A Problem in Higher Education: Academic Dishonesty Tendency

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Abstract

This study examines the academic dishonesty tendencies, created metaphors and opinions on the "ethics" and "science and research ethics" and "opinions on the taken course" of prospective teachers who took the science and research ethics course. Embedded mixed design was preferred. Academic dishonesty tendency scale, semi-structured interview form and metaphor form were used as data collection tools. With the two-stage clustering performed, the average scores of the academic dishonesty tendency scale were divided into three clusters. It was found that the majority of prospective teachers have a low level of academic dishonesty tendency. According to the results obtained from semi-structured interviews, teacher candidates have expressed their views on the concept of "ethics" under the categories of instructor, student, and administrator. Their views on the concept of "science and research ethics" have been explained under the categories of determination of the subject, conducting studies, and publication of studies. It has been revealed that the course on science and research ethics contributes to the educational processes, personal development, and professional development of teacher candidates. Different metaphors were developed for the concepts of ethics, and science and research ethics. In addition, the metaphors developed regarding the concept of ethics were generally related to guiding and mentoring. The metaphors developed regarding the concept of science and research ethics are related to the things to be considered in a scientific study process, the way to be followed in scientific studies, and the importance of ethics in scientific studies.

Keywords: Ethics, research and science ethics, academic dishonesty, higher education

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Introduction

Educational institutions aim to develop students academically and acquire a profession, as well as, ethically helping individuals realize their potential as an important member of society (Strike & Soltis, 2009). They take responsibility for future generations to adopt ethical values and receive a qualified education (Haynes, 2002). Educational institutions support and strengthen ethical values in various ways, such as instilling awareness of ethical values in students, setting an example by having educators who embrace ethical values, offering ethics courses and programs, providing guidance on how to apply ethical values in real-life situations, facilitating discussions on ethical topics, and enhancing the skills to analyze and criticize ethical issues. By doing so, future generations can contribute to the construction of a more ethical society by embracing ethical values.

Through education, individuals are taught necessary and desired behaviors. However, sometimes unethical behaviors may occur during the process. Academic dishonesty behaviors are the most observed of these unethical behaviors (Lanier, 2006). Academic dishonesty affects the degree to which educational institutions, and individuals achieve the goals they set, and the individual's future behavior (Harding et al., 2004). Academic dishonesty is a serious problem with negative consequences for individuals, institutions and society around the world (Anderman & Murdock, 2007; Nucci & Turiel, 2009). It threatens scientific integrity, creates inequality and injustice, undermines trust in educational environments, hinders quality learning, and damages societal values. Educational institutions and the academic community should actively work to prevent this problem and promote ethical values.

Academic Dishonesty

Academic dishonesty is deliberately engaging in prohibited behavior in order to gain an unfair advantage in an academic context (Zhao et al., 2021). Academic dishonesty is simultaneously a moral and practical issue (Cuadrado et al., 2019). Kibler et al. (1988) defined academic dishonesty as students' use of a work that does not belong to them, or assistance received or given by students in an academic study without permission.

The concept of academic dishonesty includes behaviors such as students cheating in the exam, exchanging exam papers with each other during the exam, obtaining questions in advance in an inappropriate way, not following the exam rules, plagiarizing homework and theses, and using others' work without permission (Aluede et al., 2006; Kıral & Saracaloğlu, 2018). In addition, behaviors such as changing research results and copying other people's projects and assignments are within the scope of academic dishonesty (Murdock & Anderman, 2006). Other academically dishonest behaviors include using information on the internet without specifying the source, copying and duplicating information from different sources without permission (Olivia-Dumitrina et al., 2019), and having someone else do the thesis or homework (Désiron & Petko, 2022).

Studies have shown that although many students describe academic dishonesty as unethical behavior, they exhibit it at a certain point in their student life or regularly (Stephens, 2017). Academic dishonesty is a serious problem that cannot be solved at all levels of education, including higher education, worldwide (Hadjar, 2017; Ives et al., 2017). Students in higher education exhibit academic dishonesty with increasing prevalence. According to the results of the research conducted by McCabe et al. (2012), 68% of undergraduate students and 43% of graduate students admit that they cheat in written or test exams. These figures show that academic dishonesty is a major problem and violates academic norms.

