Item 17)" and "I like trying new ideas. It was determined that the level of agreement with the statements "(Item 2)" was slightly higher than the other items. On the other hand, the statements with the lowest agreement were "I am mostly skeptical of new ideas." (Item 20)" and "I do not give much credence to new ideas until I see that the majority of people around me accept them. (Item 7)". Regarding IIS, only the findings that are considered to be of critical importance have been shared above along with the expressions in the items in question; due to copyright reasons, the findings for all items in the scale have not been reported.

Findings Regarding the Third Sub Question of the Research

The predictive level of individual innovativeness level, gender, graduated level of education, grade level taught, and in-service training status on the total Web 2.0 tools usage competency score was modeled with a linear regression model and the results are given in Table 4.

Table 4.

The Predictive Level of Individual Innovativeness Level, Gender, Graduated Education Level, Grade Level taught, and In-Service Training Receiving the Total Web 2.0 Tools Usage Competency Score

Explanatory / Predictive Variables	B (95% CI)	t	*p*	R	R^2	Model ANOVA *F (p)*
Individual Innovativeness	0.237 (-0.129/0.602)	1.272	.204	.599	.359	28.219 (.000)
Postgraduate	29.064 (16.895/41.232)	4.700	.000			
2nd Grade	9.079 (-2.222/20.380)	1581	.115			
3rd Grade	7.450 (-3.618/18.518)	1325	.186			
4rd Grade	13.934 (2.169/25.699)	2331	.020			
Received In-service training	40.642 (32.861/48.422)	10279	.000			

The model is a significant fit model (F=28.219, $p < .05$). Individual innovativeness, and teaching 2nd and 3rd grades are not significant predictors of the total Web 2.0 tools usage competency score ($p > .05$). Having a postgraduate education is a significant predictor that positively affects the total Web 2.0 tools usage proficiency compared to having a bachelor's degree ($p < .05$). Teaching 4th grade, receiving in-service training compared to teaching 1st grade, and not receiving it are significant predictors that positively affect the ability to use Web 2.0 tools ($p < .05$).

Discussion

As a result of the research conducted to examine the participants' competency levels in using Web 2.0 tools and their innovativeness levels and to reveal the relationship between these variables, classroom teachers' competency in using Web 2.0 tools was found to be at moderate level. While Yıldırım (2023) determined the teachers' competency in using Web 2.0 tools as low in his study, Şenel (2023) determined the competency in using Web 2.0 tools as moderate in his study.

According to the findings, the competencies of classroom teachers in using Web 2.0 tools were examined separately in terms of age, gender, graduation status, Professional seniority, grade level taught and in-service training. It has been determined that classroom teachers' competencies in using Web 2.0 tools vary by gender. Accordingly, it was determined that male teachers had a higher average than female teachers. This difference may be attributed to male teachers' higher awareness of or interest in technology, enabling more effective use of Web 2.0 tools. In the research conducted by Geçim and Çetin (2023), it was concluded that there was no significant difference in the proficiency of teacher candidates in using Web 2.0 tools by gender variable. On the other hand, studies conducted by Atalmış and Şimşek (2022) and Selvi (2022) found that male teachers had a higher average than female teachers.

When the findings related to age and professional seniority variables were examined, it was determined that as these variables increased, the participants' competency in using Web 2.0 tools increased and they had higher averages. The observed increase in competency levels with age and professional seniority may be attributed to in-service training received, cumulative experience and/or repeated exposure to technologies such as smart boards. In the research conducted by Yıldırım (2023), it was determined that the competence level of geography teachers in using Web 2.0 tools increased as age increased. On the other hand, in the research conducted by Eyüp (2022), it was concluded that the participants' competence in using Web 2.0 tools did not vary according to professional seniority.

When the findings regarding the graduation levels of classroom teachers and the variables of receiving in-service training on the use of Web 2.0 tools were examined, it was found that the averages of in-service teachers and teachers who completed their postgraduate education were higher on the Web 2.0 tools usage competency scale. In a similar vein, Keskin and Uğraş (2022) determined that the Web 2.0 tool usage competencies of physical education and sports teachers were higher, and the Web 2.0 rapid content development self-efficacy beliefs of teachers who completed their postgraduate education were higher. In addition, Akbaş and Yünkül (2024) concluded that teachers who received in-service training had higher competency in using Web 2.0 tools. However, Yıldırım (2023) found no significant difference in the proficiency level of geography teachers in using Web 2.0 tools between undergraduate and graduate teachers.

It was also observed that 4th-grade teachers had the highest average score in terms of the grade level taught. It can be said that the grade level taught by classroom teachers has an impact on the competencies in question. However Akbaş and Yünkül (2024) found that the competency levels in question did not show a significant difference according to the variable of the grade level taught.

The results also showed that classroom teachers could make the lesson fun with Web 2.0 tools and ensure student participation in the lessons with Web 2.0 tools, while their competence in preparing cartoons with Web 2.0 tools and preparing lessons with augmented reality applications was low. Likewise Selvi (2022)'s findings which show that the majority of teachers were not able to prepare cartoons and design activities related to augmented reality applications, their competence in this regard was very low, and they were also able to make the lesson fun with Web 2.0 tools and to attract students to the lessons with Web 2.0 tools. In another study by Yalçın and Temur (2023), it was determined that teachers were at a high level in making the lesson fun with Web 2.0 tools, and that they were at the lowest level of competency in preparing cartoons with Web 2.0 tools.

The study also revealed that classroom teachers demonstrated a moderate level of individual innovativeness, placing them in the "questioning" category. This finding aligns with Baki (2023) who classsified Turkish teacher candidates similarly, describing them as non-innovators despite being in the questioning group. Similarly, in the study conducted by Demir and Demir (2023), the individual innovativeness characteristics of classroom teachers were found to be within the boundaries of the "questioning" category, and it was determined that the level of openness to experience was high in the sub-dimension and their innovativeness levels were at a medium level.

As a result of the average scores of all variables and subcategories included in the study, it was determined that all groups, except those who graduated from postgraduate education, were at the moderate level, that is, in the "questioning" individual category, in terms of age, gender, professional seniority, in-service training status, and grade levels taught. Teachers with postgraduate education were included in the category of "highly innovative" and "pioneering" individuals. Pioneering individuals take an active role in accelerating and spreading change by creating models for change in society. Inquirers, in a subcategory, learn and consult new ideas from pioneers. In the research conducted by Demir and Demir (2023), they determined that teachers remained within the boundaries of the questioning category. While there is no significant difference in individual innovativeness characteristics by gender and graduation variables, it has been concluded that teachers with higher professional seniority are at a higher level than those who are at the beginning of the profession. On the other hand, Abbak and Erdamar (2024) determined in their research that teachers' innovativeness levels were lower than the general averages and that most of the teachers were in the "questioning" category. According to the gender variable, they found that the averages of both male and female teachers were close to each other and that they were at a low level of innovation. According to the professional seniority variable, the highest average individual innovativeness level belongs to teachers in the 16-20 years seniority group, the lowest averages belong to teachers in the 11-15 years seniority group, and according to the individual innovativeness education level variable; They found that the number of participants with postgraduate education was higher than those with undergraduate education. In the study conducted by Gökbulut (2021), it was determined that teachers took their individual innovativeness characteristics into two values that are close to each other: "pioneering" and "questioning". It was found that there was no significant difference in individual innovativeness characteristics according to educational status and professional seniority variables, but men's innovativeness characteristics by gender variable were higher than women's innovativeness characteristics. In the research conducted by Yapıcı and Kaya (2020), it was concluded that the majority of the participants were in the "questioning" category and that the majority were highly innovative in terms of individual innovativeness levels. It was concluded that the results of the research conducted in the relevant literature are similar to the findings of this research. There is no difference in individual innovativeness levels between classroom teachers teaching different classes and that they are in the category of moderately innovative, that is, "questioning" individuals, with values between 57-68.

Among the answers given, "Before I consider innovations, I must see that other people are using that innovation." (Item 17)" and "I like trying new ideas. It was determined that the level of agreement with the statement "(Item 2)" was slightly higher than the other items. According to Item 17, to adopt innovations, a safer decision-making process can be followed by first observing the experiences of others. It can be said that this situation causes individual innovativeness characteristics to be in the "questioning" category, as they can affect the level of innovation, reduce the tendency to take risks, and reflect a more cautious approach. According to Item 2, considering that the individual enjoys trying new ideas, has a high level of innovation, is not afraid to take risks, and has a high innovation potential, this may have had an impact on the individual innovation level.

On the other hand, the statements with the lowest participation were "I am mostly skeptical of new ideas." (Item 20)" and "I do not give much credence to new ideas until I see that the majority of people around me accept

them. (Item 7)". This can be said that teachers can take a more cautious approach to innovation and seek more evidence to accept new ideas.

When the findings regarding the third sub-objective of the research were examined, it was concluded that teaching 2nd and 3rd grades in the context of individual innovation was not a significant predictor affecting the total Web 2.0 tools usage competency score. The intense content of the subjects to be taught at these grade levels, their resistance to the use of Web 2.0 tools, their inability to adapt to innovation easily, their lack of knowledge and experience about Web 2.0 tool usage competence, and their negative attitudes about similar issues and the adoption of new ideas between classes may be effective. However, individual innovativeness level, being a 4th-grade teacher, was found to be a significant predictor that positively affects the proficiency in using Web 2.0 tools compared to being a 1st-grade teacher. The fact that more emphasis was placed on teaching reading and writing in the first grade that it was more difficult to control writing skills in the digital environment and that children in this period were not at a level to use Web 2.0 tools may have been effective. There may be an increase in the use of Web 2.0 tools due to the development characteristics of 4th-grade students as well as their greater knowledge, experience, and experience. The fact that children in this period are more competent in using technology, their level of interaction with their environment increases, and their learning needs may be effective. In addition, classroom teachers' more effective use of these tools at this grade level may have affected individual innovativeness characteristics. The fact that 4th-grade teachers have a lot of experience and use Web 2.0 tools for various course activities may have increased this level of competence. When the literature was examined, it was concluded that the teaching processes applied in the study conducted by Uysal (2020) on the use of Web 2.0 animation tools in the science lesson of 4th-grade primary school students did not make any difference in the students' basic skills, attitudes and motivation towards science.

Another finding obtained as a result of the research is that individual innovativeness level, having a postgraduate education was found to be a significant predictor that positively affects the total Web 2.0 tools usage competence compared to having a bachelor's degree. Having a postgraduate education may have increased the teachers' innovativeness level, improved the researcher identity of classroom teachers, adopted innovations more easily and increased their competence in using Web 2.0 tools. In this respect, it makes it easier for teachers who follow technology to easily transfer it to their learning environments using Web 2.0 tools (Eyüp, 2022). Increasing pedagogical knowledge through postgraduate education, it has contributed to the motivation to use technology effectively and increase the competence of using Web 2.0 tools in terms of providing in-depth technical and scientific knowledge. In a similar vein, Gökbulut (2021) found no significant difference between teachers' innovativeness characteristics and their educational status. Moreover, in the research conducted by Beşkaya (2017), it was concluded that there was no significant difference between the participants' innovation scores in terms of their education level.

Conclusion and Recommendations

The results of the study indicated that individual innovativeness level, receiving in-service training was found to be a significant predictor that positively affects the total Web 2.0 tools usage competence compared to not receiving in-service training. In-service training activities may increase the level of individual innovation as well as the proficiency in using Web 2.0 tools. The fact that they developed creative ideas to create new content within the scope of the curriculum may increase the level of individual innovation. Considering the changes in technological developments, it can be said that in-service training activities have supported the individual innovativeness of classroom teachers. Akbaş and Yünkül (2024) found that classroom teachers' competency in using Web 2.0 tools creates a significant difference in favor of those receiving in-service training shows that it coincides with the results of this research. In addition, in the studies conducted by Akbaş (2023) and Eyüp (2022), they found that teachers' use of Web 2.0 tools differed significantly depending on their education level. As a result of the data obtained from the study, the following recommendations can be made:

- More attention should be given to in-service training activities of classroom teachers to increase their competency in using Web 2.0 tools, and teachers should be supported to receive this training.
- Classroom teachers should receive postgraduate education and their individual innovation characteristics and technology use competencies should be developed through various postgraduate training.
- Within the scope of the curriculum, various platforms should be created to produce content regarding Web 2.0 tools and share these experiences, and the motivation of classroom teachers should be increased with their innovative features by sharing application examples.
- Research should be conducted in terms of different variables regarding the effects of classroom teachers' innovativeness characteristics on their competencies in using Web 2.0 tools.

• Within the scope of this research, whether classroom teachers' individual innovativeness characteristics predict their competency in using Web 2.0 tools should be addressed with different variables.

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The Impact of the STEM-Integrated Learning Model on Students' Academic Achievement and Attitudes Towards Science Courses

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ABSTRACT

This study examines the effects of integrating STEM activities into the science curriculum on students' academic achievement in the circulatory system topic and their attitudes toward science. This study was designed as a quantitative research and implemented using a pretest–posttest control group quasi-experimental design. This design is commonly employed in experimental research, as it s considered to provide a means to establish valid causal relationships through the control of extraneous variables. The study sample consisted of 40 sixth-grade students (Experimental group = 20 Control group = 20) from a middle school in Erzurum province during the 2022-2023 academic year. In the study, the Circulatory System Academic Achievement Test (CSAT) and the Attitude Scale Toward Science Course (ASSC) were employed to assess students' academic achievement and attitudes toward the science course. Following data collection, statistical analyses were conducted to examine group differences. T-tests, one-way analysis of variance (ANOVA), and analysis of covariance (ANCOVA) were conducted. Based on the analysis results, the derived findings were systematically organized into tables and subsequently interpreted in a comprehensive manner. An effect size was also calculated for the ASSC. The research findings indicate a statistically significant difference in academic achievement between the experimental and control groups, favoring the experimental group. However, no statistically significant difference was observed in students' attitudes toward the science course.

Keywords: Circulatory system, attitudes towards science course, STEM activity.

Introduction

Recent advancements in science and technology have necessisated contionus updates in educational curricula worlwide. Countries that prioritize science and mathematics education have a leader role in scientific and technological competition. Consequently, new advancements and developments in science, technology, and engineering are essential not only for fostering economic and meaningful progress, but also for maintaining continuity in the globalization process.

In recent years, rapid advancements in technology have led to changes in many fields, including education. Since 2005, educational programs have significant shift from traditional approaches to constructivist paradigms, which emphasize student-centered learning. Additionally, according to the 2018 Science Education Program by Turkey's National Ministry of Education (MEB), there has been an emphasis on cultivating individuals with 21st-century skills (Erkan, 2023).

The updated science curriculum encourages students to take responsibility for addressing real-world problems by applying scientific knowledge, scientific process skills, and essential life competencies. The rapid advancement of science and technology plays a significant role in shaping societal development and transformation, further emphasizing the importance of science education. Consequently, many countries continuously evaluate and revise their education systems and science curricula to meet emerging needs. In Türkiye, educational programs have been adapted to align with contemporary demands. One effective approach to improving the efficiency of science education is the integration of STEM principles, fostering interdisciplinary connections. This integration promotes a deeper understanding of scientific processes and enhances inquiry-based learning, allowing students to engage in problem-solving within knowledge-driven contexts (Değerli, 2021).

Similarly, in Türkiye, the science curriculum introduced in 2018 aligns with global transformations, emphasizing students' ability to establish connections between science

and engineering while fostering entrepreneurial practices. In this regard, individuals must develop an interdisciplinary perspective to acquire 21st-century skills in addition to their foundational competencies. Achieving an interdisciplinary perspective is made possible through the integration of science, mathematics, technology, and engineering disciplines, enabling a more holistic approach to learning. This framework has led to the design of STEM activities, which represent innovative and application-based practices in science education (Toprak, 2021).

STEM education employs an interdisciplinary approach that integrates academic concepts within real-life contexts by applying science, technology, engineering, and mathematics. This integrated learning framework fosters connections between schools, communities, industries, and global organizations, thereby preparing students for the evolving economic landscape. STEM learning encompasses various approaches that engage two or more STEM disciplines. When effectively structured, STEM education facilitates meaningful learning through the integration and application of mathematics, technology, and science (Permanasari et al., 2021).

The term STEM, derived from the initials of Science, Technology, Engineering, and Mathematics, has become synonymous with a distinct educational approach. Within the STEM education framework, various disciplines converge to address learning challenges through integrated solutions. Moreover, STEM education embraces a philosophy that seeks to cultivate 21st-century skills by fostering an interdisciplinary perspective rooted in the synthesis of science, technology, engineering, and mathematics. (Ünlü, 2022).

In other words, science, technology, engineering, and mathematics (STEM) constitute a meta-discipline, which represents an educational approach premised on synthesizing knowledge from diverse disciplines into a cohesive "whole." This conceptual bridge between distinct disciplines is recognized as STEM (Morrison, 2006). Furthermore, from an alternative standpoint, numerous STEM educators and researchers interpret the acronym STEM as a representation of the interconnectedness inherent within four foundational disciplines. Crucially, this interconnectedness does not imply the constant integration of these disciplines, but rather strategic and pedagogically meaningful connections aligned with learning goals. (Jones, et al., 2020).

STEM-related studies have gained significant momentum in fostering students' positive attitudes towards science and enhancing their motivation to pursue careers in science-related fields. The fundamental principle of STEM education lies in the systematic integration and coordinated application of science, technology, engineering, and mathematics domains, emphasizing problem-solving at its core. Consequently, STEM education serves as a pedagogical framework that underscores the importance of acquiring, promoting, and advancing the disciplines denoted by the acronym. (Toma & Greca, 2018).

The integration of STEM into education entails dismantling barriers between disciplines, fostering a deeper conceptual understanding and enhanced academic performance in STEM-related areas, and cultivating an appreciation for the interconnectedness between subjects and real-world challenges. Given its transformative impact on the general student population, STEM education has garnered increasing attention from researchers over the past decade (De Loof et al., 2022).

STEM-based activities can be designed to be hands-on, inquiry-based, and project-based, offering students the opportunity to explore STEM concepts (Prajuabwan & Worapun, 2023). Additionally, STEM education can be defined as the practical application and transformation of the knowledge provided in schools into products. In this sense, it is an approach that allows students to find solutions to daily problems. Rather than treating each discipline in isolation, STEM education provides multiple disciplines to be integrated and processed together, expecting students to find solutions to the problems presented to them using this approach. During the STEM education process, connecting with existing prior knowledge, ensuring meaningful learning, and acquiring higher-order thinking skills are among the advantages of STEM (Topbaş, 2023).

The practical application of STEM education in real life increases students' interest and understanding. It is a strategy that encourages world-class scientific and technological talent by developing convergent thinking and problem-solving skills (Kim & Choi, 2012). The complex challenges that the world faces today cannot be addressed within a single disciplinary framework therefore, they necessitate the integration of multiple fields of knowledge. While interdisciplinary learning is not exclusive to STEM, STEM education enables meaningful and innovative applications that reflect the increasingly interconnected nature of real-world problems.

