

The Opinions of Prospective Teachers about Biology and Nature-Related Activities for Mentally Disabled Students

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Abstract: *The aim of this study is to examine the opinions of prospective teachers about biology and nature-related activities for mentally disabled students. The survey method was used in this quantitative study. Attitude scale towards biology and nature-related activities for mentally disabled students was used as a data collection tool. The scale was applied to a total of 258 (183 females, 75 males) prospective teachers studying at the education faculty of a state university and taking special education courses. According to the findings, prospective teachers expressed their positive opinions about all the activities specified in the scale. However, a few prospective teachers stated that some of the activities, especially interaction with animals, were not applicable for their mentally disabled students. However, when the findings are evaluated in general, it is concluded that biology and nature-related activities are very valuable for mentally disabled students.*

Science Insights Education Frontiers 2024; 22(1):3499-3512

DOI: 10.15354/sief.24.or570

How to Cite: Gul, S., & Ozay Kose, E. (2024). *The opinions of prospective teachers about biology and nature-related activities for mentally disabled students. Science Insights Education Frontiers*, 22(1):3499-3512.

Keywords: *Attitude, Mentally Disabled Students, Nature-Related Activities, Prospective Teachers*

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Conflict of Interests: None

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards and the Helsinki Declaration and its later amendments or comparable ethical standards. Ethics approvals were obtained with the decision (reference no: E-56785782-050.02.04-2300358309) of the Social and Human Sciences Ethics Committee.

AI Declaration: The authors affirm that artificial intelligence did not contribute to the process of preparing the work.

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Introduction

THERE are various individual differences among the people who make up the society in terms of their physical, mental, spiritual and social characteristics. These differences can affect individuals' lives positively or negatively, and they are also decisive in terms of their competence and inadequacy (İlhan & Esentürk, 2015). The lives of individuals are negatively affected by their inability to perform certain movements, senses or functions expected from them depending on age, gender, social and cultural factors due to a physical or mental disorder. This situation is defined as disability (Sevimay, 2013). Due to these individual differences, individuals cannot receive the stimuli coming from their environment in the way that the majority perceive and cannot express themselves. This makes it difficult for individuals to adapt to society (Sözbilir et al., 2015). Different educational or medical classifications are defined for disabled individuals, depending on their disabilities. One of these classifications is mental disability.

Mental retardation is generally defined as an individual scoring 74 or lower on an IQ test. Mental retardation has also been defined as a persistent lack of at least two or more areas of behavioural adaptation (communication, self-care, life, social skills, sociability, self-management, health, safety, educational activities, free time, etc.) (Eripek, 2005). Within this group, individuals with an intelligence level of 45-75 points fall into the educable mentally disabled category. People in this group constitute 75-80% of mentally disabled people. These individuals need to break down an activity or job into simple parts in order to learn the whole thing. They may be slow and behind compared to their peers. Learning processes range from small parts to the whole. Their learning speed is slow. They think slowly and comprehend slowly. Verbal explanations don't mean much. To ensure learning, the work must be demonstrated practically (Şahin & Kardaş, 2023).

Education is a fundamental human right that is a significant prerequisite for people to participate equally in society and develop their potential. When considered from the perspective of mentally disabled people, it becomes clear that they have the right to special education. In this sense, individuals with special needs should be subjected to a special education program (Orhan & Genç, 2015). There are many definitions of the concept of special education, whose importance in society increases day by day and is constantly evolving. Special education according to the Special Education Services Regulation (Ministry of National Education [MoNE], 2021) is defined as education programs developed to meet the educational and social needs of people who differ significantly from their peers in terms of their personal and development characteristics and educational qualifications, and also education carried out in suitable places with specially trained personnel. The individual needs limited support educational services and special ar-

rangements during the education period (MoNE, 2019). According to this regulation, it is important to provide a suitable learning environment for students in need of special education through individual education programming. In this context, education for disabled people in our country is carried out with specially trained personnel, programs and materials, depending on their degree of disability. Education is provided in special education schools, especially with the necessary tools and equipment (Pakalın et al., 2023).