There have been many studies on the causes of academic dishonesty. The main reason why students commit academic dishonesty is their desire to get higher grades and their feeling of being under pressure in this regard (Stanculescu, 2013). Ercegovac and Richardson (2004) summarized the causes of academic dishonesty as social factors and individual differences.

Research shows that social factors, achievement motivation, intrinsic and extrinsic motivation, external pressure to achieve high levels of achievement, faculty attitudes towards academic dishonesty, and institutional policies can affect academic dishonesty (Nathanson et al., 2006; Yang et al., 2013). Individual factors affecting academic dishonesty include the individual's desire for social recognition, desire to achieve high grades, desire for further development in their careers, time constraints, or unawareness of the scope of plagiarism (McCabe et al., 2006; Stephens & Nicholson, 2008).

Elective Courses in Undergraduate Teacher Training Programs

Ethics is a concept that needs to be adopted and taught. In order to prevent unethical behavior, individuals need to acquire a sense of scientific research discipline. For this purpose, the importance of education provided during the student years is significant. These educational efforts should be designed to prevent students' tendencies toward academic dishonesty and assist them in embracing academic integrity. Including elective courses in teacher training undergraduate programs is an important step toward achieving this goal. Through elective courses, teacher candidates can gain an understanding of ethical values, recognize unethical behaviors, and learn how to cope with such behaviors. The inclusion of such elective courses in teacher training programs supports future teachers in possessing ethical values and enables them to transmit these values to their students later on. In this way, a stronger foundation can be established to reduce unethical behaviors in society and develop a sense of academic honesty.

In teacher training undergraduate programs, there are elective courses as well as compulsory courses in field knowledge, general culture, and professional knowledge. With the update made by the Higher Education Institution of Turkey in 2018, the limited number of elective courses in the teacher training undergraduate programs was increased, and the elective courses were included in the programs at a rate of 25% to comply with the Bologna process (YÖK, 2018). Elective courses vary in three different categories: general knowledge, professional knowledge, and subject-specific knowledge. The course on science and research ethics, which falls under the category of general knowledge elective courses, aims to equip graduates with the ability to discern scientific knowledge and behave ethically throughout all stages of the research process. The inclusion of this course in teacher training programs demonstrates that higher education institutions aim to ensure that their graduates act in accordance with ethical values in their educational processes and professional careers.

The inclusion of a course on science and research ethics in teacher training programs can make significant contributions to individuals. Through this course, teacher candidates can enhance their research skills while adhering to ethical principles. Additionally, the course teaches students how to access scientific knowledge, utilize credible sources, and prevent scientific misconduct. In this way, teacher candidates will be able to behave in line with ethical values in their educational processes after graduation and successfully instill these values in their students.

Importance of Research

The literature on academic dishonesty includes studies on various topics, such as, students' academic dishonesty tendency levels (Eminoğlu Özmercan et al., 2022; Lupton & Chapman, 2002), predictors and effects of academic dishonesty (Anderman & Murdock, 2007; Błachnio & Weremko, 2012), the relation between fear of negative evaluation and academic dishonesty tendencies (Bozdağ, 2021), the relation between cheating attitudes and academic dishonesty tendencies (Taşgın et al., 2019), the relation between academic dishonesty and online learning environments (Blau & Eshet-Alkalai, 2017; Sidi et al., 2019), academic dishonesty behaviors in traditional and online environments (Black et al., 2008; Stephens et al., 2007), students' cheating tendencies (Stanculescu, 2013), and the relationship between students' self-control levels and academic dishonesty (Karim & Ghavam, 2011). In addition to these studies, studies have also been conducted in different countries to determine the level of academic dishonesty at different levels of education (Iyer & Eastman, 2006; Lin & Wen, 2007). In addition to these efforts, it has become necessary to thoroughly examine the opinions of teacher candidates regarding the course on science and research ethics, their metaphorical perceptions and views on the concepts of "ethics", and "science and research ethics" in