Mathematical reasoning and problem-solving, as core components of mathematics, are essential in science and technology education. A 21st-century educational approach structures the learning of science, mathematics, and technology within real-life problem contexts, thereby enhancing the relevance and applicability of knowledge.

Moreover, students engaged in STEM learning benefit from collaborative environments where knowledge is constructed through dialogue, discussion, and exchange (Sulueman, 2020). Overall, STEM-oriented classrooms support students' communication, collaboration, and multidimensional thinking skills from an early age.

The contemporary educational philosophy of the current century adopts a process where students are at the center, individual differences are valued, and learners are active. Upon reviewing the literature related to STEM, it is observed that the studies are associated with areas such as argumentation-based, station technique, project-based, educational game-supported, creative drama method, and flipped learning model. In addition to these studies, research on Arduino applications, robotic STEM applications, digital game-based and educational robotic applications have also been encountered (Aluç, 2024; Bekereci, 2022; Demirci, 2023; Eren, 2024; Erkan, 2023; İnce, 2024; Koca, 2023; Özçelik, 2021; Sarıçam, 2019; Uçar, 2019).

To meet the constantly changing needs of society and bring the significantly altered educational understanding into classroom environments compared to the past, one of the widely implemented STEM activities is the use of Scratch program. Scratch, developed by the Massachusetts Institute of Technology (MIT) in the United States, is a programming language with a user-friendly interface specifically designed for children aged 8 to 16. Unlike conventional programming languages, it enables users to generate animations, games, and other interactive projects by simply clicking and dragging the desired functions with their mouse. This feature eliminates the need for complex coding, making Scratch particularly accessible for beginners and widely utilized for educational purposes (https://boenstitu.com/blog/scratch-nedir). The Scratch program is an application related to robotics and coding in STEM education and is widely used in technology, design, engineering, and mathematics fields in robotics coding education (Keçeci, 2018; Yalçın & Akbulut, 2021).

Upon reviewing the literature, various methods and techniques are used in the teaching of the circulatory system. These methods and techniques include project-based learning, argumentation-focused activities, inquiry-based learning, the station technique, mind mapping technique, critical thinking, scaffolded instruction, the use of analogies, open-ended questions, and drawings (Bastem, 2012; Biçer, 2011; Cömert, 2014; Çakıcı, 2019; Fancovicova & Prokop, 2019; Gülbahar, 2023; Kılıç, 2009; Wicaksana et al., 2020; Wulandari et al., 2022; Yalçınkaya, 2018). Additionally, virtual reality applications, animations, augmented reality, interactive digital storytelling, digital educational games, augmented reality, and the structure-behavior-function model are also methods used in teaching the circulatory system (Akkiren, 2019; Demir, 2023; Gnidovec et al., 2020; İlkay, 2022; Sarıçam, 2019; Yeşiltaş, 2019; Yetişir, 2019).

The "Circulatory System," with its concepts (systemic circulation, arteries, veins, etc.), is a topic that students struggle to fully grasp and visualize in their minds. Therefore, it makes it difficult for 6th-grade middle school students, who are still in the concrete operational stage, to learn the topic meaningfully. To enable students to learn meaningfully without resorting to rote learning and to support the development of their social, emotional, and spatial abilities during the learning process, STEM applications have been integrated into the lessons in this study.

Purpose of the Study

This study aims to investigate the effects of integrating STEM activities particularly through the use of Scratch programming—into the science curriculum on sixth-grade students' academic achievement in the circulatory system topic and their attitudes toward science. While Keçeci (2018) reported that Scratch-based instruction significantly enhanced students' academic performance on the circulatory system, changes in student profiles and instructional practices over time necessitate a renewed investigation. Accordingly, this study explores whether STEM-integrated instruction differs from traditional program-based teaching in terms of its impact on students' achievement and attitudes. Therefore, the following question and sub-problems were investigated: "Does teaching the 'Circulatory System' topic within the 6th-grade science curriculum using STEM-integrated instruction and program-based instruction affect students' academic achievement regarding the circulatory system and their attitudes towards the science course?"

Sub-Problems and research questions:

1. Is there a significant difference in the academic achievement on the circulatory system between students who receive STEM-integrated instruction and those who receive program-based instruction?

2. Is there a significant difference in the attitudes towards the science course between students who receive STEM-integrated instruction and those who receive program-based instruction?

Method

Research Model

In this study, a quasi-experimental design with pretest-posttest control groups, one of the experimental research models, was employed to examine the impact of STEM-integrated instruction on students' academic achievement regarding the circulatory system and their attitudes towards the science course. In the pretest-posttest control group model, there are two groups formed through random assignment. One of these groups is assigned as the experimental group, and the other as the control group. Measurements are taken in both groups before and after the experiment (Karasar, 2011). Before the intervention, the Circulatory System Academic Achievement Test (CSAT) and the Attitude Scale towards Science Course (ASSC) were conducted in both the experimental and control groups. In the experimental group, lessons were conducted using STEM applications, specifically Scratch activities, whereas in the control group, lessons were carried out based on the program-oriented instruction model. At the end of the process, the CSAT and ASSC were re-conducted as posttests to both the experimental and control groups. The application plan is shown in Table 1.

Table 1.

The Application Plan

Groups	Pretest	Application	Posttest
Experimental group	CSAT,ASSC	STEM integrated instruction	CSAT,ASSC
Control group	CSAT,ASSC	Program based instruction	CSAT,ASSC

Study Group

The sample of this study comprises 40 sixth-grade students from two different classrooms in Erzurum, Turkey, selected through random assignment during the 2022-2023 academic year. As a result of random selection, one of the classes was assigned as the Experimental Group (EG) (n=20), where lessons were conducted with STEM activities, and the other as the Control Group (CG) (n=20), where lessons were conducted with program-based instruction.

Data Collection Tool

The data collection instruments included the Circulatory System Academic Achievement Test (CSAT) and the Attitude Scale Towards Scence Course (ASSC), both of which have been validated in prior studies.

Circulatory System Academic Achievement Test (CSAT)

While creating the CSAT, questions were prepared by the researcher based on the achievements determined by the Ministry of Education regarding the circulatory system, as the students' success in this topic would be measured. A specification table was created for the questions, and the opinion of an expert actively involved in science education was utilized to ensure the validity of the questions. Revision was made based on the expert's opinion, and the test, consisting of 25 questions, was prepared for pilot application. The CSAT was administered to 140 students at the 7th-grade level for reliability testing. After the pilot study, it was determined that there were no questions negatively affecting reliability. Additionally, the reliability coefficient and item analyses of the CSAT were calculated. The KR-20 reliability coefficient of the CSAT was found to be .838. The reliability of achievement tests is measured through a variety of statistical methods, among which the Kuder-Richardson-20 (KR-20) stands out as a notable technique. KR-20 serves as a measure of internal consistency, specifically designed for tests and scales comprising multiple-choice items.

This method measures a reliability coefficient that ranges from 0 to 1, with values exceeding .70 indicating that the test demonstrates a high level of reliability. Consequently, KR-20 is widely regarded as an effective approach for evaluating the internal coherence and reliability of achievement tests (Demir & Şenyurt, 2021). Based on these results, it can be stated that the CSAT is significantly reliable.

Attitude Scale towards Science Course (ASSC)

The Attitude Scale Toward Science Courses was developed by Taşkın and Aksoy (2019) to measure middle school students' attitudes toward science. It consists of 12 items rated on a 5-point Likert scale, ranging from 'Strongly Disagree' to 'Strongly Agree." During the preparation of the scale items, both a review of the relevant literature and student opinions were utilized. The study employed the descriptive survey method. A probability-based cluster sampling method was used to select participants from the middle school population in Erzurum province. The scale items were administered to 196 middle school students.

To determine the construct validity of the scale, exploratory and confirmatory factor analyses were conducted. In the initial stage of the factor analysis, the data obtained through the implementation of the scale were analyzed using the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests, with the KMO value calculated as .85 and the significance level (p-value) determined as .05. Upon examining the factor loadings and item values through exploratory factor analysis, it was concluded that the scale items could be

explained through three primary factors. The first sub-factor, titled "Students' Attitudes Toward the Methods Used in Science Courses," demonstrated a Cronbach's Alpha coefficient of .782. The second sub-factor, "Students' Attitudes Toward the Relevance of Science Courses to Daily Life," had a Cronbach's Alpha coefficient of .718. The third sub-factor, "Students' Attitudes Toward the Content of Science Courses," exhibited a Cronbach's Alpha coefficient of .64. The Cronbach's Alpha internal consistency coefficient for the entire scale was calculated as .86. According to Kalaycı (2010), the reliability coefficient interpretations based on the alpha coefficient are as follows:

0.00<α<0.40: The scale is not reliable.
0.40<α<0.60: The scale has low reliability.
0.60<α<0.80: The scale is fairly reliable.
0.80<α<1.00: The scale has high reliability.

Based on Kalaycı's (2010) criteria, the scale and its sub-factors are considered highly reliable.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from Atatürk University Educational Sciences Ethics Committee (Date: 05.07.2022, Number: E-56785782-050.02.04-2200207614)
- Informed consent has been obtained from the participants.

Data Analysis

The SPSS 18 software package was used for data analysis. Before starting the analyses, assumptions such as the independence of the data, normality of distributions, and homogeneity of variances were tested to ensure the appropriateness of the tests. Once these assumptions were confirmed, parametric tests were conducted. To ascertain if there existed a notable distinction in the academic achievements of EG and CG students and their attitudes towards the science course, t-tests, one-way ANOVA, and ANCOVA were conducted. Additionally, the analysis of covariance method was used because it is a powerful statistical method that compares the mean scores by controlling one or more variables that are believed to be related to the dependent variable when examining the effect of the independent variable on the dependent variable in an experimental procedure In the analysis of covariance (ANCOVA), students' posttest scores on the Attitude Scale Toward Science Course were treated as the dependent variable, while the instructional method (STEM-integrated vs. traditional program-based) served as the independent variable. Pretest scores were included as a covariate to control for initial differences in students' attitudes toward science and to more accurately assess the effect of the instructional intervention. The ANCOVA was conducted in accordance with Büyüköztürk (2009), and the significance level was set at .05.

The homogeneity of variances test is explained in Table 2.

Table 2.

Test of Homogeneity of Variance

	Levene Statistic	df1	df2	p
FYTO (Pre-test)	3.56	1	38	.06
FYTO (Post-test)	0.54	1	38	.46
DSABT (Pre-test)	5.76	1	38	.07
DSABT(Post-test)	17.53	1	38	.30

*$p < .05$

Research Procedure

During the research process, the instructional models assigned to the experimental and control groups were implemented by the researcher across 6 instructional hours. Pretests and posttests were conducted to both groups on the same days, with a four-week instructional period between two assessments. The lessons were taught using the STEM-integrated instructional model in the experimental group, while the control group followed the program-based instructional model recommended by the MEB. In both groups, textbook-based activities were implemented in with the line instructional approaches.

Implementation of Program-Based Instruction

In the class designated as the CG, instruction was delivered in accordance with the sixth-grade science textbook provided by the MEB. The lessons were implemented over six instructional hours, strictly adhering to the curriculum and the instructional guidance outlined in the textbook. The instruction was supported with various visuals, videos, and slides. The activities in the textbook were carried out in paralle with the lesson content.

Implementation of STEM-Integrated Instruction (Implementation of the Scratch Program)

In the EG, instruction was delivered for six class hours using STEM-integrated instruction (Scratch program). Throughout the insructional process, the students engaged in researcher-designed STEM activities implemented via Scratch. The activities were completed individually and are detailed below:

Structure of the Heart

This activity aimed to teach students the anatomical components of the heart, one of the core structures of the circulatory system. A Scratch-based interactive game was developed by the researcher, in which students were instructed to drag and drop heart components displayed at the bottom of the screen into their correct positions on a heart diagram. When a correct match was made, the element locked into place, and a reinforcement sound (clapping) was played to provide immediate feedback.

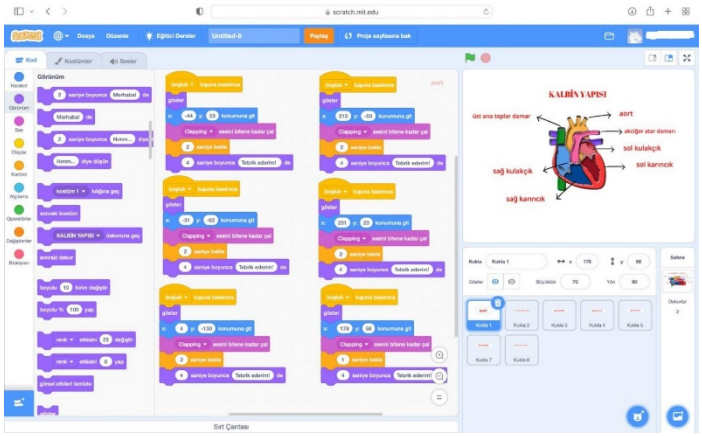

Figure 1.

Example of the Screen and Code Block for the Heart Structure Game

Quiz Competition

It was designed by the researcher to teach the achievements related to the circulatory system to the experimental group students through Scratch. An example of the Scratch screen and the code block for the quiz competition game are illustrated below.

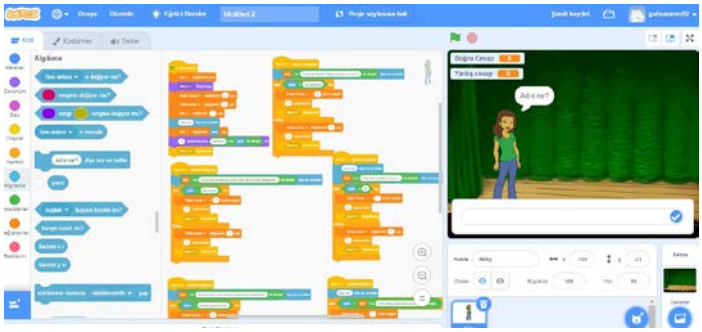

Figure 2.

Example of the Project Screen and Code Block for the Quiz Competition Game

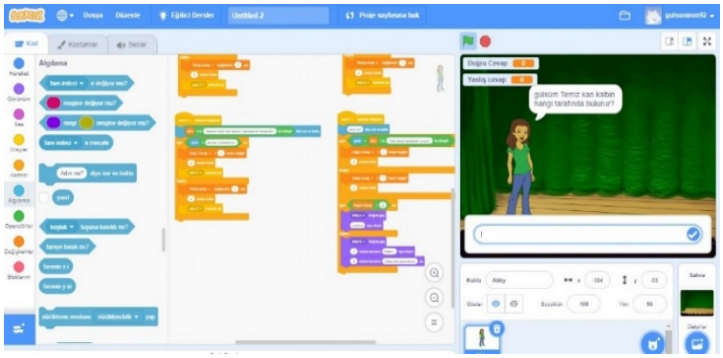

Figure 3.

Example of the Project Screen and Code Block for The Quiz Competition Game

At the start of the game, the students are prompted to enter. A sequence of multiple-choice questions is then presented. The program was coded to assign one point for each correct response and track incorrect answers. Upon completion, if a student answered at least two questions correctly, a congratulatory message ("Congratulations") appeared on the screen, providing positive reinforcement.

Systemic and Pulmonary Circulation

To facilitate learning among the experimental group students, a game focusing on systemic and pulmonary circulation was developed by the researcher using Scratch. An example of the Scratch screen and the code block for the systemic and pulmonary circulation game are illustrated below.

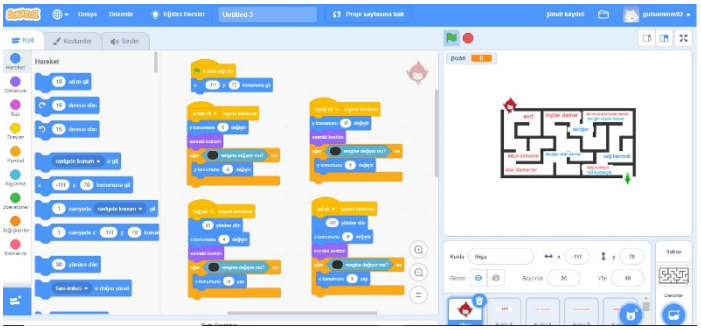

Figure 4.

Example of the Project Screen and Code Block for the Systemic and Pulmonary Circulation Game

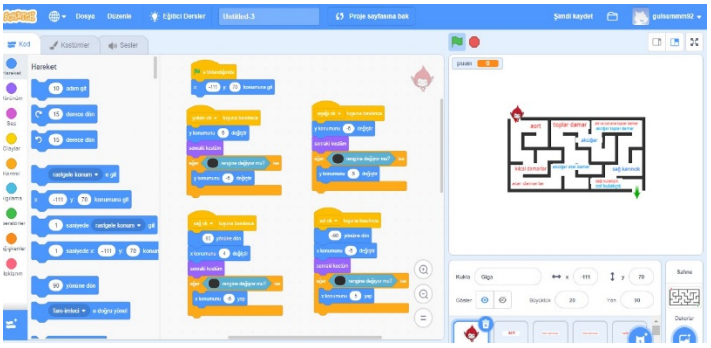

Figure 5.

Example of the Project Screen and Code Block for the Systemic and Pulmonary Circulation Game

A game was designed by drawing a diagram of the structures through which the blood passes in the systemic and pulmonary circulation on a maze. Command codes were written to make the sprite move right, left, up, and down in the maze. As the correct structures are encountered along the path of circulation, the score variable will increase by one point; if incorrect structures are encountered, the score will decrease by one point. The game concludes when the sprite reaches the designated endpoint, marked by a green arrow, at which point the message "Game Over" is displayed.

Results

This section presents the findings related to the main problem, derived from the data collection tools, are presented according to the sub-problems.

Findings Related to the Initial Sub-Problem

In the first sub-problem, the findings derived from both the pre-test and post-test of the CSAT, which was administered to determine the impact of STEM-integrated instruction and program-based instruction models on students' academic achievements in the circulatory system topic, are presented in tables. The pre-test application results are explained in Table 3.

Table 3.

Results of the Independent Groups t-Test of Data Obtained from the Pre-test of CSAT

Group	N	$\bar{X}$	sd	df	t	*p*
EG	20	30.60	15.14	38	0.79	.43
CG	20	27.40	9.90			

*$p < .05$

When examining the analysis results given in Table 3, it is observed that there is no statistically significant difference in the academic achievements on the circulatory system topic between the group with integrated STEM activities ($\bar{X}$ =30.60) and the group with program-based instruction ($\bar{X}$ =27.40) before the instruction ($t_{(38)}$=0.79; $p > .05$). These findings demonstrate that, prior to the experimental intervention, the students in both groups had comparable achievement related to the circulatory system. Consequently, it can be asserted that the groups were equivalent in terms of their academic achievement.

To determine the impact of STEM-integrated instruction and program-based instruction on students' academic achievements in the circulatory system topic, the CSAT was re-administered as a post-test after the implementation of the methods. The post-test application results are shown in Table 4.

Table 4.