Science, and especially biological science, is an important discipline for all students, whether they have special needs or not. Because biology is the most important basic science that directly concerns humans and has both scientific and social aspects (Yetkin, 1998). Biology is the systematic study of the structure and behaviour of the physical, social and natural world through observation and experimentation. Therefore, it supports students' ability to understand and retain information as it provides tactile or visible evidence of many facts they see on television and in books (Rakap et al., 2023). Additionally, biology and nature-related activities contribute to the cognitive and sensory development of the individual to the extent of their abilities. Such activities psychologically support the development of individuals by giving them a sense of confidence and achievement (Karakaş, 2018; Uslu, 2012). Students with special needs are more likely to encounter some problems in the context of science education because of their differences compared to their typically developing peers. This situation requires teachers who teach students with special needs, either within the scope of inclusive education or in special education classes, to use some special activities for biology and nature education. However, some studies report that science teachers and prospective teachers do not have the necessary competencies to teach students with special needs (Cawley, 1994; Mastropieri & Scruggs, 1994; Patton, 1995; McGinnis & Stefanich, 2007). On the other hand, special education teachers receive limited training in the context of teaching science to students with special needs and have difficulty obtaining the necessary materials. For this reason, it is seen that science is generally not taught at all in special education classes, or when it is taught, much less time is devoted to this area than in general education classes (Maguvhe, 2015). According to the American National Center for Education Statistics, students with special needs perform significantly lower in science courses (National Center for Education Statistics, 2019).

The studies on education for mentally disabled students in our country have gained momentum in recent years, and in parallel with these studies, some studies have been started in the field of mentally disabled education (Baki, 2014; Karakaş, 2018; Şahin & Kardaş, 2023; Uçar, S., & Balbağ, 2021). Yet, studies on science education for mentally disabled students are quite limited (Çapraz, 2016; Demir, 2008; Gul et al., 2023; Mete, 2016; Mete et al., 2017; Terzioğlu et al., 2023; Uslu, 2012). One of these studies

was conducted by Mete (2016). In the study, some hard and soft substances were taught to students with intellectual disabilities in the context of the visible and sensible properties of the substance by direct teaching method. As a result of the study, it was seen that learning took place in two of the three students who constituted the sample of the study and they were successful at the level of remembering, but one student did not learn to the expected extent. In his study, Çapraz (2016) investigated the effectiveness of teaching the “solid-liquid-gas” states of some substances to students with intellectual disabilities by direct teaching method and the usefulness of this method. For this purpose, teaching and evaluation were made with solid, liquid and gaseous substances first themselves and then with their pictures. The research results revealed that the direct teaching method is an effective and useful method in teaching the “solid-liquid-gas” states of some substances to students with intellectual disabilities. In addition, it has been observed that this method provides students with permanence and increases academic success. Akman Yozgat et al. (2018) aimed to teach the names of the elements to students with mild mental disabilities. The findings of the study showed that the direct teaching method is effective for students with mild intellectual disabilities. In the research conducted by Kaya (2016), it was seen that the fixed waiting time teaching method was effective in teaching the concept of “living-inanimate” in the science course. In Sazak Pınar and Merdan’s (2016) study, it was observed that students with autism gained conceptual knowledge of the digestive system subject at an accuracy level of 90% or above, and that they maintained these gains at an average level of 90% after a period of instruction.

Some activities related to biology and nature are needed for students with special needs to be successful in biology courses and to develop a positive attitude towards the course and to motivate them. Based on this, the study aimed to examine the opinions of prospective teachers in the field of special education about biology and nature-related activities for mentally disabled students. For this aim, the following questions were sought in this study:

- *What are the opinions of prospective teachers about biology and nature-related activities for mentally disabled students?*
- *What are the opinions of prospective teachers about the applicability of biology and nature-related activities for mentally disabled students?*

Method

Survey method was used in the study. The survey method aims to describe an existing situation as it is. The individual, event or object that is the subject of the research is tried to be defined in its own conditions and as it is. The individual, event or object is not affected or attempted to be changed in any

way. What is important is that what is wanted to be known can be observed and determined (Karasar, 2003).

Participants

In determining the sample, the rule of Bryman and Cramer (2001) that “the sample should be at least five times the number of items in the scale” was considered. In this way, the sample group included a total of 258 (183 females, 75 males) prospective teachers studying at the education faculty of a state university and taking special education courses. All the participants were selected from prospective teachers who had taken special education courses during their education and participated in the study voluntarily in the fall semester of academic year 2023. The ethic board of the institute approved the study.

Data Collection Tool

‘Attitude Scale on Activities Related to Biology and Nature for Mentally Disabled Students’ developed by Gul et al. (2023) was used as a data collection tool. The scale consisted of a total of 21 items grouped under 5 factors. The scale was prepared in a 5-point Likert type, and the expressions in the scale were scored as 1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree. As a result of factor analyses, considering the theoretical structure and content of the items in each of the five factors, the factors were determined as ‘in-school activities’, ‘interaction with animals’, ‘activities related to the sense organs’, ‘interaction with plants’ and ‘free time activities’. The internal consistency coefficient of the scale (Cronbach Alpha= α) was 0.89.