order to understand their tendencies towards academic dishonesty and develop more effective educational strategies in this regard. The education provided to combat academic misconduct, which has negative impacts on the educational process, and to ensure that students embrace academic integrity values, holds great importance. In these educational efforts, opportunities should be provided for teacher candidates to understand ethical values, recognize unethical behaviors, and learn how to cope with such behaviors. Within the scope of this study, it is believed that conducting a detailed examination of the tendencies of teacher candidates who take the course on science and research ethics in higher education institutions where academic misconduct behaviors are frequently observed would contribute to the field.

Purpose of the research

This study aims to examine the academic dishonesty tendencies, metaphorical perceptions, and opinions on the concepts of "ethics" and "science and research ethics" and "opinions on course taken" of prospective teachers, who took the science and research ethics course. Answers to the following questions were sought within this study:

1. What are the results of the two-stage clustering analysis of the mean scores of the academic dishonesty tendency scale?
2. What are the opinions of the prospective teachers about the science and research ethics course?
3. What are the opinions of prospective teachers on the concept of ethics?
4. What are the opinions of prospective teachers on the concept of science and research ethics?
5. What are the metaphors of prospective teachers regarding the concept of ethics?
6. What are the metaphors of prospective teachers regarding the concept of science and research ethics?

Method

Pattern of the Research

This study utilized an embedded mixed methods design within the realm of mixed methods research. Mixed methods research refers to the use of both quantitative data collection and analysis methods and qualitative data collection and analysis methods in a research process. The choice of a mixed methods design is based on the fact that it draws on both qualitative and quantitative research, thereby minimizing the limitations of each approach. In the embedded mixed design, the researcher should provide qualitative support into the quantitative design or quantitative support into a qualitative design. The supporting abutment used in the embedded pattern should strengthen the whole design

from different aspects (Creswell & Plano-Clark, 2007). We used clustering in the quantitative part of this study. Cluster analysis or clustering involves finding similarities between data according to the characteristics of the data and grouping similar data objects into homogeneous and discrete groups. In other words, it is the process of grouping similar objects in the same cluster and dissimilar ones in a different cluster (Han et al., 2012). We used phenomenology in the qualitative part of the study. In phenomenology studies, the participants' feelings, perceptions, and thoughts and how they structured them in their minds are investigated (van Manen, 2016).

Research Group

Study group was determined with convenience sampling method. The study group consists of prospective teachers studying at the education faculty of a state university in the 2021-2022 academic year and taking the "Science and Research Ethics" course. Information about the study group is given in Table 1.

Table 1
Information about the study group

Gender	N	%
Female	14	48
Male	15	52
Total	29	100

Data Collection Tools and Analysis of Data

Academic Dishonesty Tendency Scale

We used "academic dishonesty tendency scale" to determine the difference between prospective teachers' academic dishonesty tendencies before and after the science and research ethics course. The academic dishonesty scale used in the research was developed by Eminoğlu and Nartgün (2009). The scale consists of 22 items and consists of four dimensions, namely "the tendency to cheat", "the tendency to fraud in studies such as homework and projects", "the tendency to fraud in research and reporting" and "the tendency to fraudulent attributions". As a result of the item analysis performed according to the item-scale correlation (r), all items were significant at the 0.01 level. Examining the factors and the alpha reliability coefficients of the whole scale, the internal consistency reliability coefficient for the first factor was $\alpha=0.71$, $\alpha=0.821$ for the second factor, $\alpha=0.785$ for the third factor and $\alpha=0.776$ for the fourth factor. The reliability coefficient of the whole scale is $\alpha=0.90$ (Eminoğlu & Nartgün, 2009).