Results of the Independent Groups t-test of Data Obtained from the Post-test of CSAT

Group	N	$\bar{X}$	sd	df	t	*p*
EG	20	90.40	7.03	38	6.88	.00
CG	20	58.40	19.57			

*$p < .05$

When examining the analysis results given in Table 4, it is evident that the academic achievements scores of the students in EG ($\bar{X}$ =90.40) statistically higher than those of students in the control group who received program-based instruction ($\bar{X}$ =58.40), [$t_{(38)}$= 6.881; $p < .05$; n^2=0.55]. This result indicates that 55% of the variance in students' academic achievement regarding the circulatory system can be explained by the instructional method employed during the lessons. According to Cohen (1988), this value represents a medium effect. Accordingly, the STEM activities implemented in the experimental group positively influenced the students' academic achievement in the the circulatory system.

Findings Related to the Second Sub-Issue

In the second sub-problem, the findings derived from the pre-test and post-test results of the ASSC, which was administered to determine the impact of lessons taught using STEM-integrated instruction and program-based instruction models on students' attitudes towards the science course, are presented in tables. As the data in the pre-test showed normal distribution, they were analyzed using the independent samples t-test. The pre-test scores results are explained in Table 5.

Table 5.

Results of the Independent Groups t-Test of Data Obtained from the Pre-test of ASSC

Group	N	$\bar{X}$	sd	df	t	*p*
EG	20	39.25	13.33	38	-2.11	.00
CG	20	47.05	9.75			

*$p < .05$

When examining the analysis results given in Table 5, it is seenthat there is a statistically significant difference in the attitudes towards the science course between the group taught with STEM-integrated instruction ($\bar{X}$ =39.25) and the group taught with program-based instruction ($\bar{X}$ =47.05) before the intervention [$t_{(38)}$=-2.113; $p < .05$]. These findings indicate that, prior to the experimental intervention, the attitude levels of students in both groups toward science courses were not comparable. Therefore, it can be concluded that there was no equivalence between the groups in terms of their attitude levels.

To control for any pre-existing differences between the experimental and control groups at the outset of the study, and to ensure a more accurate evaluation of the intervention's effect, analysis of covariance (ANCOVA) was conducted. In this analysis, students' pretest scores were used as the covariate to determine whether the differences observed in the posttest scores could be attributed to the instructional treatment rather than initial disparities between the groups.

Table 6.

Results of the Covariance Analysis of Data Obtained from the Post-test of ASSC

Source of Variance	Sum of Squares	df	Mean Squares	F	*p*	η^2
Pre-test (total scores)	156.74	1	156.74	1.41	.24	.03
Groups	305.47	1	305.47	2.76	.10	.07
Error	4088.45	37	110.49			
Total	80106.00	40				
Adjusted Total	4763.60	39				

*p< .05

The analysis indicated that there is no statistically significant difference in the attitudes towards the science course between the students with STEM-integrated instruction and those with program-based instruction [$F_{(1-37)}$ = 305.472, p < .05]. The effect size was calculated as η^2 = 0.070. These findings suggest that the STEM activities implemented did not result in a significant change in the experimental group students' attitudes toward science courses.

Discussion

In the study, the impact of the STEM-integrated learning model as part of the science curriculum on students' academic achievements in the circulatory system topic and their attitudes towards the science course was examined. According to the results obtained from the pre-intervention of CSAT, it was concluded that the pre-test knowledge levels of the groups were similar. Given that none of the students had previously studied the circulatory system topic, this finding was anticipated (Çakıcı, 2019; Gülbahar, 2023; İlkay, 2022; Sarıçam, 2019; Yalçınkaya, 2019; Yetişir, 2019). Following the implementation of the instructional interventions and the administration of the posttest, a statistically significant difference was observed between the groups (p < .05). This difference may be attributed to the nature of the STEM-integrated learning environment, in which the activities appealed to multiple cognitive domains and facilitated more meaningful engagement with the content. Such an environment may have enhanced students' understanding and reduced their perception of science as an obligatory subject.

Additionally, since it was determined that 55% of the increase in students' academic achievements in the circulatory system was accounted for by the implemented application, it can be said that integrating STEM activities into science lessons can make the teaching process more efficient. The results obtained regarding the increase in academic achievement in the circulatory system topic are consistent with the findings in the literature, which also indicate that integrating STEM activities has a positive impact on students' academic achievements (Alp, 2019; Gazibeyoğlu, 2018; Gökçe, 2019; Kapan, 2019; Kavak, 2019; Kurt, 2019; Taştan-Akdağ, 2017; Toprak, 2021; Zhang et al., 2022). Similarly, several studies have highlighted the positive impact of Scratch-based STEM applications on students' academic achievement (Kader, 2022; Karagöz, 2024; Keçeci, 2018; Koyuncu, 2022; Wen et al., 2023).

Although different teaching methods were used, several factors may explain the lack of a statistically significant difference in students' attitudes toward the science course. One possible reason is that students' prior negative experiences with science instruction may have shaped their perceptions and persisted throughout the intervention. Furthermore, the relatively short duration of the implementation period-limited to six class hours-may not have been sufficient to modify entrenched beliefs regarding science as a difficult and abstract subject. The abstract nature of the circulatory system topic, combined with the fact that students were encountering both the content and the instructional approach (i.e., fSTEM-integrated learning) for the first time, may also have existing literature is thoroughly examined, similar findings can be observed (Büyükkara, 2011; Doğan, 2019; Küçük, 2014; Neccar, 2019; Wendell & Rogers, 2013).

Conclusion and Recommendations

STEM-integrated instructional approaches have been found to significantly enhance academic achievement. In this study, students exposed to STEM-based learning demonstrated a more comprehensive understanding of the circulatory system and attained higher post-test scores. However, the integration of STEM activities did not result in a statistically significant improvement in students' attitudes toward science. Despite the improvement in academic performance, no statistically significant shift was observed in their perceptions of science courses. These findings underscore the effectiveness of STEM methodologies in facilitating conceptual learning and academic success, while highlighting the need for extended or more immersive interventions to influence students' attitudes toward science education.

To better understand students' attitudes towards science lessons, long-term and large-scale studies should be conducted. Teaching methods should incorporate activities and experiments that capture students' attention and engage them effectively. It is essential to create learning environments that foster active participation from students. Additionally, STEM activities should be developed, diversified, and implemented across various topics to integrate them into the curriculum; Where feasible, the establishment of dedicated STEM classrooms may support sustained implementation. Furthermore, activities and practices should be diversified by connecting them to real-life scenarios and other academic subjects to make learning more relevant and enriching.

This study is limited to a sample of 40 sixth-grade students from a single school and focuses exclusively on the circulatory system topic, where STEM activities were implemented. Additionally, the duration of the study (six weeks) may not have been sufficient to observe significant changes in students' attitudes.

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Primary School Teachers' Perceptions of Peer-Assisted Learning

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ABSTRACT

This research aims to understand primary school teachers' perceptions of peer-assisted learning. Accordingly, the study seeks to understand how primary school teachers perceive peer-assisted learning, investigate their methods for planning peer-assisted learning activities, and assess the extent to which they integrate peer-assisted learning into their teaching practices. A qualitative research design was employed in this study. Data were collected through semi-structured interviews. 36 primary teachers participated in the research. The findings revealed that the teachers perceive peer-assisted learning as a means to help students understand challenging concepts and overcome difficulties. The teachers expressed a strong inclination toward encouraging students to provide support to their peers through peer-assisted learning. They highlighted that students enjoy collaborative work and feel satisfied when helping their friends. Additionally, the teachers indicated a preference for implementing peer-assisted learning primarily in Mathematics lessons. Despite its benefits, teachers identified challenges, such as misconceptions spreading, unequal participation, and dominant students overshadowing peers. To address these, they suggested structured implementation with teacher supervision and professional development opportunities to enhance effectiveness. They also emphasized the need for integrating peer-assisted learning across different subjects. In conclusion, while peer-assisted learning contributes significantly to student engagement and academic success, careful planning and teacher guidance are essential for maximizing its benefits.

Keywords: Peer-assisted learning, primary school teachers, qualitative research, content analysis.

Introduction

Constantly evolving political, economic, informational, and technological changes significantly impact educational practices. It is possible for individuals and societies to comprehend the current advancements in the realms of economy, technology, and science on a global scale, and to receive education that enables them to stay abreast of these progressions. This can be achieved through the strategic organization of educational philosophies and policies at the national level (Köse, 2011). In order to keep up with modern developments, today's educational approach aims to raise students as individuals who can apply their knowledge to create new ideas, comprehend events deeply, and think critically. It also emphasizes the development of mental skills such as generalization, independent thinking and problem-solving. Innovative methods that actively involve students in the learning process, such as peer-assisted learning, have gained importance. Peer-assisted learning is a learning method based on social constructivism that emphasizes students being active participants in the learning-teaching process.

Literature Review

Peer-assisted learning involves students of the same or similar age or status working together (Graf, 2016; Hassan et al., 2016; Navalkha et al., 2021; Topping, 2005). Upon closer examination, some researchers describe peer-assisted learning as a process where students of the same age gain knowledge and skills by collaborating with each other (Hassan et al., 2016; Topping, 2005). Additionally, other researchers argue that peer-assisted learning involves both students of the same age and those of different ages (Aktay, 2015; Falchikov, 2001). Although there are various ways to determine who participates in peer-assisted learning or who qualifies as a peer, generally, 'peers' are those who contribute relevant experiences, perspectives, or expertise to the group based on the exchange's theme or objectives (Navalkha et al., 2021). Peer-assisted learning is described as an educational relationship involving students with different levels of knowledge and skills on a subject, where one student acts as an expert and the other as a learner. In peer-assisted learning, students work together in sufficiently small

groups to enable individualized face-to-face interactions. The main criteria for implementing peer-assisted learning are the students' academic and social competencies and their organization into teacher-learner pairs (Topping et al., 2017). Vygotsky's concept of the Zone of Proximal Development is defined as the process in which a child learns about a subject by engaging in interactions with a more skilled or experienced adult or peer (Fawcet & Garton, 2005). This has led to an increased emphasis on the concepts of apprenticeship and peer-assisted learning in education (Pound, 2012). Vygotsky noted that advanced mental structures are developed as a result of social interaction, and that this process is facilitated when students interact with more capable peers in the presence of adults through the Zone of Proximal Development (Latchman, 2000).

In peer-assisted learning, students should actively interact with each other. At the primary school age, students develop an interest in social events, feel the need to be accepted by their peers, and enjoy participating in group activities (Altınkök, 2012).

Peer interaction is a vital source of information for students, enabling them to gain diverse experiences (Gülden, 2013). Unlike traditional teacher-student interactions, peer interactions are more collaborative and less hierarchical. Students assist their peers by explaining concepts, answering questions, and providing guidance while actively engaging in the learning process and contributing to the dialogue (Qi, 2023). Peer-assisted learning supports students in working together, learning from each other, and sharing their knowledge, feelings, and thoughts. In this regard, the present curricula in our country emphasize the aim of developing self-confident individuals who are in harmony with themselves and their society. These individuals should understand the feelings of others, participate in group activities, be helpful, communicate effectively, know their responsibilities, and fulfil necessary tasks (MoNE, 2018). Primary school programs include collaborative activities for students within the scope of activity-based teaching (Yılmaz, 2011), indicating that these student-centered programs support peer-assisted learning.

Researchers have stated that peer-assisted learning improves academic performance. Moreover, socialization experiences with peers are crucial for cognitive development and for developing the academic motivation necessary to engage in academic tasks and succeed in school (Rohrbeck et al., 2003). Similarly, researchers found that peer instruction significantly affects both cognitive and emotional domains, positively developing students' achievement, problem-solving skills, conceptual understanding, learning gains, critical thinking, and creative thinking (Woo et al., 2022). Social interaction with adults and more experienced peers is important in learning (Baş & Beyhan, 2017). Kiarie (2003) emphasizes that peer-assisted learning involves structured and positive interactions between peers, provides opportunities for the development of positive relationships between students, ensures students' active participation in teaching materials, improves academic performance, and thus minimizes students' chances of engaging in destructive behaviors.

Peer-assisted learning is considered as one of the most effective strategies to improve students' learning, increase their motivation, and strengthen their friendships (Sobhanian & Ye, 2016). The literature provides various explanations for its value and effectiveness. For instance, a review of 22 studies by Williams and Reddy (2016) showed that implementing peer-assisted learning significantly improves learning among peer educators. These results suggest that peer-assisted learning supports quality education.

On the other hand, the literature shows that most studies on peer-assisted learning focus on secondary education (Graf, 2016; Tokgöz, 2007), with limited research at the primary level. Therefore, it is significant to obtain detailed information about the application of peer-assisted learning in the primary school learning-teaching process to ensure quality education. Accordingly, this study examines how primary teachers implement peer-assisted learning in practice and their perspectives on its contribution to the learning-teaching process.

Purpose of the Study

Peer-assisted learning has gained importance with the support of active learning of students in primary school programmes. As mentioned above, peer-assisted learning helps students gain skills such as cooperation, teamwork, learning to learn, critical questioning, maintaining friendship relations and supporting their social development alongside academic success. Therefore, defining the extent to which peer-assisted learning is implemented in the teaching-learning process, understanding how primary teachers plan peer-assisted learning, and identifying the challenges they encounter in this process will contribute to the effective implementation of peer-assisted learning. In this context, the study will:

- Assess the extent to which primary school teachers incorporate peer-assisted learning into their teaching practices.
- Analyze the challenges teachers face in implementing peer-assisted learning.
- Explore strategies to support teachers in effectively

integrating peer-assisted learning into their classrooms.

Identifying the extent to which peer-assisted learning is realized in practice and the problems experienced by primary teachers will further support the qualified implementation of this approach. The findings to be obtained in this context will provide important information about the provision of effective learning-teaching processes in student-centred environments in primary school. In this respect, this study aims to understand primary teachers' perceptions of peer-assisted learning.

Accordingly, the research questions are presented as follows:

1. What are primary teachers' perceptions of peer-assisted learning?
2. What is the role of peer-assisted learning in the teaching-learning process?
3. How can teachers be supported to implement peer-assisted learning effectively?

Method

Research Design

This study employs a qualitative research approach, which provides an in-depth exploration of participants' opinions and experiences, often through direct quotations (Patton, 2014). As Patton (2014) highlights, the foundation of qualitative reporting lies in description and quoting, emphasizing the importance of including direct quotes and offering sufficient context to allow readers to engage with participants' thoughts and situations. Unlike quantitative research, which focuses on numerical conclusions, qualitative research seeks to offer a descriptive and realistic depiction of participants' perceptions and experiences (Yıldırım & Şimşek, 2013). In line with this approach, the findings from the interviews with the teachers were carefully interpreted, incorporating direct quotations to ensure depth and authenticity in the analysis.

Participants

Criterion sampling, one of the purposeful sampling methods, was used to select the study group for interviews with primary teachers in this research. Criterion sampling is defined as the study of situations that meet predetermined criteria (Yıldırım & Şimşek, 2013). Detailed information about the primary teachers participating in the study is given below.

It was thought that the primary teachers participating in this study would provide more comprehensive data if they had experience in traditional practices as well as innovative practices in the learning-teaching process. In this direction, the participation of primary teachers with more than 10 years of professional experience was determined as a criterion. This criterion was set to ensure that participants had extensive experience with both traditional and innovative teaching practices, including peer-assisted learning. Teachers were selected from various schools in a province in the Marmara region to capture diverse experiences in implementing peer-assisted learning. The sample was categorized by teaching experience: Eight of the teachers have 10-20 years of experience, 13 of them have 21-30 years of experience and 15 of them have 30 years of experience or more. This approach aimed to provide a robust dataset reflecting primary teachers' perceptions of peer-assisted learning. A total of 36 primary teachers (9 males, 27 females) participated in the interviews.

Data Collection Tool

Semi-structured interviews including open-ended questions were conducted with primary teachers. To construct the interview questions, the relevant literature was first reviewed in detail. A draft interview form was then prepared and submitted for expert review. The experts are qualified in educational sciences and measurement and evaluation. Based on their feedback, the draft was revised and edited. Language adjustments were made to improve clarity and comprehensibility, and the scope of some questions was expanded to obtain more in-depth information. Topic-specific headings were added for systematic structure, and the order of the questions was rearranged to align with the research objectives. These revisions aimed to improve the quality of the interview form and support effective data collection. The interview form consists of demographic information, and open-ended questions as well as the aims of the study.

Data Collection Process

The interviews were conducted individually and face-to-face with the teachers. Prior to the interviews, school administrators and teachers were informed about the research. The interviews were scheduled in terms of time, and locations for both the teachers and the school administration. In order to prevent data loss, a voice-recording device was used during the interviews. To keep the identities of the teachers participating in the study confidential, each teacher was coded by giving a number during the transcription of the interviews. The necessary permissions were obtained and scientific and ethical rules were followed by the researchers.

The ethical process in the study was as follows:

- Ethics committee approval was obtained from the Çanakkale Onsekiz Mart University Social Sciences and Educational Sciences Ethics Committee (Date:

29.03.2017, Number: 2017/09).

- All participants voluntarily participated, without pressure to answer. Before the research began, primary teachers were informed about the research's purpose and interview subject. They were also told they could withdraw at any time, and their statements would remain confidential.
- Before starting the interviews, verbal permission was obtained from the participants for audio recording.
- The research report does not include identifiable personal data. To maintain anonymity, no identifying information (e.g., names, schools, locations) was collected. Participants were given unique codes (e.g., T1, T2, T3) to ensure confidentiality.

Data Analysis

Content analysis was used to analyze the data. Qualitative content analysis involves a process designed to transform raw data into categories or themes based on valid inference and interpretation. This process uses inductive reasoning, with themes and categories emerging from the data through careful examination and continuous comparison by researchers (Zhang & Wildemuth, 2005). Accordingly, qualitative content analysis does not perform counting and has no statistical significance; rather, it reveals important patterns, themes, and categories relevant to a social reality.

Content analysis consists of four stages: coding the data, finding themes, organising the codes and themes, and interpreting the findings (Yıldırım & Şimşek, 2013). In this regard, the data obtained were read and divided into meaningful sections, and codes were determined by both of the authors. In the first stage, open coding was conducted by breaking down the data into meaningful units and assigning descriptive labels. This process was carried out systematically without predefined codes, allowing the data to guide the emergence of categories. The codes were compared for similarities and differences, leading to the formation of broader categories. Then, the data were categorized by considering the similarities and differences between the codes. In line with the categories obtained, two main themes, namely Teachers' Perceptions of Peer-Assisted Learning and The Place of Peer-Assisted Learning in the Teaching-Learning Process, were obtained.

Validity and Reliability of the Study

The literature emphasises that reporting the data in detail and explaining how the researcher reached the results is one of the most important criteria of validity (Merriam, 2013; Yıldırım & Şimşek, 2013). In order to ensure external validity in this study, the method section, research design, development of data collection tools, and data collection and analysis processes were explained in detail. In addition, at the reporting stage of the research, direct quotations were included in the findings section and detailed descriptions were made.