Data Analysis

All statistical analyses were performed in Microsoft Excel and IBM SPSS 20. The data analysis was conducted in a descriptive manner. The arithmetic means were interpreted as follows: strongly disagree in the point range of 1.00-1.80, disagree 1.81-2.60, neutral 2.61-3.40, agree 3.41-4.20, and strongly agree 4.21-5.00 (Gul & Gul, 2022).

Results

The Results for the First Research Question

The first research question was aimed at examining the opinions of prospective teachers about biology and nature-related activities for mentally disabled

students. Findings for the overall scale and each of the five factors are shown in **Table 1**.

When the arithmetic means in **Table 1** are examined, the highest value belongs to F4, and the lowest value belongs to F2. However, it is seen that the prospective teachers completely agreed with the statements in F4, but also positively agreed with the statements in other factors. Similarly, the arithmetic means of the prospective teacher' opinions regarding the overall scale is within the 'agree' limits.

The Results for the Second Research Question

The second research question was aimed at examining the opinions of prospective teachers about the applicability of biology and nature-related activities for mentally disabled students. Findings for the second research question are shown in **Table 2**.

According to the findings in **Table 2**, the majority of prospective teachers thought that the activities in the scale were suitable for mentally disabled students. However, for a few activities (I6, I8, I9, I10), more than 30% of the prospective teachers stated that the activities were not applicable for mentally disabled students.

Discussion and Conclusion

The main purpose of the education of mentally disabled individuals is to provide them with the necessary skills to live their lives without being dependent on anyone else. For this, an educational environment that will meet their needs is needed (Obaseki & Osagie-Obazee, 2009). Many educational methods and techniques are used in the teaching process of mentally disabled individuals. One or more of these techniques and methods can be used at the same time, depending on the level of the disabled child and the skill given (Bedir et al., 2013). The scale used in this study is aimed at students who are included in the 'educable mentally disabled' category. Based on this, this study was examined the opinions of prospective teachers about biology and nature-related activities for mentally disabled students.

The findings indicated that that the prospective teachers completely agreed with the statements in F4 (Interaction with plants), but also positively agreed with the statements in other factors. One of the reasons why students have trouble trying to learn science concepts is that they cannot relate science concepts to daily life (Er Nas et al., 2018; Stolk et al., 2012). Biology, an important field of science, is also a branch of science intertwined with daily life. Therefore, it is important to offer activities related to daily life in teaching biology subjects to mentally disabled students. At this point, when the activities in the scale are examined, it is very valuable that prospective

Table 1. Descriptive Analysis of Prospective Teachers' Opinions Regarding the Expressions in the Scale.

Factors	Minimum	Maximum	Mean	SD
In-school activities (F1)	1.17	13.00	3.89	0.96
Interaction with animals (F2)	1.00	5.00	3.75	0.79
Activities related to the sense organs (F3)	1.00	12.00	3.88	0.94
Interaction with plants (F4)	2.00	5.00	4.23	0.60
Free time activities (F5)	1.00	5.00	4.01	0.79
Overall	1.24	6.67	3.94	0.62

teachers think that these activities are suitable for mentally disabled students. Because these activities are themed on nature and biology, which are life sciences, and are intertwined with daily life. As a matter of fact, Dilber (2017) stated that mentally disabled students can more easily relate biology subjects and concepts to daily life. In another study conducted by Er Nas et al. (2018), how special education teachers carry out the teaching process of science and nature activities with mentally disabled students was examined. As a result of the study, it was determined that special education teachers preferred the student's performance level, developmental characteristics, and concrete and understandable activities when designing science and nature activities. It was determined that special education teachers preferred experiments and activities related to the subject of "Living Creatures and Life".

When the findings for the second research question of the study are examined, it was determined that the majority of prospective teachers thought that the activities in the scale were suitable for mentally disabled students. Biology and nature-related activities in this scale require students' active participation in the teaching process. The activities also help students develop their observation skills. This may make it easier for students with mental disabilities to learn. In a study conducted by Bedir et al. (2013), teachers' opinions about active learning practices in schools where mentally disabled students were educated were taken. Teachers stated that their students were special education students and that the lessons were mostly based on individual education, therefore they ensured the active participation of the students in the lessons. It has been determined that students' active participation in the lesson makes them happy and is beneficial for the students. Similarly, in some studies, science teachers stated that most mentally disabled students were able to use more observation skills (Dilber, 2017; Er Nas et al., 2018).