We applied a two-stage clustering to the mean scores obtained from the academic dishonesty tendency scale. There are different clustering algorithms in the literature. The selection of the clustering algorithm depends on the structure, purpose, and application of the data to be analyzed (Rodriguez et al., 2019). Clustering algorithms commonly used in the literature are grouped under two headings, hierarchical and non-hierarchical clustering (Xu & Tian, 2015). The two-stage clustering method used in the study is one of the non-hierarchical clustering techniques. Two-stage clustering aims to divide the data set into homogeneous subgroups. The two-stage clustering can process categorical and continuous variables, determine the most appropriate number of clusters automatically or optionally, and remove observations that do not comply with the created clusters.

Semi-Structured Interview Form

We developed a semi-structured interview form to reveal the views of the participants on the concepts of "ethics", "science and research ethics" and the "science and research ethics" course. Expert opinions were used during the development of the form and finalized in line with expert opinions. Interview forms were applied to the participants in the study group.

Content analysis was used in the analysis of the data obtained. Content analysis is generally used to systematize and analyze data obtained using qualitative data collection tools (Fraenkel et al., 2012). The main purpose of content analysis is to reach codes, themes, and categories that can explain the relationships between concepts based on the data (Marshall et al., 2021).

In order to ensure the consistency of the results obtained after the analysis of the qualitative data, it is stated that the coding can be reviewed by the same coder 10-14 days later (Flick, 2014). The obtained data were reanalyzed 10 days later by the same researcher. The reliability coefficient between the two encodings was calculated using Miles and Huberman's (1994) formula (agreement/consensus+disagreement). We found 90% consistency between codings. We also ensured credibility by making direct quotations from the interview data where necessary (Creswell & Creswell, 2017). The quotations made by the prospective teachers participating in the study were coded as "S+Number" in order not to reveal their identity within the framework of research ethics.

Metaphor Form

We prepared a metaphor form to examine the metaphors created by the participants towards the concepts of "ethics" and "science and research ethics". Metaphors, which are a way of thinking (Forceville, 2002), are used to explain the properties of events or objects (Patton, 2014). Metaphors can be subjective indicators related to the problem being investigated, as well as a variety of low-level concepts and themes obtained from

the data (Shenton, 2004). The process of analyzing and interpreting the metaphors generated by teacher candidates was conducted following the stages of (1) identifying metaphors, (2) classifying metaphors, (3) developing categories, and (4) ensuring validity and reliability.

Findings

In this section, the findings obtained as a result of the analysis of the research data are presented.

What are the results of the two-stage clustering analysis of the mean scores of the academic dishonesty tendency scale?

The results of the two-stage clustering analysis of the mean scores of the academic dishonesty scale are presented in Figure 1 and Table 2.
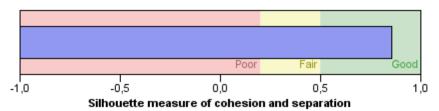

Figure 1. *Cluster Quality*

Cluster quality results are shown in Figure 1. Silhouette measure is used to assess the cluster quality. The silhouette value is a criterion that uses the similarity of an object to its own cluster (cohesion) relative to other clusters (separation). It is calculated by averaging, (B - A) / max (A , B), for every record, where A is the distance between record and its cluster center and B is the distance between record and the nearest cluster center that is different from A. Cluster interpretation metrics of poor, fair and good are based on the work of Kaufman and Rousseeuw (1990). These interpretations are translated as good-strong evidence, fair-weak evidence and poor -no significant evidence with respect to cluster structure. We can say that the cluster structures have a strong evidence and fall under the category of 'good', according to performed clustering scheme.

Table 2
Two-Step Clustering Results of Prospective Teachers' Average Scores on the Academic Dishonesty Tendency Scale

Clusters	N	x̄	σ	%
1st Cluster (Low level)	20	1.76	0.21	69.0
2nd Clusters (Medium level)	4	3.05	0.05	13.8
3rd Cluster (High level)	5	3.65	0.09	17.2

When Table 2 is examined, the mean scores of 20 (69%) prospective teachers in the first cluster (high level) is seen as 1.76, the mean scores of 4 (13.8%) prospective teachers in the second cluster (medium level) is seen as 3.05, and the average scores of 5 prospective teachers in the third cluster (high level) is seen as the prospective teacher (17.2%) is 3.65. Accordingly, it can be said that 69% of the prospective teachers have a low level of academic dishonesty.