The analysis continued until the findings reached saturation, meaning that no new themes or patterns emerged from the data. This contributed to the internal validity (Merriam, 2013). Moreover, the researchers presented all of the findings directly from the data to increase the internal validity. All interviews in the data collection process were recorded using a voice recorder to prevent data loss, and the raw data and coding obtained during the data collection process were kept by the researcher. The researchers paid attention to being objective at all stages of the research. Thus, the internal and external reliability of the research is considered to be ensured.

Results

As a result of the interviews with primary teachers, the findings were presented under two main themes: Teachers' Perceptions of Peer-Assisted Learning and the Place of Peer-Assisted Learning in the Learning-Teaching Process.

Teachers' Perceptions of Peer-Assisted Learning

In this theme, four categories were found: Defining Peer-Assisted Learning, Benefits of Peer-Assisted Learning, Limitations of Peer-Assisted Learning and Recommendations for Effective Use.

Defining Peer-Assisted Learning

The findings show that almost half of the teachers explained peer-assisted learning as the learning of children in the same age group:

"It evokes learning with peers, meaning that peers receive education at the same time and in the same place." (Teacher 7)

"What comes to my mind when I think of peer-assisted learning? Students belonging to the same age group being in the same environment, not different age groups" (Teacher 27)

"This term involves students engaging in learning activities with their peers and learning from one another" (Teacher 6)

The above explanations show that teachers explained peer-assisted learning as students from the same age group coming together and learning at the same place and time.

For example, Teachers 6 and 7 defined peer-assisted learning as children learning together with their peers. Additionally, Teacher 7 emphasized the aspect of education taking place simultaneously and in the same location. Teacher 27 explained peer-assisted learning as students of the same age group learning in the same environment.

Some of the teachers drew attention to the concepts of sharing and interaction in peer-assisted learning and defined peer-assisted learning as influencing, being influenced, sharing and helping each other:

"Peer-assisted, within the classroom, students positively support each other in lessons, topics, in terms of helping each other in the lessons, and areas where they might struggle, by helping and collaborating with one another." (Teacher 29)

"When we talk about peer-assisted learning, it means that students are influenced by each other, learn from each other, and it is a method that we frequently use in the classroom, so students learn more from each other"(Teacher 24)

Teacher 29 explained peer-assisted learning as students helping and supporting each other in lessons. Similarly, Teacher 24 stated that in peer-assisted learning, students are influenced by and learn from each other. This situation is referred to as reciprocal peer-assisted learning in the literature.

Besides some teachers emphasise cross-peer-assisted learning when explaining peer-assisted learning:

"When I think of peer-assisted learning, I think of children with a slightly higher level or better individual development help students who are a little behind or less advanced than themselves." (Teacher 17)

"In peer-assisted learning, I understand that students who learn at a slower pace are assisted by students who can grasp and learn faster, understand the lesson, objectives or subject."(Teacher 34)

The above teachers explained peer-assisted learning as students who have a higher level of learning, helping their peers and supporting them to understand the subject. These explanations show that the teachers' explanations point to cross peer-assisted learning.

The above explanations of the teachers show that they explained peer-assisted learning with different concepts such as helping, sharing and interaction. While a few teachers explained it as children of the same age receiving education and training in the same place based on the word peer, some of them drew attention to the student level and expressed it as one student helping and supporting another student. These explanations also show that the teachers defined different types of peer-assisted learning as classroom, reciprocal and cross peer-assisted learning in support of the explanations in the literature.

Benefits of Peer-Assisted Learning

In this category, the primary teachers explained the benefits of peer-assisted learning for students and teachers. The majority of the teachers stated that they found peer-assisted learning significant and used it from time to time. Accordingly, some of them stated that peer-assisted learning provides benefits such as relieving the teacher's burden, saving time, and providing a positive classroom environment:

"Of course, it is also beneficial for the teacher, the children who understand the lesson do it quickly, and the children who solve it quickly get bored after a while, this disrupts the order of the lesson, and we have to explain it to the children who do not understand it for the second and third time, the child who understands the subject gets bored a lot, and you can lead them in that way, you know, it does not create unnecessary noise, distraction, boredom, I think it is beneficial in that respect." (Teacher 33)

From the excerpts above, it is seen that they think that peer-assisted learning supports them in many aspects. Teacher 33 emphasised that peer-assisted learning was useful in overcoming the problem by stating that students who understood more quickly in the lesson were bored and unnecessary noise and distraction were encountered. Teacher 33's explanations show that peer-assisted learning actually contributes to classroom management and creating a positive classroom environment.

Most of the teachers stated that peer-assisted learning supports students' social development:

"In any case, without peer-assisted learning, social development would be difficult, other individual education prevents socialisation, peer-assisted education or education involving friends brings more socialisation and activation, for example, students play ball with their peers after classes, this brings socialisation, they go to a picnic, they take them, you take them as a school, as a class, then they go to a certain place, they talk, sit, chat, in the meantime they evaluate the lessons, I think interaction would be very good... There is mutual interaction among peers, that is, they are interested in each other or they see each other, they behave, the friendship relations of the majority of them are progressing positively." (Teacher 9)

"First of all, helping each other, socialising, they are socially influenced by each other, as I just said, they are influenced by their behaviour, their writing, everything, what else could it be? Again, they cooperate, first, they do what they

know, then they continue in cooperation, again, it is important in terms of helping and socialisation, you know, if you consider that today there are not even neighbourly relations, it will affect their future lives, as long as they help, they will be able to ask for help, it develops this, doesn't it?" (Teacher 21)

"They find opportunities to freely engage in various activities related to their talents and interests, whether it's music, sports, visual arts, and express themselves in that manner. They can explore themselves by immersing themselves in different activities, and discovering their interests and themselves. Thus, peer education fosters personality development, promoting healthy growth. Essentially, it not only influences academic success but also positively impacts personality development." (Teacher 25)

Teacher 9 emphasized that it increased children's socialisation, they would interact better with their friends, they would be able to do activities together and thus their friendship relations would improve. Similarly, Teacher 21 emphasised that students socialise and cooperate within the scope of peer-assisted learning and suggested that they can develop the ability to ask for help as long as they help. Teacher 25 stated that peer-supported learning not only fosters academic success for students but also contributes to personality development. They expressed that peer-supported learning is beneficial for children to express themselves, discover their interests, and develop in various areas.

Almost all of the teachers emphasised that students' feelings of cooperation increased during the activities they carried out peer-assisted learning:

"Children learn skills and cooperation, this is a very important thing, they learn to help each other, to help each other, which is a very important thing, children at that age are generally a little more selfish, they are more self-centred, I think they experience those feelings of helping the other person, showing mercy, they experience those feelings, I think it improves cooperation and interaction among students and enhances their social skills." (Teacher 4)

"Helping each other was developing with the children, for example, he says he couldn't understand, I take a look, he goes to him and tells him, look, you will do this like this, you will be like this at the end of these, peer learning strengthens the cooperation, conversation, solidarity in the classroom, as I said, I gave tasks to the children, the children are working with each other during the break time; now I'm doing it like this, here, look, you should say this line like this here, they work together, they produce a product." (Teacher 20)

They emphasized that peer-assisted learning activities enabled children to develop mutual support skills and experience the joy of helping others. Teacher 4 stated that primary school students were generally selfish and that their feelings of helping and interaction increased thanks to peer-assisted learning. Teacher 20 emphasised that peer-assisted learning strengthened cooperation, communication and solidarity in the classroom, and that when students were given tasks, they helped each other and created something together.

Most of the teachers also stated that peer-assisted learning improves students' self-confidence:

"Well, in friendship, when they learn something from each other, the child who teaches the other children, for example, develops self-confidence, develops self-confidence, then either it was useful to someone and I learnt something there, so it can be." (Teacher 14)

"Yes, it naturally evolves in every class; you know, those children with more of a leadership spirit can use it to assist others. They can further this topic. What happens is, you know, if a child helps their friend in one lesson, that child can then take on that role and ask questions to their friends in other lessons or provide examples, having realized it themselves. They could provide examples and be more helpful to their friends." (Teacher 3)

As can be understood from the explanations of Teacher 14, children stated that their self-confidence increased when they helped their friends. Teacher 3 mentioned that through peer-assisted learning, students discover their leadership spirit, thus continuing these behaviors in other subjects and helping their peers.

Limitations of Peer-Assisted Learning

The findings show that while the teachers emphasized the importance and benefits of peer-assisted learning, they also mentioned its limitations. Almost half of the teachers stated that mislearning may occur during peer-assisted learning:

"In a negative sense, there may be something like this, I mean, the risk may be this; if it goes out of control, peer assisted learning may transfer the negative things that the child wants to transfer, peer assisted learning, may learn the wrong thing, that is also a possibility." (Teacher 6)

"You need to observe the child explaining without intervening immediately. They might explain it incorrectly, which could be a problem. However, when this approach is applied consistently in class, the control remains with you. If incorrect information is given, you can intervene. This system is used in all lessons, so it's important to monitor how the student explains and teaches their peers. Even one

wrong word can cause harm, and you may not notice, leading the child to learn it incorrectly." (Teacher 5)

The teachers stated that children can misinform each other. Teacher 6 stated that students could learn wrong information from each other. Teacher 5 expressed the need to control how children explain things to each other, stating that peer-assisted learning cannot be implemented in crowded classrooms. However, most of the teachers stated that in order to prevent mislearning, the studies related to peer-assisted learning should be controlled and monitored by themselves:

"... you know, children can sometimes affect each other in a negative way, maybe in one subject, but I think it would be useful to have them under supervision..." (Teacher 32)

"Well, of course, it needs to be controlled, just as the student learns the wrong behaviours, of course it needs to be controlled." (Teacher 24)

The teachers' explanations draw attention to the importance of teacher supervision and control in peer-assisted learning. Teachers emphasised that otherwise, students would not be able to achieve the desired outcomes and would acquire wrong information.

Some teachers, on the other hand, stated that they encountered children's negative behaviours such as oppressing, mocking, belittling, hurting, and being harsh in the activities carried out together within the peer-assisted learning processs or when they assigned students to help their friends. Teacher 21 explains this situation as follows:

"Sometimes it becomes a topic of mockery, like 'Oh, you don't know anything either.' But I tell them, 'You are a whole, a family. The success or failure of the class affects all of us. We must support each other and fill in the gaps, just like in a family.' The downside is that children at this age can be very cruel, and there's a lot of teasing. I give examples of scientists and say, 'Look, they were mocked too, but they made discoveries. How do you know your friend won't be the next Edison?' Then they start to think." (Teacher 21)

They stated that students would engage in negative behaviours during peer-assisted learning. For example, Teacher 21 stated that elementary school children can offend other students by making fun of them. Teacher 21 stated that in order to prevent these negative behaviours, she emphasised the importance of cooperation and the need for students to support each other in the classroom and thus prevent problems.

Some of the teachers also mentioned the negativities that may arise during peer-assisted learning as follows:

"I can't keep up with the time, we have a shortage of time, our curricula are rigid, since the learning outcomes are shared according to the time periods, this requires a process and I have to allocate a separate time for this, this time I exceed the duration of the lesson according to the curriculum, this causes a shortage of time for me." (Teacher 34)

From the above explanations, it is seen that the teachers stated that they encountered problems in terms of time shortage, negative effects of some students on the study and physical characteristics of the classroom during peer-assisted learning. For example, Teacher 34 stated that the activities prepared within the scope of peer-assisted learning took time and this situation caused problems in terms of completing the programme.

Recommendations for Effective Use

Most of the teachers suggested that seminars or in-service training should be provided on peer-supported learning. They indicated that introducing peer-supported learning and raising awareness among teachers about it would enable them to conduct more effective work.

"*Yes, I think it would be different to do this after taking a seminar, training, etc., there is no practice or seminar for teachers about this, you are the only one who has come to us about this issue so far, I think all primary school teachers apply this, I mean, because teachers act improvisationally on this issue, well, it is necessary to get training, I mean, I think it is necessary to do this job more consciously, I think it is an important issue, I think teachers should be informed."(Teacher 4)*

"I honestly think that I am doing it, well, even among my current friends, I believe they might be doing it too if my friends are using it and it's a system that is not being used, then it should be explained, it should be explained by experts that I think the goodness of such a thing, and its potential benefits, should be explained through organized events such as discussions or seminars, I mean, if it is not being used effectively, I think it is a system that cannot be ignored." (Teacher 35)

The teachers stated that they should receive training to use peer-assisted learning effectively. For example, Teacher 4 emphasized that peer-assisted learning would be more beneficial when used in a conscious and planned way. Teacher 35 stated that she and her colleagues use peer-assisted learning; peer-assisted learning is important and in order to use it effectively, training should be given by experts on what kind of benefits peer-assisted learning can give in the learning-teaching process.

Also, Teacher 20 and Teacher 32 underlined the lack of peer-assisted learning in the programmes:

"… in order to strengthen children's solidarity, to make learning more enjoyable, in these programs, for example, in the syllabuses, we can open something called peer learning more clearly, for example, in the syllabuses, and different alternatives can be offered, so you can do it in this way, you can do it through drama, and in our guidebooks, for example, this peer learning can be put more intensively." (Teacher 20)

"Yes, I've seen the word "peer" in criteria, grading, or peer assessment. If we do group work, do the books say it's suitable for this? Should I mention it? I don't come across the word "peer" much, but I'd like to benefit from it if it's in the programs. Moving away from teacher-centered teaching could help, guide students to learn on their own. Not every teacher teaches everything; they are a guide, opening the door for students. I think there could be more room for these approaches." (Teacher 32)

Teacher 20 stated that peer-assisted learning could be emphasized more intensively in the guidebooks and different alternatives could be offered to teachers for the implementation of peer-assisted learning. Teacher 32 stated that she heard the word peer as peer assessment in measurement and evaluation and that she would use it in her class if it is included in the programmes and thus, student-centred learning can be the main focus in education.

The Place of Peer-Assisted Learning in the Teaching-Learning Process

This theme was divided into three categories: the role of the teacher, the contextual usage of peer-assisted learning and the role of the student.

The Role of the Teacher

Almost all of the teachers stated that they did not plan the use of peer-assisted learning and that the activities they carried out within peer-assisted learning developed spontaneously when they needed to improvise:

"I mean, it usually emerges at that moment, that is, out of need, we intervene in that way because we see at that moment who needs what and how, what they can and cannot do, and we enable them to support each other. (Teacher 26)

"No, meticulously planning everything doesn't always work, why? Because you're a teacher, and there's a group of students in front of you. Depending on how things unfold, the teacher really needs to be creative, it's somewhat related to the teacher's character. The teacher should be creative, alert, attentive, and a good observer. If the teacher's skills develop well, they will improvise, applying and developing the most suitable methods instantly, and this is crucial. I highly value the teacher's creativity." (Teacher 13)

Teacher 26 and Teacher 13 stated that they did not plan peer-assisted learning. For example, Teacher 26 emphasized that she applied the activities of peer-assisted learning when she saw the students' deficiencies and felt the need to use them. Also, she stated that she saw whether the students learnt or not, what they could do, what they could not do during the lesson, activity, and study; in this case, she stated that she intervened and ensured that the students assisted each other. Teacher 13 emphasized that even though lessons may be planned, the plan can change, indicating the need to adapt to the needs and situations of the students. Additionally, Teacher 13 stated the importance of teacher creativity and its significant role in using appropriate methods.

The teachers–mentioned that they changed the seating arrangement of the students while implementing peer-assisted learning:

"I change the place of the child so that the child can be affected, for example, when you put a child who cannot write well next to a child who writes well, it affects him/her. Apart from the seating plan, what I pay attention to is that, as I just said, the good students who comprehend a little later support each other when they are next to each other."(Teacher 21)

"Yes, from their friends, I mean, now, when I seat the children in the classroom, I try to seat them as well, for example, not the good child with the good child, the bad child with the bad child, but I always move them around like this so that there is nothing between them, so that they take the good aspects from each other." (Teacher 23)

The teachers stated that they changed the seating arrangements of the students during peer-assisted learning. For example, Teacher 21 said that she changed the seating arrangement of the students to bring them together while implementing peer-assisted learning in the classroom. Likewise, Teacher 23 also stated that she changed the seating arrangement of students at different levels in order to support each other and gain each other's strengths.

The findings indicated that the teachers assumed important roles in issues such as student organisation, seating arrangement, and use of materials during the implementations within the scope of peer-assisted learning.

Contextual Usage of Peer-Assisted Learning

Most of the teachers stated that they used peer-assisted learning in different lessons:

"Well, of course, it is necessary, it is indispensable, it is a part of education, and for this reason, we already apply it in the classroom, in the form of group work, cluster work, both in science lessons, in social studies lessons, from time to time in Turkish lessons, so it is a method that we frequently apply." (Teacher 24)

"In particular, the areas I have applied in this field are in the field of reading and writing, for example, students who cannot learn to read and write can teach and help students who have learnt to read and write. It can help in reading, in the repetition of syllables or in such things that can be slightly new to reading, it can help in those readings, it can support in this regard. In other words, I would like to say that improvisation happens almost spontaneously in all lessons. I use it mostly in reading and writing."(Teacher 2)

Teacher 24 stated that she used peer-assisted learning in Science, Social Studies and Turkish lessons and considered it as a part of education and she frequently applied it as group or cluster work in all lessons. Teacher 2, on the other hand, stated that improvisation can occur in almost all lessons and emphasized that she mostly used it in teaching reading and writing. He stated that students supported and helped their friends in reading and repeating syllables.

In addition, most of the teachers stated that they used peer-assisted learning mostly in Mathematics lessons:

"In maths, for example, they can check each other's operations in the problems we do; for example, my teacher put minus instead of plus or subtracted instead of adding. In this way, they can distinguish between what is given and what is required in the problem with the given and the required, and in Life Science, they are always doing the activities together, one of them can act as a guide for the other and act as a control when they make a mistake." (Teacher 17)

"I use it mostly in mathematics, let's say we are going to draw a triangle in mathematics, how we are going to place it in the squares, I explain this on the board, then I say to draw it, I look at the children, I look at which ones have drawn it exactly, I assign them to those who cannot draw it, I say how did you draw it, go and tell your friend, he goes, he shows his friend how many squares he left, how he drew it, how he used the ruler, etc., in the same way, you look at the other one and see that the other one has done it too, so it accelerates us in this way."(Teacher 22)

Teacher 17 stated that the students checked each other's operations in the problems they solved, that they could distinguish the problems together, and that they did the activities together in the Life Science lesson and the students guided each other. Teacher 22 stated that she used it mostly in the Mathematics lesson and explained that she assigned students to help each other with the points that were not understood and thus accelerated the learning process.

The Role of the Student

Most of the teachers stated that primary school students have a higher sense of cooperation and are willing to help each other and support their friends:

"Of course, if the teacher manages them in this way, starting from the first grade, they support each other, they complement each other, they help each other or they explain, it's very nice for example" (Teacher 15)

"In fact, there was peer-assisted learning in the classroom yesterday. Without me giving any instructions, the children tried to help each other, learn fractions and addition, and subtraction. So, the children are helping each other in this way, trying to teach each other, even without me prompting them." (Teacher 18)

The teachers stated that students were very willing to help each other within the process of peer-assisted learning. For example, Teacher 15 stated that students begin supporting each other from the first grade onwards. Teacher 18 expressed that even though she did not direct students for peer-assisted learning, children try to help and teach each other in the classroom.