To provide science skills to students who need special education, including the mentally disabled, and to develop science literacy, learning environments should be created by taking into account their individual

Table 2. Prospective Teachers' Acceptance Level Towards the Applicability of Biology and Nature-Related Activities for Mentally Disabled Students.

Factor	Items	Acceptance Level	
		Yes	No
In-school Activities (F1)	I11. Performing biology-related laboratory activities increases the attitude of mentally retarded individuals towards biology and nature.	217 (84.1%)	41 (15.9%)
	I12. Inviting expert guests in biology and nature (doctor, veterinarian, biologist, etc.) to the class increases the attitude of mentally retarded individuals towards biology and nature.	223 (86.4%)	35 (13.6%)
	I13. Observing animate and inanimate nature elements with a microscope and lens increase the attitude of mentally retarded individuals towards biology and nature.	211 (81.8%)	47 (18.2%)
	I14. Watching documentaries, photographs, slides or movies about biology and nature increases the attitude of mentally retarded individuals towards biology and nature.	228 (88.4%)	30 (11.6%)
	I15. Doing activities aimed at observable change, such as fermenting yoghurt and making pickles, increase the attitude of mentally retarded individuals towards biology and nature.	208 (80.6%)	50 (19.4%)
	I16. Collecting living and non-living things in nature increases the attitude of mentally retarded individuals towards biology and nature.	180 (69.8%)	78 (30.2%)
Interaction With Animals (F2)	I17. Going to the zoo increases the attitude of mentally retarded individuals towards biology and nature.	218 (84.5%)	40 (15.5%)
	I18. Fishing increases the attitude of mentally retarded individuals towards biology and nature.	172 (66.7%)	86 (33.3%)
	I19. Doing activities that communicate with animals, such as riding horses and swimming with dolphins, increase the attitude of mentally retarded individuals towards biology and nature.	179 (69.4%)	79 (30.6%)
	I10. Participating in swimming and diving activities to watch underwater creatures increases the attitude of mentally retarded individuals towards biology and nature.	167 (64.7%)	91 (35.3%)
Activities Related to the sense organs (F3)	I11. Smelling activities such as flowers and spices that will appeal to the sense of smell increase the attitude of mentally retarded individuals towards biology and nature.	223 (86.4%)	35 (13.6%)
	I12. Conducting various fruit and vegetable tasting activities that will appeal to the sense of taste increases the attitudes of mentally retarded individuals towards biology and nature.	223 (86.4%)	35 (13.6%)
	I13. Doing activities by touching various living things and inanimate objects that will appeal to the sense of touch increases the attitude of mentally retarded individuals towards biology and nature.	223 (86.4%)	35 (13.6%)
	I14. Listening to music containing various animal, water and nature sounds that will appeal to the hearing sense increases the attitude of mentally retarded individuals towards biology and nature.	231 (89.5%)	27 (10.5%)
Interaction With Plants (F4)	I15. Doing activities such as planting seeds and collecting fruits and vegetables increases the attitude of mentally retarded individuals towards biology and nature.	242 (93.8%)	16 (6.2%)
	I16. Going to the botanical garden increases the attitude of mentally retarded individuals towards biology and nature.	225 (87.2%)	33 (12.8%)
	I17. Participating in tree and sapling planting activities increases the attitude of mentally retarded individuals towards biology and nature.	243 (94.2%)	15 (5.8%)
	I18. Participation in the camp-picnic event increases the attitude of mentally retarded people towards biology and nature.	213 (82.6%)	45 (17.4%)
Free Time Activities (F5)	I19. Growing ornamental plants increases the attitude of mentally retarded individuals towards biology and nature.	226 (87.6%)	32 (12.4%)
	I20. Spending time with inanimate elements such as stone, soil, sand increases the attitude of mentally retarded individuals towards biology and nature.	221 (85.7%)	37 (14.3%)
	I21. Observing celestial elements such as stars, clouds and rainbows increases the attitude of mentally retarded individuals towards biology and nature.	223 (86.4%)	35 (13.6%)