What are the opinions of the prospective teachers about the science and research ethics course?

The opinions of the participants about the science and research ethics course were examined and the findings from the interview forms are presented in Table 3.

Table 3
Opinions of prospective teachers about science and research ethics course

Theme	Category	Code	f
Science and research ethics course	Contribution to the educational process	Raising awareness about the ethical principles to be considered while preparing homework reports	21
		Raising awareness about the ethical principles to be considered while preparing homework reports	19
		Gaining research skills	19
	Contribution to personal development	Adopting ethical and moral principles	22
		Build a sense of responsibility	18
		Developing empathy skills	16
	Contribution to professional development	Raising awareness of teachers' responsibilities to students	20
		Raising awareness of teachers' responsibilities towards the teaching profession	19
		Raising awareness of teachers' responsibilities towards their institutions	16

When Table 3 is examined, it is seen that the opinions of the prospective teachers about the science and research ethics course are grouped under 3 different categories. Examples of prospective teachers' opinions on the code with the highest frequency in each category are as follows:

S7: Before I took the science and research ethics course, I used to copy and paste from internet sources in the assignments or presentations I made. This course taught me that I should question whether the sources I use in my homework are reliable or not, that I cannot copy and paste directly, and that I should cite the sources I use *(Contribution to the educational process).*

S12: This course did not teach me only the ethical rules to be considered while doing academic or scientific studies. I think it also contributes to my personal development. I can say that it helped me to adopt ethical and moral principles more *(Contribution to personal development).*

S4: When I became a teacher through the science and research ethics course, I learned in detail what my responsibilities were towards my students and my profession. This course contributed to both my academic and professional development *(Contribution to professional development)*.

What are the opinions of prospective teachers on the concept of ethics?

The opinions of the participants on the concept of ethics were examined and the findings from the interview forms are presented in Table 4.

Table 4

Opinions of prospective teachers on the concept of ethics

Theme	Category	Code	f
Concept of ethics	Instructor	Should be fair in the assessment and evaluation process.	18
		Must follow developments in the field	17
		Should conduct education process efficiently	17
		Must be sensitive to students' problems	14
		Should avoid behaviors that may negatively affect students	14
		Must respect individual differences	12
		Must be reliable	12
		Must be a role model to students	10
		Must guide students	10
		Must be aware of his/her responsibilities towards society	8
	Student	Should fulfill the responsibilities given in the educational process in a timely manner	17
		Should not plagiarize in works such as homework, projects	15
		Shouldn't cheat in exams	15
		Must respect different ideas	13
		Must respect his/her teachers	13
		Must be honest	12
		Should be aware of his/her responsibilities towards his family	10
		Be aware of responsibilities towards society	10
		Be mindful of his/her behavior towards their peers	9
		Must not damage public property	9
	Administrator	Must look after the interests of the institution	16
		Mustn't be mobbing employees	15
		Should not use institutions' resources for his/her own private business	15
		Must be honest	11
		Must respect the rights of staff	11
		Should not discriminate between employees	9
		Be aware of his/her responsibilities towards students.	8

When Table 4 is examined, the opinions of prospective teachers on the concept of ethics are grouped under 3 different categories. Examples of prospective teachers' opinions on the code with the highest frequency in each category are as follows:

S1: Instructors should act in a way that will benefit the students in all educational activities. Instructors should follow the developments in their fields and strive to ensure that students benefit from the education process at the maximum level. They should avoid behaviors that will negatively affect their students. At the same time, they should act fairly in the assessment and evaluation processes *(Instructor)*.