Some of the teachers stated that students guided each other in activities and studies and gave warnings to their friends:

"*Again in physical education classes, it's like that, let's say you are playing a game of handkerchief grab, one of your students is not very good, but the good student is trying to teach him/her tactics, like, look, you have to control the other student very well, you have to look at his/her hand gestures, and so on." (Teacher 2)*

"For example, a student with lower manual dexterity can do the drawing we give very late, for example, but the other one, who is more skilful, can do his own activity in a much shorter time and shows him how to do it, how to draw it more, how to place the things on it." (Teacher 22)

Teacher 2 stated that in the Physical Education lesson, the student realised peer-assisted learning by giving tactics to his/her friend about the game. Teacher 22 stated that in the Visual Arts lesson, students who finished their work quickly helped students with low manual dexterity in drawing.

Discussion

The data analysis revealed that the teachers could not define peer-assisted learning comprehensively, but they tried to explain different types of peer-assisted learning,

namely reciprocal and cross-peer-assisted learning. Cross-peer-assisted learning is defined as students in different grades and at different levels teaching younger students (Robinson et al., 2005). In addition, reciprocal peer-assisted learning involves students at the same level fulfilling both teacher and student roles (Cheng & Ku, 2009). The literature generally defines peer-assisted learning as the mutual acquisition of knowledge and skills by students of the same age and status during their studies together (Hassan et al., 2016; Topping, 2005). Some researchers describe it as a teaching tool in which students of the same or different age and level groups help and support one another (Falchikov, 2001), while others describe it as a teaching arrangement in which the teacher pairs two students as a teacher-learner to encourage the learning of academic skills or subject matter (Kiarie, 2003).

The findings showed that the teachers perceived peer-assisted learning as students taking on the role of teacher to instruct their peers; therefore, they implemented peer-assisted learning in a teacher-learner format. Some of the teachers emphasized interaction, sharing and mutual learning. These explanations indicate that primary teachers defined peer-assisted learning in a limited way by addressing it from some aspects.

The findings also showed that the teachers thought that using peer-assisted learning is important and that it provides benefits to students in the learning-teaching process. These explanations support Vygotsky's view that peer cooperation and verbal communication will help students to be active participants and see different perspectives, thus supporting their cognitive development (Zambrano & Gisbert, 2015).

Peer-assisted learning supports the increase in students' self-confidence as it encourages students to communicate with each other and thus improves their basic language skills (Yurt & Aktaş, 2016). Similarly, most of the teachers emphasized that primary school students have a higher sense of cooperation and are willing to help each other and support their friends. They stated that peer-assisted learning supports students' social development and improves students' self-confidence, and that children learn to help each other through the work they do together.

In addition, although it was revealed that the teachers explained the importance and benefits of peer-assisted learning and the related activities, it was found that they drew attention to some limitations of peer-assisted learning. Teachers drew attention to the fact that students may transfer wrong information to each other, especially in primary school, and therefore, wrong learning may occur. They stated that one of the most important limitations of peer-assisted learning is that the student who knows the subject has superiority over the other student and that children compare each other with negative behaviours such as crushing, mocking, belittling, hurting, being harsh and this situation may lead to low self-confidence in the other student. In this regard, they stated that they intervened in the situation, that the studies carried out within the scope of peer-assisted learning should be controlled and that they should be monitored and followed up by the teacher. It is understood that they emphasized the importance of feedback correction and teacher guidance in peer-assisted learning.

The analysis also revealed that the teachers implemented peer-assisted learning improvisationally, without pre-planning. Activities emerged during lessons when the teachers identified student needs or deficiencies. The teachers implemented peer-assisted learning as needed, rather than through planning. However, the literature highlights the importance of planning such as defining content and objectives, identifying participants and their roles, choosing the right time and place, providing materials, and evaluating the process when planning peer-assisted learning (Thurston et al., 2007). For example, Topping et al., (2004) evaluated the cognitive and affective impacts of cross-age peer tutoring in primary school science using the "paired science" program. Conducted over eight weeks with 30-minute sessions twice a week, the study involved 7 to 8-year-old tutees and 8 to 9-year-old tutors. Compared to the control group, the experimental group showed significant cognitive gains in scientific concepts and terminology, especially among tutees, with effect sizes greater than one. Attitudes toward the program were generally positive among both students and teachers, highlighting cross-age peer tutoring as an effective method to support understanding and engagement in science.

The findings revealed that most of the teachers reported using peer-assisted learning through strategies such as one student helping another with challenging subjects, one-to-one explanation, and peer teaching. It is understood that some teachers drew attention to the level difference between students and brought students at different levels together. Research examining the relationship between peer social interaction and cognitive development is generally based on Vygotsky's Zone of Proximal Development Theory. According to Vygotsky's theory, the most productive experience in a child's education is the cooperation with peers who are more talented than him/her, and children can influence each other's learning in peer-interactive situations (Fawcett & Garton, 2005; Zambrano & Gisbert, 2015).

Mlawski (2021) examines how first-grade students utilize peer learning (PL) mechanisms and behaviors during a learning task, highlighting that young children naturally influence and motivate each other. The findings emphasize peer learning's potential to enhance collaborative behaviors, suggesting practical strategies for educators to cultivate peer interaction skills in structured classroom settings.

Although teachers used peer-assisted learning in different courses; it shows that they mostly use it in Mathematics courses. The literature shows that the studies in our country are mostly carried out at the secondary and high school levels (Akay, 2011; Yardım, 2009; Demirel, 2013). However, there is no study on the use of peer-assisted learning in mathematics at the primary school level in Turkey. International literature supports the findings of this study and emphasises that peer-assisted learning contributes to mathematics achievement. For example, Topping et al. (2003) applied cross-peer-assisted learning in mathematics lessons for 7-11 year-old students. They emphasized that peer-assisted learning has an important place in the success of students; especially in children with low achievement at risk, it helps to acquire gains in mathematics, self-concept and social interactions. Robinson et al. (2005) stated that cross-peer-assisted learning increased the academic achievement of primary and secondary school children in mathematics. Tella (2013) evaluated the effects of peer tutoring and explicit instructional strategies on primary school students' mathematics achievement and attitudes. The findings showed that peer tutoring had a significant positive impact on students' achievement and attitudes in mathematics.

Teachers used peer-assisted learning in teaching primary literacy. The teachers stated that they observed that students helped each other in writing letters and corrected each other's mistakes. Similarly, Aktay (2015) observed interactions based on peer teaching in the first-grade students' first reading and writing lesson. Accordingly, he emphasized that peer collaboration among students emerged mostly in the form of cooperation and increased communication between them. Türkmenoğlu and Baştuğ (2017) stated that peer instruction had a positive effect on the development of fluent reading and reading comprehension skills of primary school fourth-grade students with reading difficulties. Similarly, Blanch et al. (2013) demonstrated the effectiveness of peer-assisted learning in enhancing reading comprehension skills among primary school students, showing that all participating students improved their abilities in this area.

Additionally, most teachers expressed a desire for in-service or online training to use peer-assisted learning more effectively. Providing such training would raise their awareness and help them implement it successfully. Creating suitable classroom environments and incorporating peer-assisted learning activities and examples in textbooks and resource books would also support its effective implementation. In the literature, studies developing paired reading programs at the elementary level have been encountered (Topping, 1996; Blanch et al., 2013; Zambrano and Gisbert, 2015). For example, in the study by Zambrano and Gisbert (2015), the program was effective in improving reading, comprehension, and fluency.

Conclusion and Recommendations

The findings of this study showed that teachers perceive peer-assisted learning as an important learning method. While some highlighted interaction, sharing, and mutual learning, they saw it as a teacher-student dynamic where students teach their peers. However, the method has limitations including the risk of negative behaviors among students and the potential of incorrect learning.

Teachers generally implement peer-assisted learning improvisationally, without sufficient planning, which can lead to inconsistencies in effectiveness. Concerns about negative peer interactions highlighted the need for structured guidance from educators.

The teachers who participated in the study stated that they often use peer-assisted learning in mathematics lessons and that these collaborations are generally limited to problem-solving and basic arithmetic, emerging improvisationally. To enable students to experience peer-assisted learning more effectively, activity examples and plans should be developed for other lessons.

To address these challenges, it is important to integrate structured professional development programs focused on peer-assisted learning strategies into teacher training. Such training would provide educators with effective methodologies to facilitate positive peer interactions and create supportive learning environments.

Schools should also embed peer-assisted learning into the curriculum by providing resources that promote collaboration, creating conducive classroom environments, and implementing feedback mechanisms to evaluate its effectiveness. By fostering an inclusive atmosphere, schools can maximize the benefits of peer-assisted learning and contribute to the academic and social development of primary school students.

In conclusion, while peer-assisted learning has the potential to enhance academic skills and social interactions, addressing its challenges and limitations is crucial for successful implementation. Providing adequate training and structured guidance will enable educators to

create a more effective educational experience and support students' holistic development.

Additionally, the findings of this research are based on interviews with teachers. Observing how classroom teachers implement peer-assisted learning methods will also provide valuable insights into classroom practices, highlighting the similarities and differences between teachers' perspectives on this approach and their actual implementations. Schools should also embed peer-assisted learning into the curriculum by developing structured lesson plans and activity guides that outline specific peer-assisted learning techniques for different subjects. This could include peer tutoring frameworks, cooperative group tasks, and structured peer feedback sessions to ensure that students engage in meaningful interactions. Providing teacher handbooks with best practices and example activities can also support educators in integrating peer-assisted learning more effectively across various disciplines. Additionally, implementing feedback mechanisms is essential to evaluate peer-assisted learning effectiveness. Teachers can use structured observation checklists, student self-assessments, and peer evaluation forms to monitor interactions and outcomes. By fostering an inclusive atmosphere, schools can maximize the benefits of peer-assisted learning and contribute to the academic and social development of primary school students.

Limitations of the Research

One limitation of this research is related to the audio recording of interviews with teachers. Some teachers felt uncomfortable prior to the interview due to the recording. This discomfort may have led them to provide examples and explanations that they believed aligned with the researcher's expectations. To mitigate this effect, the teachers were assured at the outset of the study that their names would remain confidential and that no identifying information would be disclosed in the research results.

Ethics Committee Approval: Ethical committee approval was obtained from the Çanakkale Onsekiz Mart University Social Sciences and Educational Sciences Ethics Committee (Date: 29.03.2017, Number: 2017/09).

Informed Consent: All participants in this study participated voluntarily.

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Comparison of Chemistry and Physics Test Questions in the 2019-2023 Higher Education Institutions Entrance Exams in Terms of Content Validity

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ABSTRACT

In the study, a total of 100 questions from the physics test in the Basic Proficiency Test (TYT) and Field Proficiency Tests (AYT) of the Higher Education Entrance Examinations (YKS) between 2019-2023 were analyzed within the framework of the 2018 Secondary Education Physics Curriculum (MoNE, 2018). The findings were carefully compared with the results of previous studies by Gacanoğlu (2024), Gacanoğlu and Nakiboğlu (2022), and Gacanoğlu and Nakiboğlu (2024) In the first part of analysis, it was found that, among the 213 learning achievements outlined in the 2018 physics curriculum, most questions were derived from the"Force and Motion" unit of the 9th-and 11th-grades. This indicated a lack of homogeneity in the distribution of questions across TYT and AYT physics tests. Nevertheless, it was ultimately concluded that the content validity of the YKS physics test questions was generally preserved, as questions addressed learning achievements from curriculum units. In the second part of the study, the content validity of the YKS physics and chemistry test questions was compared based on curriculum alignment. Although the chemistry test contained the highest number of achievement-based questions, its content validity was lower than that of the physics test due to the lack of questions on certain topics.

Keywords: 2018 physics curriculum, 2018 chemistry curriculum, basic proficiency test (TYT), field proficiency test (AYT)

Introduction

Academic achievement is one of the most important concepts in the education system in Türkiye (Yıldırım & Ergene, 2003). At the end of the 12 year education period, individuals take the YKS and take the first step towards career choices that will shape their lives. This challenging and demanding process is experienced by young people as one of increasing responsibility. In some cases, individuals may even feel that their equity is threatened during the examination and evaluation process (Yıldırım & Ergene, 2003). For this reason, the YKS must be carefully planned, implemented and evaluated.

In Türkiye, students take exams administered by Student Selection and Placement Center (ÖSYM) at the end of the 12th-grade. In this way, they attempt to qualify for university admission in their desired field of study. These exams, known as the Higher Education Institutions Exam (YKS), are held at the end of secondary education. The YKS exam is extremely important as it significantly affect an individual's professional and social future.

University admission in Türkiye was not based on exams in the 1960s. During those years, candidates were admitted based on application order, demand in relevant fields, and high school graduation scores. However, as the number of graduates and applicants increased, this system became insufficient. Consequently, universities began to conduct their own exams, which led to problems as students could not attend multiple exams held simultaneously. As candidate numbers continued to grow, an objective and comprehensive exam system became necessary. In 1974, the Interuniversity Board established Interuniversity Student Selection and Placement Center to centralize university entrance exams. This center oversaw exams until 1981, after which it was renamed ÖSYM (Measurement, Selection and Placement Center) in 2011 (ÖSYM, 2024a). Since the 1980s, exams have been administered in two stages: the first for selection and the second for placement. After 1987, both stages served placement purposes (Dökmen, 1992). From 1999 to 2010, the exam was held in a single stage under the name ÖSS (Student Selection System) (ÖSYM, 1999). Between 2010 and 2017, a two-stage system called Transition to Higher Education Exam (YGS) and Undergrade Placement Exam (LYS) was implemented. Since 2017, the system has continued as TYT and AYT (ÖSYM, 2024b).

The current YKS consists of two sessions: TYT and AYT. In TYT, students answer 120 questions across four fields (Turkish, Social Sciences, Science, and Mathematics) within 165 minutes. In AYT, 160 questions are answered in 180 minutes for verbal and numerical score types, while the foreign language test includes 80 questions in 120 minutes (MoNE, 2023). TYT assesses basic proficiency levels, while AYT calculates scores in four categories: Numerical, Equal Weight, Verbal, and Foreign Language (MoNE, 2023). Students answer questions according to the field they study (MoNE, 2023) and placement can be made in the preferred higher education institution according to the results of both exams. Exam result rankings of students are formed in the context of the latest updates made in YKS.

Following the 2017 update, both the names and content of the sessions were changed. According to Sarıca (2019), the most notable change was the significant reduction in the number of questions. Previously, YGS tests contained 14 physics, 13 chemistry, and 13 biology questions, and LYS tests had 30 from each field (ÖSYM, 2017). In the current system, TYT includes 7 physics, 7 chemistry, and 6 biology questions, while AYT includes 14 physics, 13 chemistry, and 13 biology questions (ÖSYM, 2023).

According to exam guides, this change led to a reduction of 20 questions (50%) in TYT and 50 questions (over 50%) in AYT. This shift has sparked discussions on exam content validity and its implications for student preparation (ÖSYM, 2017; ÖSYM, 2023). The change in the number of questions has raised several issues, such as where the exam questions will be drawn from, which subjects should be prioritized during preparation, whether the difficulty level of the exam will change with fewer questions, and how the content validity of the exam will be affected. Consequently, this situation has led to increased discussion of the content validity of YKS in the academic literatüre.

Studies addressing content validity can be found across all subject areas covered in the YKS. For instance, Çoban and Hançer (2006), in their study examining how the weight of secondary school physics subjects varies by grade level and how this distribution is reflected in ÖSS physics test questions, reported issues with content validity in both the curriculum and the ÖSS questions. Similarly, Biçer (2013), in his study on the content validity of 122 psychology, sociology, and logic questions from the philosophy section of the LYS exam (prior to 2018), concluded that the questions were not homogeneously distributed across units and learning activities.

Ayvacı et al. (2018) analyzed physics questions from the university entrance exam in terms of the learning achievements in both the secondary school physics and primary school science and technology curricula, and found that questions were based on achievements from both curricula. Efe and Temelli (2003) evaluated the 1999–2001 ÖSS biology questions in terms of content and difficulty levels to determine what knowledge and skills were required to answer them and whether they aligned with the secondary and high school biology curricula. They concluded that although the questions generally matched the textbooks and curricula, in some years students had difficulty answering due to factors such as questions exceeding their level or inadequate time being allocated to certain topics.

Dursun and Parim (2014) found that the mathematics questions in the YGS exam (as it was known in 2013) primarily targeted the application level of Bloom's Taxonomy. Gürbüz and Biber (2021) analyzed 363 mathematics questions asked between 1966 and 2019, focusing on the topics of limits, derivatives, and integrals. They found that derivative questions were the most frequently asked, while limit questions were the least common, with a steady increase in questions on integrals.

Gacanoğlu and Nakiboğlu (2022) reported problems with the content validity of the TYT and AYT chemistry test questions administered after 2018, based on the learning achievements defined in the chemistry curriculum. Manyas (2022), in her thesis analyzing biology test questions from 2012 to 2022 using the revised Bloom's Taxonomy, concluded that the questions were not evenly distributed across the cognitive domains. In another study, Gacanoğlu (2024) examined the content validity of YKS chemistry and biology questions between 2019 and 2023, and found that although the biology questions showed content validity, they lacked homogeneous distribution, while the chemistry questions had more significant content validity issues.

Purpose of the Study

In this study, the Physics test questions in the TYT and AYT exams between the 2019 and 2023 academic years were analyzed based on the learning achievements of the 2018 Secondary School Physics Curriculum (MoNE, 2018), and the content validity was evaluated in terms of subject coverage. Additionally, these findings were compared with those related to the content validity of the Chemistry test questions in the YKS, as reported in the studies by Gacanoğlu (2024), Gacanoğlu and Nakiboğlu (2022), and Gacanoğlu and Nakiboğlu (2024). It is believed that this study may contribute to ensuring a more balanced distribution of the 2024 YKS exam questions in alignment with curriculum achievements and support the review of content validity. To this end, the study seeks to answer the following research questions:

- Which of the physics test questions in the YKS exams administered between 2019 and 2023 align with the 9th-grade achievements of the 2018 Physics Curriculum, and how are these questions distributed across units?

- Which of the physics test questions in the YKS exams administered between 2019 and 2023 align with the 10th-grade achievements of the 2018 Physics Curriculum, and what is the unit-based distribution of these questions?

- Which of the physics test questions in the YKS exams administered between 2019 and 2023 align with the 11th-grade achievements of the 2018 Physics Curriculum, and how are these questions distributed across units?

- Which of the physics test questions in the YKS exams administered between 2019 and 2023 align with the 12th-grade achievements of the 2018 Physics Curriculum, and what is the unit-based distribution of these questions?

- What is the overall distribution of the physics test questions in the YKS exams administered between 2019 and 2023 by grade level and unit, according to the 2018 Physics Curriculum?