differences (Uçar & Balbağ, 2021; Uzoğlu & Denizli 2017). At this point, teachers have a great responsibility. Teachers need to have information about students who need special education, the learning difficulties they may encounter in the classroom, the precautions that can be taken, and how they can be useful to these students (Toptaş, 1998). Reading difficulties, behavioral problems and some sensory deficiencies of students who need special education can make science teaching difficult (Sönmez Kartal, 2017). Therefore, these students should be provided with environments that will improve themselves in terms of their physical, social and personality characteristics, by getting rid of the education and training approach aimed only at their cognitive development (Tatliloğlu & Avcı, 2012). At this point, the importance of applied approaches in the learning environment becomes evident. According to some researchers, the practical nature of science courses has a positive effect on students with mental disabilities (Dalton et al, 1997; McCarthy, 2005). Applied approaches and experiments reveal that they enable students to focus on concrete materials such as microscopes, plants and animals, rocks and minerals rather than the textbook, and are very useful for mentally disabled students (Scruggs & Mastropieri, 1994). Accordingly, although biology and nature-related activities were accepted as applicable by the majority of prospective teachers in the study, some activities were not found suitable for mentally disabled students by a limited number of teacher candidates. Considering these findings, more than 30% of the prospective teachers stated that a few activities (I6, I8, I9, I10) were not applicable for mentally disabled students. Among these activities, activity I6, which is included in the in-school activities (F1) factor, is about collecting living and non-living things in nature. Prospective teachers may not have approved this activity, thinking that collecting living creatures in nature or interacting directly with these creatures could be dangerous for mentally disabled students. As a matter of fact, some activities (I8, I9, I10) that prospective teachers think are not most applicable for mentally disabled students are related to interaction with animals (F2). Animals are creatures that add enriching experiences to children's world. It is also known that animal-assisted therapies are frequently used in disabled rehabilitation. At this point, it is interesting that some prospective teachers have low acceptance of the applicability of the activities specified in the scale. Perhaps prospective teachers may not have approved of these activities because they were not in-school activities. However, considering out-of-school learning activities, these are also applicable today. It should also be noted that such activities can be carried out with the participation of all students within the framework of an activity planned by the teacher, outside of the free time activity (Yağlıkara, 2006). The results of a study conducted by Scruggs and Mastropieri (1994) showed that students with mild mental disabilities in applied science courses greatly

enjoyed science activities and significantly benefited from the opportunity to directly interact with scientific materials.

In the study, the highest mean value among activities related to biology and nature was found in interaction with plants (F4). The fact that plants do not actively move from one place to another like animals or that they can be more harmless when in direct contact may have caused teachers to prefer F4 as the most applicable activities. On the other hand, activities involving plant cultivation, planting, growing, and observing plants are among the activities that students participate in with interest (Yağlıkara, 2006). Students learn to recognize the properties of the soil while growing plants, to recognize and use the tools and equipment used in growing plants, to cooperate with their friends, and to be sensitive to the needs of plants, which are living things. Since students have the opportunity to observe and learn by doing such activities, it can be said that these activities are effective in creating environmental awareness and awareness (Dere & Ömeroğlu, 2001). In the study conducted by Er Nas et al. (2018), when the science and nature activities carried out with mentally disabled students were examined, it was determined that almost all of the special education teachers frequently included plant growing and germination experiments. Students can better comprehend situations that they can relate to their daily lives (Ültay & Çalık, 2012). In this regard, it can be stated that the reason why special education teachers give more space to plant growing and germination experiments is due to the fact that students with learning disabilities frequently encounter these activities in their daily lives.

When the findings of the study were evaluated in general, the majority of prospective teachers accepted that biology and nature-related activities were useful for mentally disabled students and applicable in learning environments. This can be attributed to the fact that the activities in question are practical. According to Gerston et al. (2000), in an applied approach, full learning can occur when knowledge is concretized for the student and the entire activity process is experienced and observed by the student. At this point, implementing these activities in classes with mentally disabled students can provide effective teaching. Despite these positive results, the study has some limitations. Therefore, the following recommendations are offered for future research:

- According to the prospective teachers in the study, biology and nature-related activities can develop positive attitudes in mentally disabled students. For this reason, both science and biology teachers teaching in inclusive classrooms and special education teachers should frequently include such activities in their learning environments.
- The contribution of students' cognitive, affective, and social development can be investigated by carrying out biology and nature-related ac-

tivities in learning environments where mentally disabled students are present.

- This study was limited to a total of 258 prospective teachers. For further studies, similar studies can be conducted with science or biology teachers and special education teachers.

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Received: January 15, 2024

Revised: January 22, 2024

Accepted: February 08, 2024