S9: Students should not plagiarize in their homework, presentations and project work. Unfortunately, sometimes our aim is just to pass the course and we can do our work without paying attention to ethical principles. In addition, there should be no cheating in the exams and everyone should be rewarded for their hard work. Another important issue is that students are aware of their responsibilities and fulfill their responsibilities on time *(Student)*.

S5: A good administrator must first protect the interests of his institution. As an administrator, he should be at an equal distance from all employees and should not discriminate among employees. Paying attention to the satisfaction of the employees will also enable them to work more selflessly *(Administrator)*.

What are the views of prospective teachers on the concept of science and research ethics?

The opinions of the participants on the concept of science and research ethics were examined and the findings from the interview forms are presented in Table 5.

Table 5
Opinions of prospective teachers on the concept of science and research ethics

Theme	Category	Code	f
	Determination of the subject	Should contribute to the literature	21
		The literature should be scanned in detail.	20
		Original topics must be found	18
		Other people's ideas should not be used without permission	16
		Should benefit society	12
Science and research ethics	Conducting studies	Ethics committee permissions should be obtained	23
		Application permissions must be obtained	22
		Should avoid plagiarism	22
		Research data shouldn't be falsified	19
		Valid and reliable sources should be used	17
		Research method should be applied correctly	15
		Research participants should be informed about the research	14
		Practices that will harm the participants should be avoided	12
	Publication of studies	The work should not be published in pieces in such a way that its integrity will be disrupted	17
		The work should not be published in more than one place	14
		Those who do not contribute to the study should not be registered as authors.	14

When Table 5 is examined, the opinions of prospective teachers on the concept of ethics are grouped under 3 different categories. Examples of prospective teachers' opinions on the code with the highest frequency in each category are as follows:

S3: Before conducting an academic study, national and international literature should be scanned in detail. Because doing a study that has been done many times before will not contribute to the literature. What should be done is to determine the original research topics that contribute to the literature *(Determination of the subject)*.

S11: Ethics committee and application permissions should be obtained. A study conducted without obtaining the necessary permissions contains ethical violations. In addition, it is necessary not to benefit from the work of others without attribution. It is necessary to cite correctly. By not plagiarizing, we will not ignore the efforts of others *(Conducting studies)*.

S6: In order to increase the number of publications, researchers should not divide their studies into pieces in a way that would disrupt their integrity. It is necessary to publish the work as a whole in a way that does not disturb the integrity of meaning *(Publication of studies)*.

What are the metaphors of prospective teachers regarding the concept of ethics?

The metaphors that the participants created for the concept of ethics were examined and the findings from the metaphor forms are presented in Table 6.

Table 6
The Metaphors Formed by Prospective Teachers for the Concept of Ethics

Category	Created metaphor	f
Ethics as a guide	Teacher	5
	Roadmap	5
	Compass	4
	Mother	3
	Lighthouse	1
Ethics as a limiter	Traffic light	2
	Orbit	1
	Hopscotch game	1
Ethics as a helper of reaching the truth	Calculator	2
Ethics as a source of life	Water	1
	Sun	1
	Oxygen	1
	Air	1

When Table 6 is examined, it is seen that prospective teachers have developed a total of 13 types of metaphors under 4 categories for the concept of "ethics". The metaphors that prospective teachers mentioned the most regarding the concept of ethics are, "teacher", "road map", "compass", "mother", "traffic light" and "calculator". Other metaphors developed were, "lighthouse", "orbit", "hopscotch game", "water", "sun", "oxygen" and "air". All of the developed metaphors are concrete. In addition, it is seen that metaphors are related to guidance and mentoring. Examples of metaphors created for each category and the categories they belong to are as follows:

S2: Ethics is like a roadmap because it shows people the path they should take *(Ethics as a guide)*.

S6: Ethics is like a traffic light, because it shows where we should limit our behavior and where we can act freely *(Ethics as a limiter)*.

S8: Ethics is like a calculator, because relying on it leads to accurate results *(Ethics as a helper of reaching the truth)*.