- Are there any similarities or differences between the number of physics and chemistry test questions in the YKS exams between 2019 and 2023 in terms of grade level and unit coverage based on the relevant curricula?

Method

Research Model

In this study, document analysis, one of the qualitative research methods, was employed. This method is used to make meaningful evaluations about a subject (Nakiboğlu, 2021). Document analysis is a functional data collection technique, and since there are no participants involved, there are no reactive situations arising from participant behavior. It is also considered effective for long-term research (Özkan, 2019). In the document review method, existing resources and documents are examined, making it a purposeful evaluation process (Karasar, 2005). According to Bowen (2009), document analysis involves the examination and evaluation of various printed and non-printed sources.

Data Sources of the Research

In this study, the 2018 Secondary School Physics Curriculum (MoNE, 2018) was used as the primary data source. The physics questions from the science sections of the TYT and AYT sessions of the YKS exams administered between 2019 and 2023 were used as the secondary data sources (ÖSYM, 2019; ÖSYM, 2020; ÖSYM, 2021; ÖSYM, 2022; ÖSYM, 2023). Ethical approval has not been obtained for the data sources of this research, namely the YKS physics and chemistry test questions. The YKS questions have been publicly shared by ÖSYM on its official website, and the questions themselves have not been directly used. The study presents the results of an analysis regarding the content validity of the questions.

Data Analysis

Within the scope of the study, a total of 105 physics questions were analyzed 35 from the TYT and 70 from AYT. The questions were retrieved from the official website of ÖSYM (ÖSYM, 2019; ÖSYM, 2020; ÖSYM, 2021; ÖSYM, 2022; ÖSYM, 2023). The findings of chemistry test questions from the studies by Gacanoğlu (2024), Gacanoğlu and Nakiboğlu (2022), and Gacanoğlu and Nakiboğlu (2024) were used as references in the comparison tables.

Each physics question in the YKS exams was compared with the learning achievements of the 2018 Physics Curriculum. If a question was determined to be related to a specific achievement, it was coded with the achievement number, the name of the YKS session, the year of the exam, and the order of the question in the test (e.g., “TYT-2020-1…”). Tables were created to display the codes of the related achievements and the number of questions associated with each grade level and unit.

Results

The findings are presented and explained under separate headings to answer the research questions.

Findings Concerning the First Research Question

The findings of the 2019 TYT and AYT exam questions, obtained through document analysis in relation to the achievements outlined in the 2018 Physics Curriculum, to which the 2019 YKS physics test questions correspond, are presented in Table 1.

Table 1.
Distribution of 2019 TYT and AYT Physics Test Questions by Unit, Achievement Number and Grade Level

Question Identity	Number of Achievement	Unit Name	Grade Level
TYT-2019-1	9.2.1.1.	Substance and Properties	9
TYT-2019-2	9.3.1.2.	Motion and Force	9
TYT-2019-3	9.4.1.1.	Energy	9
TYT-2019-4	9.5.5.1.	Heat and temperature	9
TYT-2019-5	10.1.2.3.	Electricity and Magnetism	10
TYT-2019-6	10.4.1.2.	Optical	10
TYT-2019-7	10.4.9.1.	Optical	10
AYT-2019-1	11.1.2.1.	Force and Motion	11
AYT-2019-2	11.1.5.2	Force and Motion	11
AYT-2019-3	11.1.7.1.	Force and Motion	11
AYT-2019-4	11.1.3.1.	Force and Motion	11
	11.1.8.2.	Force and Motion	11
	11.1.7.1.	Force and Motion	11
AYT-2019-5	11.2.1.1.	Electricity and Magnetism	11
	11.2.2.1.	Electricity and Magnetism	11
AYT-2019-6	10.1.3.1.	Electricity and Magnetism	10
	10.1.4.1.	Electricity and Magnetism	10
AYT-2019-7	11.2.5.3.	Electricity and Magnetism	11
AYT-2019-8	12.1.1.4.	Circular Motion	12
AYT-2019-9	12.1.3.3.	Circular Motion	12
AYT-2019-10	12.2.1.4.	Simple Harmonic Motion	12
AYT-2019-11	12.3.2.1.	Wave Mechanics	12
AYT-2019-12	12.4.3.2.	Introduction to Atomic Physics and Radioactivity	12
AYT-2019-13	12.5.3.4.	Modern Physics	12
AYT-2019-14	12.6.1.1.	Applications of Modern Physics in Technology	12

Looking at Table 1, it is evident that the 2019 TYT physics questions were prepared based on a total of seven different achievements. In terms of grade-level distribution, four questions were aligned with 9th-grade objectives, three with 10th-grade objectives, and no questions were prepared based on the 11th- and 12th-grade achievements. Table 1 also indicates that, the 2019 AYT physics questions were prepared based on two objectives at the 10th-grade level, eight at the 11th-grade level, and seven at the 12th-grade level. The unit with the highest number of questions was the 11th-grade "Force and Motion" unit. No questions were based on the 9th-grade objectives. In total, the 2019 AYT physics questions were prepared from 18 different achievements.

Findings Concerning the Second Research Question

Based on the analysis of the 2018 Physics Curriculum related to the 2020 TYT and AYT exam questions, the findings for the 2020 TYT and AYT exam questions are shown in Table 2.

Table 2.
Distribution of 2020 TYT and AYT Physics Test Questions by Unit, Achievement Number, and Grade Level

Question Identity	Number of Achievement	Unit Name	Grade Level
TYT-2020-1	9.1.3.1.	Introduction to Physical Science	9
TYT-2020-2	9.3.3.2.	Motion and Force	9
	9.3.3.3.	Motion and Force	9
	11.1.7.2.	Force and Motion	11
TYT-2020-3	10.2.2.1.	Pressure and Buoyancy	10
TYT-2020-4	9.5.1.5.	Heat and temperature	9
TYT-2020-5	10.1.2.1.	Electricity and Magnetism	10
	10.1.2.3.	Electricity and Magnetism	10
TYT-2020-6	10.3.2.2.	Waves	10
TYT-2020-7	10.4.4.1.	Optical	10
AYT-2020-1	11.1.2.2.	Force and Motion	11
AYT-2020-2	11.1.3.1.*	Force and Motion	11
AYT-2020-3	11.1.4.6.	Force and Motion	11
AYT-2020-4	11.1.6.2.	Force and Motion	11
AYT-2020-5	11.1.7.4.	Force and Motion	11
AYT-2020-6	11.1.3.1. *	Force and Motion	11
AYT-2020-7	11.2.1.3.	Electricity and Magnetism	11
AYT-2020-8	11.2.4.7.	Electricity and Magnetism	11
AYT-2020-9	11.2.6.2.	Electricity and Magnetism	11
AYT-2020-10	12.1.1.3.	Circular Motion	12
AYT-2020-11	11.1.7.2.	Force and Motion	11
AYT-2020-12	12.1.3.3.	Circular Motion	12
AYT-2020-13	12.3.1.2.	Wave Mechanics	12
AYT-2020-14	12.2.1.4.	Simple Harmonic Motion	12

** Recurring achievements.*

Looking at Table 2, it is evident that the 2020 TYT physics questions were prepared from a total of ten different achievements. Regarding their distribution by grade level, four objectives were from the 9th grade, five from the 10th grade, and one from the 11th-grade. No questions were based on 12th-grade achievements. Table 2 also indicates that the 2020 AYT physics questions were prepared from a total of 13 different achievements. These achievements were distributed across the grade levels as follows: nine achievements from the 11th-grade (one of which was not counted twice because it was a recurring achievement),

and four achievements from the 12th grade. No questions were prepared from the achievements of the 9th and 10th grades. It was determined that the unit with the most questions was the 11th-grade "Force and Motion" unit.

Findings Concerning the Third Research Question

Based on the analysis conducted regarding the achievements of the 2018 Physics Curriculum, which the physics questions of the 2021 TYT and AYT exams are aligned with, the findings of the 2021 TYT and AYT exam questions are presented in Table 3.

Table 3.

Distribution of 2021 TYT and AYT Physics Test Questions by Unit, Achievement Number, and Grade Level

Question Identity	Number of Achievement	Unit Name	Grade Level
TYT-2021-1	9.2.3.1.	Substance and Properties	9
TYT-2021-2	9.3.3.1.	Motion and Force	9
TYT-2021-3	10.2.1.1.	Pressure and Buoyancy	10
TYT-2021-4	9.5.4.2.	Heat and temperature	9
TYT-2021-5	10.1.2.3.	Electricity and Magnetism	10
TYT-2021-6	10.3.1.1.	Waves	10
TYT-2021-7	10.4.7.2.	Optical	10
AYT-2021-1	11.2.1.3.	Electricity and Magnetism	11
AYT-2021-2	9.3.1.4.	Force and Motion	11
	11.1.5.1.	Force and Motion	11
AYT-2021-3	11.1.5.2.	Force and Motion	11
AYT-2021-4	11.1.8.2.	Force and Motion	11
	11.1.9.1.	Force and Motion	11
AYT-2021-5	11.2.2.1.	Electricity and Magnetism	11
AYT-2021-6	11.2.4.1.	Electricity and Magnetism	11
AYT-2021-7	11.2.6.1.	Electricity and Magnetism	11
	11.2.6.2.	Electricity and Magnetism	11
AYT-2021-8	12.1.1.2.	Circular Motion	12
AYT-2021-9	12.1.1.3.	Circular Motion	12
	12.1.5.1.	Circular Motion	12
AYT-2021-10	12.2.1.1.	Simple Harmonic Motion	12
AYT-2021-11	12.3.1.3.	Wave Mechanics	12
AYT-2021-12	12.4.3.1.	Introduction to Atomic Physics and Radiation	12
AYT-2021-13	12.5.3.2.	Modern Physics	12
	9.6.1.1.	Electrostatic	9
AYT-2021-14	12.6.5.1.	Applications of Modern Physics in Technology	12

Looking at Table 3, it is evident that the 2021 TYT physics questions were prepared based on a total of seven different achievements. Considering the distribution of these achievements by grade level, three were from the 9th grade, four from the 10th grade, and none from the 11th or 12th-grade levels. Table 3 also indicates that the 2021 AYT physics questions were prepared based on a total of 19 different achievements. In terms of grade-level distribution, one achievement was from the 9th grade, ten from the 11th-grade, and eight from the 12th grade, while no questions were prepared from the 10th-grade level. The unit with the most questions was the "Force and Motion" unit at the 11th-grade level.

Findings Concerning the Fourth Research Question

Based on the analysis conducted regarding the achievements of the 2018 Physics Curriculum, which the physics questions of the 2022 TYT and AYT exams correspond to, the findings of the 2022 TYT and AYT exam questions are presented in Table 4.

Table 4.

Distribution of 2022 TYT and AYT Physics Test Questions by Unit, Achievement Number, and Grade Level

Question Identity	Number of Achievement	Unit Name	Grade Level
TYT-2022-1	9.2.1.1.	Substance and Properties	9
TYT-2022-2	9.3.3.3.	Motion and Force	9
TYT-2022-3	10.2.1.2.	Pressure and Buoyancy	10
TYT-2022-4	9.5.4.2.	Heat and temperature	9
TYT-2022-5	9.3.3.1.	Motion and Force	9
	9.6.1.3.	Electrostatic	9
TYT-2022-6	10.3.3.3.	waves	10
TYT-2022-7	10.4.4.1.	Optical	10
AYT-2022-1	11.1.3.1.	Force and Motion	11
AYT-2022-2	11.1.2.2.	Force and Motion	11
	11.1.3.2	Force and Motion	11
AYT-2022-3	11.1.7.2.	Force and Motion	11
AYT-2022-4	11.1.8.2.	Force and Motion	11
AYT-2022-5	11.2.4.10.	Electricity and Magnetism	11
AYT-2022-6	12.5.4.1.	Modern Physics	12
AYT-2022-7	11.2.6.1.	Electricity and Magnetism	11
AYT-2022-8	12.1.1.1.	Circular Motion	12
AYT-2022-9	12.1.5.1.	Circular Motion	12
AYT-2022-10	12.2.1.1.	Simple Harmonic Motion	12
AYT-2022-11	12.3.1.6.	Wave Mechanics	12
AYT-2022-12	12.4.2.2.	Introduction to Atomic Physics and Radioactivity	12
AYT-2022-13	12.5.1.2.	Modern Physics	12
AYT-2022-14	12.6.1.1.	Applications of Modern Physics in Technology	12

Looking at Table 4, it is evident that the 2022 TYT physics questions were prepared based on a total of eight different achievements. In terms of grade-level distribution, five achievements were from the 9th grade and three from the 10th grade, while no questions were based on the 11th- or 12th-grade achievements. Table 4 also indicates that the 2022 AYT physics questions were prepared from a total of 14 different achievements. Considering the distribution of these achievements by grade level, seven belong to the 11th grade and eight to the 12th-grade, while none are from the 9th- or 10th-grades. The unit with the most questions is "Force and Motion" at the 11th-grade level.

Findings Concerning the Fifth Research Question

From the analysis conducted regarding the achievements of the 2018 Physics Curriculum, to which the physics questions of the 2023 TYT and AYT exams are related, the findings of the 2023 TYT and AYT exam questions are presented in Table 5.

Table 5.

Distribution of 2023 TYT and AYT Physics Test Questions by Unit, Achievement Number, and Grade Level

Question Identity	Number of Achievement	Unit Name	Grade Level
TYT-2023-1	10.2.1.2.	Pressure and Buoyancy	10
TYT-2023-2	9.3.1.2.	Motion and Force	9
TYT-2023-3	10.1.2.3.	Electricity and Magnetism	10
TYT-2023-4	9.5.4.1.	Heat and temperature	9
TYT-2023-5	10.1.2.3.	Electricity and Magnetism	10
TYT-2023-6	10.4.1.2.	Optical	10
TYT-2023-7	10.4.3.1.	Optical	10
AYT-2023-1	11.1.1.3.	Force and Motion	11
AYT-2023-2	11.1.3.2.	Force and Motion	11
AYT-2023-3	11.1.4.1.	Force and Motion	11
AYT-2023-4	11.1.7.4.	Force and Motion	11
AYT-2023-5	11.1.8.2.	Force and Motion	11
AYT-2023-6	11.2.4.1.	Electricity and Magnetism	11
AYT-2023-7	11.2.3.5.	Electricity and Magnetism	11
AYT-2023-8	11.2.6.1.	Electricity and Magnetism	11
AYT-2023-9	11.2.5.4.	Electricity and Magnetism	11
AYT-2023-10	12.2.1.3.	Simple Harmonic Motion	12
AYT-2023-11	12.1.3.3.	Circular Motion	12
AYT-2023-12	12.1.1.1.	Circular Motion	12
	12.1.5.1.	Circular Motion	12
AYT-2023-13	12.2.1.5.	Simple Harmonic Motion	12
AYT-2023-14	12.3.1.2.	Wave Mechanics	12

Looking at Table 5, it is evident that the 2023 TYT physics questions were prepared from a total of seven different achievements. In terms of grade-level distribution, two achievements belong to the 9th grade and five to the 10th-grade, while no questions were prepared from the 11th- and 12th-grade levels. Table 5 also indicates that the 2023 AYT physics questions were prepared from a total of 15 different achievements. According to grade level, nine achievements belong to the 11th- grade and six to the 12th grade, while no questions were prepared from the 9th- and 10th-grade levels. The unit for which the most questions were prepared was the "Force and Motion" unit at the 11th-grade level.

Findings Concerning Sixth Research Question

A comparison of the chemistry and physics questions asked in the TYT and AYT sessions of the YKS exams administered between 2019 and 2023, in terms of unit, grade level, and number of achievements, is shown in Table 6 and Table 7.

Table 6.

Comparison of TYT Chemistry Test Questions and Physics Test Questions (2019–2023) in Terms of Number of Achievements / Grade Level

Grade Level	2019 TYT (Gacanoğlu & Nakiboğlu, 2022)		2019 TYT Physics		2020 TYT Chemistry (Gacanoğlu & Nakiboğlu, 2022)		2020 TYT Physics		2021 TYT Chemistry (Gacanoğlu & Nakiboğlu, 2022)		2021 TYT Physics		2022 TYT Chemistry (Gacanoğlu, 2024)		2022 TYT Physics		2023 TYT Chemistry (Gacanoğlu & Nakiboğlu, 2024)		2023 TYT Physics	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
9	7	5.51	4	1.88	8	6.29	4	1.88	5	3.94	9	4.23	6	6.59	5	2.35	4	3.15	2	0.94
10	3	2.36	3	1.41	6	4.72	5	2.35	4	3.15	4	1.88	4	3.15	3	1.41	4	3.15	5	2.35
11	3	2.36	0	0	3	2.36	1	0.47	2	1.57	0	0	1	0.79	0	0	0	0	0	0
12	2	1.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	15	11.81	7	3.29	17	13.38	10	4.69	11	8.66	13	6.10	11	8.66	8	3.76	8	6.30	7	3.29

Table 7.

Comparison of AYT Chemistry Test Questions and Physics Test Questions (2019–2023) in Terms of Number of Achievements / Grade Level

Grade Level	2019 AYT Chemistry (Gacanoğlu & Nakiboğlu, 2022).		2019 AYT Physics		2020 AYT Chemistry (Gacanoğlu & Nakiboğlu, 2022).		2020 AYT Physics		2021 AYT Chemistry (Gacanoğlu & Nakiboğlu, 2022).		2021 AYT Physics		2022 AYT Chemistry (Gacanoğlu, 2024).		2022 AYT Physics		2023 AYT Chemistry (Gacanoğlu & Nakiboğlu, 2024).		2023 AYT Physics	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
9	0	0	0	0	0	0	0	0	0	0	1	0.47	0	0	0	0	0	0	0	0
10	4	3.17	2	0	5	3.94	0	0	5	3.94	0	0	0	0	0	0	4	3.15	0	0
11	14	11.02	8	0.94	13	10.24	9	4.23	19	14.96	10	4.69	11	8.66	7	3.29	9	7.09	9	4.23
12	10	7.84	7	3.29	5	3.94	4	1.88	7	5.51	8	3.75	7	5.51	8	3.75	3	2.36	6	2.82
TOTAL	28	22.05	17	7.98	23	18.11	13	6.10	22	17.32	19	8.92	18	14.17	13	6.10	16	12.59	15	7.04

When Table 6 is examined, it is seen that:

- In 2019, TYT physics test questions covered 3.29% of curriculum achievements, while chemistry covered 11.81%. Thus, chemistry had higher content validity.
- In 2020, TYT physics covered 4.69%, chemistry 13.38% — again, chemistry showed higher content validity.
- In 2021, physics covered 6.10% and chemistry 8.66% — chemistry still had higher validity.
- In 2022, physics covered 3.76%, chemistry 8.66% — chemistry remained higher.
- In 2023, physics covered 3.29%, chemistry 6.30% — chemistry test questions again showed higher content validity.

It can therefore be concluded that, across all years, the TYT chemistry test consistently demonstrated higher content validity and included a broader range of achievements than the physics test.

When Table 7 is examined:

- In 2019, AYT physics covered 7.98% of the curriculum achievements, whereas chemistry covered 22.05%.
- In 2020, physics covered 6.10%, chemistry 18.11%.
- In 2021, physics covered 8.92%, chemistry 17.32%.
- In 2022, physics covered 6.10%, chemistry 14.17%.
- In 2023, physics covered 7.04%, chemistry 12.59%.

In all cases, the chemistry test questions had higher content validity than the physics questions, suggesting that more curriculum achievements were addressed in the chemistry section each year.

Discussion

This study aimed to summarize the content validity of the physics questions in TYT and AYT of the YKS administered between 2019 and 2023. It focused on the alignment of these questions with the achievements defined in the Secondary Education Physics Curriculum and included a comparison with chemistry questions from the same period.

The findings revealed that the TYT and AYT physics test questions from the YKS exams administered between 2019 and 2023 were fully aligned with the achievements of the Secondary Education Physics Curriculum. It was determined that the questions in the TYT physics test primarily targeted the 9th and 10th-grade achievements, while the AYT physics test questions focused on the 11th and 12th-grade levels. It was also found that there were no units left unrepresented by questions, although a significant concentration of questions stemmed from the "Force and Motion" unit at both the 9th and 11th-grade levels. This indicates a lack of homogeneous distribution across the curriculum, consistent with the findings of Çoban and Hançer (2006) and Çoban et al. (2006), who reported similar results in the 2006 ÖSS exam.

Due to the COVID-19 pandemic and the 2023 earthquake disaster, the scope of the curriculum was narrowed in 2020 (MoNE, 2020), and no questions were asked from the excluded topics. Apart from these exceptional circumstances, no significant issues were found regarding the content validity of the physics test questions.

When the TYT and AYT chemistry test questions from 2019 and 2022 were examined, it was found that the "Nature and Chemistry" and "Energy Resources and Scientific Developments" units were not represented. This aligns with the findings of Gacanoğlu and Nakiboğlu (2022) and Gacanoğlu (2024), who identified content validity problems in the TYT-AYT chemistry tests. Overall, it was determined that the YKS physics and chemistry test questions administered between 2019 and 2023 lacked homogeneity and had content validity issues.

Conclusion and Recommendations

A different perspective on the TYT and AYT chemistry and physics tests shows that the total number of achievements in the Secondary Education Physics Curriculum is 213, while the Chemistry Curriculum has 127 achievements. The number of objectives for which questions were prepared was significantly lower than the total number of achievements in both subjects. This indicates that a substantial portion of the physics curriculum was not reflected in the exams, resulting in a lack of homogeneity.

Based on the findings of this study, the following recommendations are made to improve the content validity of the 2019–2023 YKS physics test questions and their comparison with chemistry test questions:

• Ensuring a homogeneous distribution of YKS physics test questions across all achievements could increase students' motivation and reduce anxiety during exam preparation.
• Improving the content validity of YKS chemistry test questions could prevent negative experiences for students and their families and support a more effective preparation process.
• Reviewing the units selected for question preparation in both physics and chemistry and increasing the number of represented achievements could enhance student engagement and lead to more effective learning.

Ethics Committee Approval: No ethics committee approval is required for this study as it does not involve any human participants.
Informed Consent: Not applicable, as the study does not include human participants.
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Decoding Diversity, Equity, and Inclusion (DEI) in Higher Education: A Linguistic and Theoretical Exploration

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ABSTRACT

This study undertakes a comprehensive examination of Diversity, Equity, and Inclusion (DEI) literature in higher education, aiming to identify central themes and assess the theoretical frameworks that shape scholarly discourse. By conducting a thematic analysis of 1,010 DEI-related articles sourced from the Web of Science (WOS) database and utilizing MAXQDA for qualitative data analysis, this research provides a systematic evaluation of existing studies. The findings reveal a predominant focus on gender and racial dynamics, particularly within the U.S. context, alongside a disciplinary concentration in medical and health-related fields. This pattern suggests a limited scope in DEI research, often neglecting broader social identities such as disability, socioeconomic status, religion, nationality, first-generation status, and political perspectives, and overlooking the intersectionality of these identities and their distinct experiences. Additionally, the analysis uncovers a lack of diverse theoretical applications, highlighting the need for alternative conceptual frameworks to advance the depth and applicability of DEI scholarship. The study also points to a significant gap in international perspectives, with most research centered on Western institutions. By synthesizing these insights, this study contributes to the DEI discourse by offering a critical overview of existing research and identifying key areas for further investigation. Ultimately, it advocates for a more inclusive and globally relevant understanding of DEI in higher education.

Keywords: Diversity, equity, inclusion, higher education, systematic review, academia.

Introduction

Diversity, Equity, and Inclusion (DEI) in higher education has experienced profound transformation over the years. Initially, DEI efforts predominantly focused on racial/ethnic backgrounds and cisgender identities (Worthington et al., 2020). However, contemporary definitions of DEI have expanded to encompass a much broader range of social identity characteristics, which include gender expression, sexual orientation, disability, religious and spiritual beliefs, national and geographic background, linguistic preferences, economic background, age, service in the military, political beliefs and more. The DEI domain has quickly advanced, incorporating nuanced interpretations of intersectionality (e.g., Byrd et al., 2019) and recognizing the variability of multiple identities among students, faculty, and staff (Harris & Patton, 2019; Worthington et al., 2014).

In response to this evolution, higher education institutions have broadened the scope of their DEI initiatives and taken significant steps towards embracing DEI principles. These expanded efforts involve enhancing an equitable, diverse, and inclusive campus environment, enhancing curriculum and teaching methods, improving recruitment and retention strategies, and enhancing procurement and supplier diversity (Worthington et al., 2014). These efforts show their commitment to confronting systemic issues faced by minoritized groups in higher education (Turner et al., 2008).

While numerous individual studies have explored various aspects of DEI within higher education (Liou et al., 2021; Morris et al., 2022; Wong et al., 2021), a comprehensive review synthesizing this body of research and identifying gaps for further investigation has yet to be conducted. Thus, a thorough literature review is essential to provide a comprehensive overview, synthesize key findings, and deepen our understanding of DEI in higher education. This study aims to systematically explore DEI terminology within the higher education literature, with two main objectives: first, to identify and analyze the key concepts, phrases, and language patterns shaping academic discourse on DEI; and second, to examine the dominant theoretical frameworks that underpin DEI studies.

Review of DEI Concept

Diversity, equity, and inclusion (DEI) are multifaceted concepts that often provoke discussions and debates regarding their meanings and practical implementations. Diversity is the recognition of physical and social attributes that differentiate individuals or groups, with celebrating these distinctions as sources of strength for the entire community (Rodriguez, 2016; Tan, 2019). It explores the impact of societal disparities in power and advantages associated with various social identities such as race, ethnicity, culture, gender, gender identity, sexual orientation, income, religion, disability, age, nationality, and language (American Psychological Association (APA), 2021). Diversity serves as the foundation for understanding the concept of privilege, which involves unearned advantages granted to some based on their social identity or status rather than earned merit (Johnson, 2018). On the contrary, oppression arises when one subgroup wields more power and privilege than another, using it to dominate and maintain the current social hierarchy (APA, 2021).

Unconscious bias refers to a negative bias towards a particular social group that exists unconsciously (APA, 2021). These biases are often shaped or reinforced by stereotypes—mental generalizations, such as beliefs and expectations, about the attributes and traits of individuals within a specific group or social category (Britannica, n.d.). When unconscious biases and stereotypes influence behavior, they can lead to discrimination, which involves unjust and differential treatment of individuals based on their social identities. Discrimination operates at both individual and institutional levels, creating systemic advantages for some groups while limiting opportunities for others (APA, 2021). A specific manifestation of discrimination is racism, which targets individuals or groups based on race (APA, 2021). However, racism is just one aspect of a broader process of marginalization. Marginalization extends beyond racial prejudice to include the systematic isolation or disempowerment of certain individuals or groups, rendering them insignificant in society. It results from a range of social, economic, and political inequalities, creating barriers to full participation and equal opportunities in society (APA, 2017). Furthermore, microaggressions—subtle and often unintentional discriminatory acts—frequently stem from unconscious biases and stereotypes, perpetuating marginalization through derogatory attitudes based on characteristics like race or gender (APA, 2017).

Equity, a crucial element of DEI, ensures equal opportunities and access regardless of background. It involves removing barriers that hinder the participation of some groups and levelling the playing field for all (Rodriguez, 2016). As an essential component of equity, access means removing barriers that lead to unequal opportunities for individuals to be part of a group, organization, or community (APA, 2021). Equity is linked to social justice, defined as the commitment to creating fairness in resources, rights, and treatment for marginalized individuals and groups lacking equal power in society (Duignan, n.d.).

The 'I' in DEI stands for inclusion, which celebrates diverse perspectives and actively engages individuals from all backgrounds, ensuring equal opportunities for all. It fosters belonging by making everyone feel valued as their authentic selves without hiding parts of their lives (Tan, 2019).

DEI initiatives hold great importance for higher education institutions. By fostering diverse representation and creating an inclusive learning environment, universities provide crucial support to students from historically underrepresented backgrounds, inspiring them and bolstering their belief in their own potential and capabilities. Diversity on campus enhances cultural awareness, enriching dialogues and dismantling prejudices (Clayton, 2021). A diverse, equitable, and inclusive university environment encourages students to reflect on their ideas, understand diverse perspectives, and resolve conflicts through compromise and mutual understanding. A more supportive and inclusive educational experience ultimately leads to improved academic performance (Tavares, 2021). Similarly, having a diverse faculty positively impacts the retention and graduation rates of students from historically underrepresented backgrounds, enhances faculty welfare, and leads to better promotion and tenure outcomes (Beer et al., 2023; Gilkes-Borr, 2019).

Researchers have examined various dimensions of DEI in academia. For example, studies have found that gender disparities remain widespread, with women often encountering structural barriers such as unequal pay, limited mentorship opportunities, and underrepresentation in leadership positions (Beech et al., 2021). Race also plays a significant role, as studies demonstrate how institutional biases and systemic racism hinder the academic trajectories of underrepresented minorities (Arnold et al., 2016; Jayakumar et al., 2009). Socioeconomic status further compounds inequities, with scholars from less privileged backgrounds facing challenges such as limited access to funding, professional networks, and academic preparation (Morgan et al., 2022). Similarly, studies have revealed that religion and cultural identity can influence academic experiences, particularly for individuals whose beliefs or practices diverge from institutional norms

(Chen et al., 2019).

While various studies explore different aspects of DEI in academia, they often focus on specific issues, such as gender or race, in isolation. A comprehensive review that synthesizes this body of research and identifies its gaps is notably absent. This study aims to fill that gap by offering an integrated analysis of the DEI landscape in higher education literature.

The study conducts a detailed review of DEI terminology and theoretical frameworks within higher education literature. It aims to 1) identify and examine the DEI lexicon, including essential concepts and language patterns shaping academic DEI discussions, and 2) to evaluate the theoretical frameworks supporting DEI research, with a focus on their application and impact on understanding DEI principles.

Method

Research Design

This study adopts a a systematic literature review (SLR), guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. An SLR is appropriate for this research as it enables a comprehensive synthesis of existing literature, ensuring a rigorous evaluation of DEI in higher education (Petticrew & Roberts, 2008).

To achieve the research objectives, the study employs thematic analysis, combining manual review with qualitative and quantitative data analysis techniques, facilitated by MAXQDA software. The literature search was conducted using the Web of Science (WOS) database to identify scholarly articles related to DEI in higher education as of March 2024. WOS was chosen as the primary database due to its high-quality indexing criteria, which ensure the relevance and credibility of the included studies. Additionally, its advanced search capabilities facilitate precise retrieval of DEI-related literature.

The PRISMA guidelines were adopted for this research. PRISMA is widely recognized as a protocol designed to enhance the reporting quality of systematic reviews and meta-analyses. The framework includes a checklist and a flow diagram to ensure that studies are conducted and presented in a transparent, complete, and replicable manner (Liberati et al., 2009) (Figure 1).

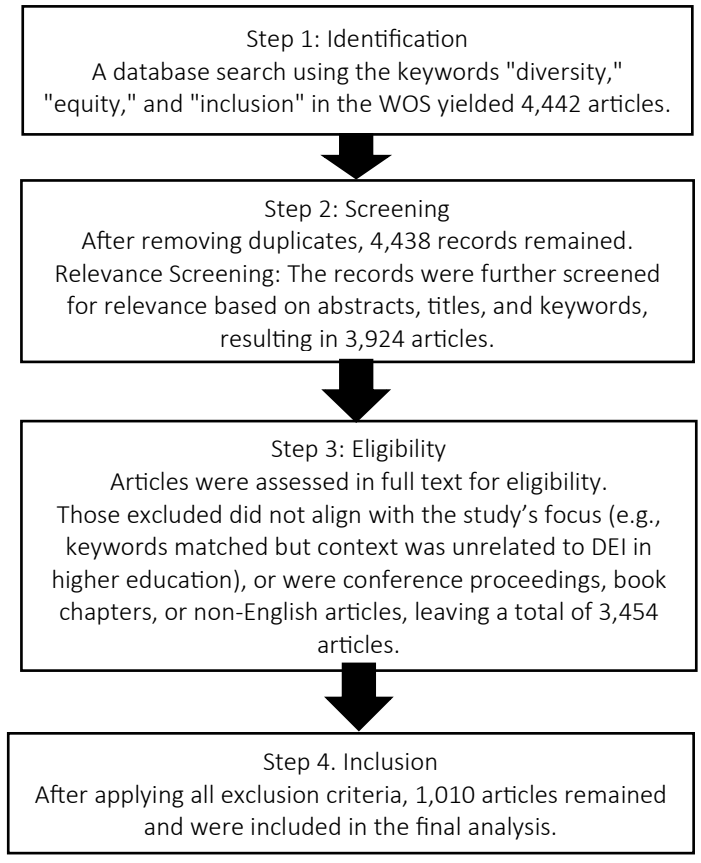

Figure 1.
PRISMA Framework Adopted in the Study

Data Source

The initial research employed the keywords "diversity," "equity," and "inclusion," which yielded 4,442 articles (WOS, 2024). To narrow the focus to higher education, the results were refined by including articles with keywords such as "academy," "academic," "faculty," "university," "higher education," and "curriculum." To ensure inclusivity and accuracy, the author manually reviewed all retrieved articles, examining their abstracts, keywords, and titles to ensure relevance to the study's focus on DEI in higher education. The manual review process involved applying the following exclusion criteria: Conference proceedings and book chapters were disregarded. Non-English articles were removed. Articles containing the specified keywords but deemed irrelevant to the study's objectives were excluded. For example, articles focusing on DEI practices in primary education or corporate settings were excluded, as the study specifically targets higher education. After implementing the exclusion criteria and conducting a thorough manual review, a final sample of 1010 studies was considered relevant for the study.

No ethics committee approval was needed for this study, as it involved only publicly available literature and did not include human participants or sensitive data. The research solely focused on the analysis of publicly available literature

and documents related to DEI in higher education.

Data Analysis

All articles were downloaded and imported into the MAXQDA, a qualitative data analysis software. Prior to analysis, a series of data preparation steps were implemented to ensure the relevance and accuracy of the analysis results: Hyperlinks, hashtags, numbers, email addresses, and other non-textual elements were systematically excluded from the dataset. A predefined Stop Word List for the English language was activated within the MAXQDA software. This list excluded common words and articles that typically carry less semantic weight, such as "the" "and" "in" and others. Then, the "Lemmatize Words" option was enabled within MAXQDA. This process standardized words to their base or dictionary form, allowing for more accurate analysis and reducing the impact of inflections and variations.

A word combination analysis was performed, and the word cloud was generated using the top 50 word combinations. MAXQDA's "Keyword in Context" and "Lexical Search" tools were employed to identify the theoretical frameworks. Systematic searches utilizing key terms such as 'Theoretical Framework,' 'Theory,' and 'Conceptual Framework' were executed to ensure comprehensive coverage and in-depth investigation. Following the lexical search for theories, each result was carefully reviewed to ensure that references were not mistakenly included in the findings. Abstracts, titles, and keywords of the articles were imported as an Excel file. An additional keyword frequency analysis was performed via MAXQDA to enable the quantification of the prevalence of specific terms and the identification of dominant themes within the body of literature.

Results

An Overall Look

Starting in 2015, there has been a notable and consistent increase in the number of articles published on DEI in higher education, as illustrated in Figure 2. This upward trajectory highlights a growing academic and institutional interest in DEI topics, with a particularly steep rise observed from 2018 onwards. Given the cutoff date was in March, it's expected that there will be more studies by the end of 2024.

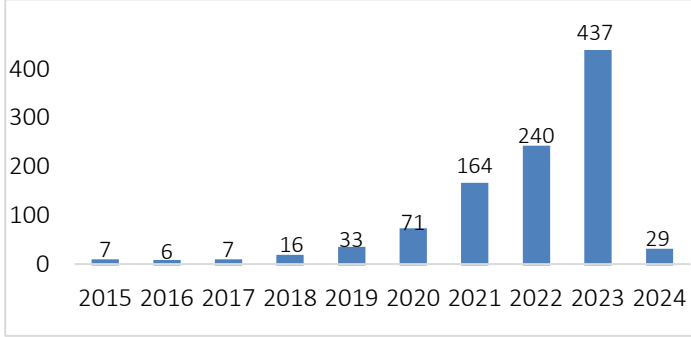

Figure 2.
Yearly Distribution of Studies

Keyword Analysis

The keyword analysis reveals a nuanced understanding of the focus areas within the DEI discourse in higher education, especially concerning academic medicine (Table 1). Having "Medical Education" and "Academic Medicine" as top-ranked keywords indicates a significant interest in advancing the quality, effectiveness, and inclusivity of medical education and academic healthcare practices. "Health Equity" and "Health Care" together illustrate the extensive approach of higher education in training healthcare professionals. "Nurse Education" highlights the importance of training nurses to provide equitable care to diverse populations. The frequent mentions of "Social Justice" and "Social Work" reflect academic institutions' growing focus on addressing societal inequalities and preparing students with the values, knowledge, and skills needed to foster a more equitable society. The emphasis on "Professional Development" indicates a commitment to continuous learning and skill enhancement among faculty and staff, especially in DEI practices. The frequent mention of "Gender Equity" indicates a unified approach within academic settings to address and diminish gender-based disparities. The emphasis on "STEM Education" highlights initiatives to address underrepresentation in Science, Technology, Engineering, and Mathematics and encourage broader student engagement in these fields. The term "Cultural Humility" emphasizes academia's shift toward continuous self-assessment and learning, encouraging ongoing reflection on cultural identity, biases, and power structures to enhance respect and inclusivity in educational settings. The focus on "Faculty Development" emphasizes the importance of educators in creating inclusive environments and enhancing teaching, curriculum, and student engagement for greater inclusivity and equity.

Table 1.