S12: Ethics is like oxygen, because it is essential to life *(Ethics as a source of life).*

What are the metaphors of prospective teachers regarding the concept of science and research ethics?

The metaphors that the participants created for the concept of science and research ethics were examined and the findings from the metaphor forms are presented in Table 7.

Table 7
The Metaphors Formed by Prospective Teachers for the Concept of Science and Research Ethics

Category	Created metaphor	f
Science and research ethics as a guide	Guide	6
	Teacher	5
	Compass	5
	Traffic light	4
	Book	2
	Light	1
	Flashlight	1
Science and research ethics associated with values	Conscience	1
	Turtle shell	1
Science and research ethics as a supporting element	Building foundation	1
Science and research ethics as a regulator	Prosecutor	1
	Sieve	1

When Table 7 is examined, it is seen that prospective teachers have developed a total of 12 types of metaphors under 4 categories for the concept of "science and research ethics". The metaphors that students stated most about the concept of science and research ethics are, "guide", "teacher", "compass", "traffic light" and "book". Other metaphors developed are "light", "flashlight", "conscience", "turtle shell", "building foundation", "prosecutor" and "sieve". Only one of the developed metaphors is abstract (conscience), the others are concrete. In addition, it is seen that metaphors are related to the way to be followed and the things to be considered while conducting a scientific study. Examples of metaphors created for each category and the categories they belong to are as follows:

S1: Science and research ethics are like teachers, because they show us what we should do and what we should pay attention to when doing research *(Science and research ethics as a guide)*.

S4: Science and research ethics are like conscience, because they require respect for the efforts of others *(Science and research ethics associated with values)*.

S7: Science and research ethics are like the foundation of a building, because research that does not comply with ethical rules is doomed to disappear like a rotten building *(Science and research ethics as a supporting element)*.

S13: Science and research ethics are like prosecutors, because they ensure the reliability of scientific studies *(Science and research ethics as a regulator)*.

Result and Discussion

Higher education is the highest level of education at which people gain their expertise in the pre-service process. In addition to the high-quality undergraduate education they receive, the ethical attitudes and behaviors they gain in this education process are also effective in qualifying individuals for graduation from higher education institutions. With the innovations and revisions made in the curriculum of higher education programs, the concept of ethics is trying to be gained by individuals with different dimensions. Especially within the scope of the science and research ethics course, attention is drawn to the importance of these concepts, and activities are given for students to adopt these concepts. In this way, academic dishonesty tendencies are tried to be reduced.

We aim to examine the academic dishonesty tendencies of prospective teachers who took the science and research ethics course, their opinions on the science and research ethics course, their created metaphors, and opinions on the concepts of "ethics" and "science and research ethics".

As a result of the two-stage clustering, the dependent variable "academic dishonesty tendency scale average scores" was categorically divided into three clusters. The cluster with the largest arithmetic mean was considered as high level, the cluster with the medium arithmetic mean was considered as medium level and the cluster with the smallest arithmetic mean was considered as low level. We found that the majority of prospective teachers had a low level of academic dishonesty tendency. Considering the dimensions that make up the academic dishonesty tendency scale used in the study, it is possible to say that prospective teachers' dishonesty tendencies in cheating and homework-projects are low and they do not show dishonesty tendencies towards research conduction, citation and reporting processes. This result may be related to the application of the scale at the end of the term. Students took science and research ethics course throughout the semester. Therefore, the fact that they have completed their lack of knowledge on the subject may have reduced their tendency to academic dishonesty. In some studies, it is stated that the lack of knowledge is effective on students' academic dishonesty tendencies (Burgason et al., 2019; Keçeci et al., 2011). Chow et al. (2021) concludes that university students may engage in academic dishonesty due to reasons such as the tendency to use internet data without specifying the source, not having sufficient knowledge about plagiarism, and not knowing the rules about bibliography and citation. Therefore, we think that taking the science and research ethics course is effective in eliminating their lack of knowledge on the subject and reducing their tendency to academic dishonesty.