Keyword Analysis

Word combination	Frequency
High Education	84
Medical Education	59
Social Justice	35
Health Equity	25
Professional Development	23
Diversity Equity	21
Nurse Education	20
Gender Equity	19
Underrepresent Minority	13
Health Care	12
Graduate Student	11
Stem Education	10
Social Work	10
Faculty Development	10
Equity Inclusion	10
Cultural Humility	10
Academic Medicine	10

Detailed Word Combination

Beyond the initial keyword analysis, the study delved further into word combinations across all involved articles, uncovering additional trends. The analysis highlighted a dominant focus on the U.S. context, as evidenced by the frequent use of terms like “United States” and “American Medical." It also identified a significant emphasis on racial and ethnic diversity, demonstrated through recurring references to “African American," "Race Ethnicity," "Ethnic Minority," "Systemic Racism," and “Ethnic Diversity." Furthermore, the prevalent mention of “Implicit Bias” underscores its critical role in addressing subconscious prejudices impacting decisions and interactions within higher education.

Figure 3.

Word Combination Analysis Word Cloud

The importance of "Learning Environment," "Student Experience," and "Lived Experience" was underscored, reflecting their impact on educational outcomes and the understanding of diverse student backgrounds. Student-related terms such as "College Student" and "Undergraduate Student" indicate a focus on student experiences and support. The inclusion of "Sexual Orientation" and "Gender Identity" highlights an increasing awareness of LGBTQ+ inclusivity. The term "Mental Health" shows an acknowledgment of the importance of the psychological and emotional well-being of individuals in the academic community. Additionally, references to the "COVID-19 Pandemic" point to recent examinations of the pandemic's impact on DEI in higher education. "Role Model" underscores the importance of figures who promote DEI by influencing positive behaviors and fostering an inclusive environment. Lastly, "Financial Support" addresses economic barriers in education and provides resources to ensure equitable access and opportunities for all. The word combination analysis is visually depicted in Figure 2 through a word cloud.

Theoretical Framework Used in the Studies

The theoretical frameworks used in DEI studies within higher education are summarized in Table 2, along with their overarching objectives and their applications in the context of higher education studies, supported by sample references from the analyzed articles. The theoretical frameworks listed in the table are ranked according to their frequency of use in studies, with those at the end being applied in only a single study. In the studies, only theories employed as foundational frameworks were considered; those mentioned in passing or in a single sentence were not included.

The table highlights key theoretical frameworks commonly employed in DEI research within higher education. Among these, Critical Race Theory and the Theory of Racialized Organizations are frequently cited in studies (e.g., Casellas

Connors, 2021; Corneille et al., 2019; Inskip, 2023; Schachle & Coley, 2022; Yi et al., 2022), underscoring the centrality of race in DEI discourse. Critical Race Theory examines systemic racism's impact on academia, while the Theory of Racialized Organizations highlights how institutional practices perpetuate racial inequities.

The Theory of Capital (Bourdieu, 1986) is also prominently used in studies, highlighting the unequal distribution of cultural, social, and economic capital within academia (Deng et al., 2023; Heffernan, 2022). This theory offers a critical perspective on how access to resources—both material and symbolic—impacts the ability of marginalized groups to succeed in higher education.

Intersectionality Theory appears in a significant number of studies (e.g., Casellas Connors, 2021; Corneille et al., 2019; Inskip, 2023; Razzante, 2018; Woodhead et al., 2022), providing a framework for understanding how race, gender, class, and other social categories intersect to shape individuals' experiences in academic environments.

The table further highlights additional key theoretical frameworks, each contributing unique insights into the dynamics of DEI in higher education. For instance, Transformative Learning Theory (Mezirow, 1995) emphasizes self-examination and the confrontation of biases (e.g., Brandhorst et al., 2023; Nuss, 2023). The application of Queer Theory (Betsky, 1997) helps to break down biases surrounding sexual orientations and gender identities (e.g., Parra-Martínez et al., 2021; Wilby et al., 2022). Black Feminist Theory (Hill-Collins, 1990) challenges mainstream feminism, which often centers on the experiences of white women, advocating for an approach that recognizes the specific struggles faced by women of color (Leath et al., 2021; Ruel & Tajmel, 2023). Minority Stress Theory (Meyer, 1995) emphasizes the pressures faced by underrepresented students and faculty, providing insights into how these stresses impact academic success and well-being (Avery-Desmarais et al., 2021). Gendered Organizations Theory (Acker, 1990) explores how organizational structures and norms often prioritize masculine standards, marginalizing non-masculine perspectives (Bird & Latimer, 2019; Edwards et al., 2019; Laursen & De Welde, 2019). Standpoint Theory (Harding, 1986) highlights how individuals' social positions influence their perspectives on power dynamics and inequality (Razzante, 2018; Schusler et al., 2021). Although less commonly used, other theories in Table 2 contribute significantly to DEI in higher education.

Table 2.

Key Theoretical Frameworks

Theoretical Frameworks and Overarching Objectives & Applications in Higher Education Studies (Sample Article References)
Critical Race Theory (CRT) (Crenshaw et al., 1995) Critical Race Theory (CRT) asserts that racism is a deeply entrenched part of society, shaping the educational experiences and outcomes for students of color. In the realm of higher education, CRT aids in unveiling how institutional structures perpetuate racial inequalities and guides efforts to foster more equitable and inclusive learning environments (Corneille et al., 2019; Casellas Connors, 2021; Inskip, 2023).
Theory of Capital (Bourdieu, 1986) The Theory of Capital highlights the unequal distribution of cultural, social, and economic capital, shaping inequalities within educational settings. This framework clarifies how varying values assigned to applicants' backgrounds influence the selection process, reflecting broader societal inequities. The theory calls for transparency in admissions to address biases and power imbalances to ensure a diverse academic community (Deng et al., 2023; Heffernan, 2022).
Intersectionality Theory (Crenshaw, 1989) Intersectionality shows how intersecting identities -race, gender, class, and sexuality - create distinct advantages or barriers. Incorporating intersectionality into DEI strategies allows institutions to acknowledge the full spectrum of individual experiences. By adopting an intersectional approach in DEI work, higher education institutions can adopt a more comprehensive perspective on diversity, recognizing and appreciating the diverse experiences of its community (Razzante, 2018; Woodhead et al., 2022)
Theory of Racialized Organizations (Ray, 2019) The theory of Racialized Organizations challenges the notion of race neutrality and reveals how racial group membership influences access to resources and leadership roles, typically favoring white individuals. It highlights a systemic lack of diversity among faculty and leadership and promotes a more inclusive academic environment by challenging existing norms and fostering genuine racial equity (Schachle & Coley, 2022; Yi et al., 2022).
Transformative Learning Theory (Mezirow, 1995) Transformative Learning Theory emphasizes self-examination and bias confrontation and helps learners reassess their beliefs through new experiences. This theory enhances DEI education by aiding students in identifying and addressing discriminatory attitudes, thereby nurturing an inclusive learning atmosphere (Brandhorst et al., 2023; Nuss, 2023).
Queer Theory (Betsky, 1997) Queer Theory critiques traditional gender and sexuality categories as socially constructed, promoting diversity beyond heteronormative and binary norms. Integrating Queer Theory into higher education pedagogy encourages the breakdown of prevailing biases, promoting a deeper appreciation for diversity and inclusivity across sexual orientations and gender

identities (Parra-Martínez et al., 2021; Wilby et al., 2022).

Black Feminist Theory (Hill-Collins, 1990)

Black Feminist Theory challenges mainstream feminism's focus on the experiences of white women, advocating for an inclusive approach that recognizes the unique struggles of women of color. Integrating the theory in higher education DEI efforts allows institutions to combat discrimination more effectively and support marginalized groups (Leath, Whiteside & Jones, 2021; Ruel & Tajmel, 2023).

Minority Stress Theory (Meyer, 1995)

Minority Stress Theory explains the psychological distress experienced by marginalized groups, highlighting unique stressors and their impact on the success of diverse students, including those of different races, genders, and sexual orientations. By using the theory, studies emphasize the unique pressures on underrepresented students and faculty, guiding higher education institutions to develop supportive environments to alleviate these stresses (Avery-Desmarais et al., 2021).

Gendered Organizations Theory (Acker, 1990)

Gendered Organizations Theory examines how organizational norms based on masculine standards marginalize non-masculine perspectives, reflecting historical male dominance. Applying this theory, universities can reassess 'gender-neutral' policies to promote inclusivity and diversity, reduce gender disparities, and foster an equitable environment that values contributions from individuals of all gender identities (Bird & Latimer, 2019; Edwards et al., 2019; Laursen & De Welde, 2019).

Standpoint Theory (Harstock, 1983)

Standpoint Theory explores how individuals' perspectives are shaped by their social positions and experiences. It highlights power dynamics and facilitates solutions to inequality more effectively. Applying this theory, higher education fosters inclusivity and amplifies underrepresented voices, creating environments attuned to community diversity (Razzante, 2018; Schusler et al., 2021).

Theory of Practice (Bourdieu, 1972)

Theory of Practice focuses on concepts like habitus (internalized dispositions), capital (resources like money, social connections), and field (social environments), explaining how they influence people's behaviors and opportunities. The theory is used to understand the roles of habitus, capital, and field in shaping the experiences of diverse students, thereby guiding efforts to address inequalities and promote inclusivity (Byrd, 2022; Han et al., 2023).

Social Learning Theory (Bandura, 1997)

Social Learning Theory posits that regular interactions and shared experiences significantly influence individuals' attitudes and behaviors. This theory explores how continuous engagement and role modeling by academic leaders can enhance faculty members' understanding of inequities and bolster DEI initiatives in higher education (Klemm Verbos et al., 2014; Marchiondo et al., 2023).

Social Justice Theory (Frenkena, 1966)

Social Justice Theory focuses on achieving equitable access to resources, opportunities, and rights for all individuals. By applying the theory, higher education can develop policies and practices to eliminate discrimination, address inequalities, and ensure fair treatment, fostering an inclusive environment aligned with DEI principles (Ávila Reyes et al., 2021).

Social Role Theory (Eagly & Karau, 2002)

Social Role Theory examines how societal roles and expectations influence the behavior, attitudes, and opportunities of individuals based on their gender or social identity. It helps investigate how gender and social identity-based role expectations contribute to bias in evaluation, assessment, and promotion processes in higher education (Balkin et al., 2022).

Social Identity Theory (Tajfel & Turner, 1979)

Social Identity Theory examines how individuals derive their self-worth and identity from group memberships. This theory aids in understanding how students develop their scholarly identities and sense of belonging within their academic disciplines, highlighting the significance of acknowledging cultural and social identities (Willis & Schram, 2023; Wolbring & Lillywhite, 2021).

Social Cognitive Career Theory (Lent, Brown & Hackett, 1994)

Social Cognitive Career Theory examines how individuals' beliefs in their own abilities, expectations of outcomes, and personal goals influence their career development and decision-making processes. This theory is used to understand how marginalized students and faculty perceive their abilities and prospects for success in their chosen career paths (Deng et al., 2023).

Theory of Academic Capitalism (Slaughter & Rhoades, 2004)

Theory of Academic Capitalism explores how universities increasingly adopt market-oriented practices and strategies due to evolving economic and political conditions. It examines the impact of these market-oriented practices on DEI efforts within universities, highlighting potential challenges such as commercialization and difficulties in tackling social justice issues (David, 2009; Kauppinen & Kaidesoja, 2014).

Co-cultural Theory (Orbe, 1998)

Co-cultural Theory posits that marginalized individuals often adjust their communication to align with the dominant culture's expectations. This theory is applied to investigate how students, faculty, and staff from co-cultural groups modify their communication strategies within the dominant academic culture in higher education (Razzante, 2018; Ruiz-Mesa, 2022).

Theory of Cultural Humility (Tervalon & Murray-García, 1998)

Theory of Cultural Humility acknowledges that everyone has both conscious and unconscious biases. It emphasizes the importance of self-awareness, recognizing the limitations of one's understanding of others' experiences, and fostering humility in interactions. The theory encourages higher education institutions to pursue cultural competence with humility and openness to learning, aiming to break down systems of oppression, discrimination, and microaggressions (Buchanan & O'Connor, 2020; Yen et al., 2019).

Human Capital Theory (Becker, 1962)

Human Capital Theory posits that investments in education, skills, training, and experience enhance an individual's economic success and earning potential. It examines how disparities in human capital investments, particularly between

genders, contribute to differences in educational attainment, hiring biases, promotional disparities, and wage gaps within academia (Becker & Beckworth, 2023; Sun & Turner, 2023).

Adult Learning Theory (Knowles, 1978)

Adult Learning Theory emphasizes self-directed learning and real-world application, which is essential for DEI in higher education. It helps create programs and environments that respect adult learners' diversity, improving DEI experiences. Utilizing its principles promotes a deeper DEI understanding and fosters an inclusive academic community (Mullett et al., 2022).

Critical Race Feminism (Wing, 1997)

Critical Race Feminism (CRF) addresses and analyzes the intersecting impacts of race and gender, particularly as they affect women of color in academic settings. It provides a framework for understanding how systemic inequalities and discrimination shape experiences and opportunities (Corneille et al., 2019)

Relative Deprivation Theory (Crosby, 1976)

Relative Deprivation Theory explains how individuals may feel deprived when they perceive a discrepancy between their actual and desired outcomes, especially after comparing themselves with others. This theory explores how students and faculty in higher education perceive disparities and compare their experiences based on race, gender, socioeconomic status, and other social identities (Buttner & Lowe, 2017).

Critical Social Work Theory (CSWT) (Webb, 2019)

Critical Social Work Theory (CSWT) encourages critical self-analysis and active participation in addressing social injustices. By integrating the theory, higher education institutions can create inclusive spaces for open discussion and reflection, enhancing learning and preparing students for effective, justice-focused practice (Owens-King, 2020).

Equity Theory (Adams, 1963)

Equity theory examines the concepts of fairness and justice in social relationships, particularly in the workplace. In the context of higher education, equity theory is utilized to understand and address disparities and perceptions of fairness among students, faculty, and staff (Buttner & Lowe, 2017).

Discussion

The analysis of DEI literature within higher education reveals a landscape predominantly shaped by discussions on gender (e.g., Becker et al., 2023; Didier et al., 2023) and racial dynamics (e.g., Lacy et al., 2024; Wigger, 2024), with a considerable emphasis on the U.S. context (e.g., Carter et al., 2023; Raldow et al., 2023; Rodrigues et al., 2023). The findings highlight an urgent need to broaden DEI research in higher education beyond traditional identity categories to address diverse forms of exclusion. While race and gender remain central to DEI efforts, studies focusing on disabled individuals (e.g., Dollinger et al., 2023; Krishnan, 2024; Rudzki et al., 2023), religious minorities (e.g., Nojan, 2023; Padela et al., 2023), international students (Tavares, 2021; Wang & Sun, 2022), language barriers (Girolamo et al., 2022), and economic disparities (e.g., Rachoin et al., 2023) are sparse. Additionally, there is a notable lack of research on underrepresented first-generation (e.g., Salehi et al., 2020) and politically diverse student groups (e.g., Adida et al., 2023), further highlighting critical gaps in the literature. Expanding the scope of DEI research to encompass these underexplored areas is essential for fostering truly inclusive academic environments.

Notably, a significant portion of the literature originates from medical schools (e.g., Bond et al., 2024; Nguyen et al., 2024; Weller et al., 2024; Wheat et al., 2024), revealing a disciplinary bias that overlooks the distinct DEI challenges and opportunities within other academic fields. To develop a more comprehensive understanding of DEI, it is crucial to expand research to encompass disciplines such as Social Sciences, Humanities, Business, and Legal Studies (e.g., Turco et al., 2023). Greater inclusion of diverse academic domains is essential to achieving a holistic perspective on DEI issues and solutions.

The DEI research landscape in higher education predominantly draws on theories such as Critical Race Theory (Crenshaw et al., 1995), Theory of Capital (Bourdieu, 1986), Intersectionality Theory (Crenshaw, 1989), and Theory of Racialized Organizations (Ray, 2019). While these frameworks are invaluable for analyzing systemic inequalities, privileges, and exclusions, there is a pressing need for DEI research to evolve by integrating and expanding its theoretical base. This evolution could include exploring more transformative and revolutionary perspectives, such as Black Marxism (Robinson, 2023), Ecological Feminist Theory (Gaard, 2011), and Critical Disability Theory (Hall, 2019). Additionally, theories that have been underutilized, such as Equity Theory (Adams, 1963), Relative Deprivation Theory (Crosby, 1976), and Adult Learning Theory (Knowles, 1978), hold the potential to enrich the DEI discourse. Expanding the use of these frameworks can offer fresh insights and address gaps in understanding DEI research.

Conclusion and Recommendations

This study delved into DEI within the context of higher education. First, a comprehensive analysis of DEI literature, examining word combinations and keywords, was conducted to uncover prevalent themes and concepts. Then, by identifying and explaining the theoretical frameworks underpinning DEI research, the study offers a solid foundation for understanding the theoretical aspects driving DEI efforts in academia.

Overall, this study contributes to the wider discussion on DEI in higher education by providing clear explanations of

terminology, theories, and the critical field's underpinnings. A better understanding of DEI language and theoretical frameworks can guide future research and inform policy-making. Ultimately, the findings offer significant insights for the academic community, institutions, and policymakers, delineating a more informed approach to advancing DEI in higher education and paving the way for more inclusive, equitable academic environments.

The study identifies several gaps in the DEI landscape within higher education. While the literature predominantly focuses on gender and racial dynamics, it often overlooks the intersectionality of other identities, such as disability, religion, nationality, first-generation status, and political perspectives, despite their distinct experiences and challenges. Future DEI research should expand to include these diverse and intersecting social identities. Prioritizing underrepresented groups will provide a more comprehensive understanding of inclusivity and help develop DEI strategies that reflect the experiences of all student populations.

In addition, a significant portion of DEI research comes from medical schools, which skews the focus of the research and fails to address the unique DEI challenges in other academic disciplines. Broadening the scope to encompass diverse disciplines is crucial for a more comprehensive understanding of DEI across higher education.

Moreover, the research often relies on a few dominant theories, such as Critical Race Theory, Intersectionality Theory, and the Theory of Racialized Organizations. While valuable, these frameworks do not fully capture the complexities of discrimination, exclusion, and privilege. To provide a more nuanced understanding of systemic inequalities, it is essential to integrate a broader range of theoretical approaches that address the diverse experiences of marginalized groups.

Lastly, the recent rise in anti-DEI legislation poses significant challenges to DEI efforts in higher education, yet few studies have addressed this (Carter et al., 2023; Fowler et al., 2024; Harried, 2024; Orr et al., 2023). Further research is strongly recommended to address the notable gap in understanding the implications and effects of anti-DEI legislation within academia, which poses a threat to the core principles of DEI in educational settings.

In summary, the study highlights critical gaps in the current DEI research landscape and offers recommendations to address these gaps. Expanding the focus of DEI research to include a broader range of social identities, academic disciplines, and theoretical frameworks will strengthen efforts to create a more inclusive and equitable higher education environment.

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