These results also support the qualitative findings of the study. We asked prospective teachers about their opinions on the science and research ethics course. Their opinions on the science and research ethics course were grouped under the categories of "contribution to the educational process", "contribution to personal development" and "contribution to professional development". Under the category of contribution to the educational process the codes of "raising awareness about the ethical principles to be considered while preparing homework reports", "raising awareness about the ethical principles to be considered while preparing homework reports", and "gaining research skills" are included. Under the category of contribution to personal development, "adopting ethical and moral principles", "build a sense of responsibility", and "developing empathy skills" codes are included. Under the category of contribution to professional development, "raising awareness of teachers' responsibilities to students", "raising awareness of teachers' responsibilities towards the teaching profession", and "raising awareness of teachers' responsibilities towards their institutions" codes are included.

Students generally benefit from the internet and books while doing research or homework on a subject, and they mostly do not cite references in their studies (Rezeki, 2018). Therefore, we can say that students who take the science and research ethics course will gain awareness of behaviors in accordance with ethical principles, which will reduce unethical behaviors. We also think that acting in accordance with ethical principles in the education process will ensure that individuals comply with ethical principles in their later social and professional lives. Indeed, according to the findings obtained from the research, we can say that the participants gained an awareness that they should base their decisions on honesty in personal and professional fields. The science and research ethics course made the participants think that ethical principles should not be limited to academic and scientific fields but should be reflected in life in general.

Each of the participants developed a different metaphor for the concept of ethics. Developed metaphors are gathered under categories of "ethics as a guide", "ethics as a limiter", "ethics as a helper of reaching the truth", and "ethics as a source of life". Prospective teachers' created metaphors for the concept of ethics were "teacher", "road map", "compass", "mother", "traffic light", "calculator", "lighthouse", "orbit", "hopscotch game", "water", "sun", "oxygen" and "air". All of the developed metaphors were concrete concepts. Evaluating the reasons for the creation of these metaphors, it is seen that "obtained correct results, the rules to be followed, and the ways to be followed and the importance of ethics" are emphasized (Table 6). Similarly, explanations of ethics such as to question human behaviors as good-bad, right-wrong and to make an assessment accordingly (Haidt, 2013), rules, principles and standards that guide the examination of individuals' behavior and attitudes as right or wrong (Aydin, 2016), and morality of human behavior (Edwards & Mauthner, 2012) are included. Prospective teachers' opinions were also consulted in order to analyze the perceptions of prospective teachers about the concept of ethics in detail within the study.

Prospective teachers' opinions on the concept of ethics were grouped under the categories of "educators", "students" and "administrators". The fact that prospective teachers' views on the concept of ethics are gathered under these categories shows that they explain the concept of ethics by associating them with the stakeholders of the education process.

In the instructor category, "should be fair in the assessment and evaluation process", "must follow developments in the field", "should conduct education process efficiently", "must be sensitive to students' problems", "should avoid behaviors that may negatively affect students", "must respect individual differences", "must be reliable", "must be a role model to students", "must guide students", and "must be aware of his/her responsibilities towards society" codes are included. Instructors play an important role in

raising future generations morally well and in getting a quality education (Haynes, 2002). Educators, who are in constant interaction with students in the education-teaching processes, become role models for students with their attitudes and behaviors. For this reason, instructors should be aware of these responsibilities and act in accordance with ethical principles. In the student category, "should fulfill the responsibilities given in the educational process in a timely manner", "should not plagiarize in works such as homework, projects", "shouldn't cheat in exams", "must respect different ideas", "must respect his/her teachers", "must be honest", "should be aware of his/her responsibilities towards his family", "be aware of responsibilities towards society", "be mindful of his/her behavior towards their peers", and "must not damage public property" codes are included. Students, on the other hand, are the group in which the desired behaviors are tried to be gained at the end of the education process. Therefore, adopting and implementing ethical principles is one of the most important outputs of the education process. In the administrator category, "must look after the interests of the institution", "mustn't be mobbing employees", "should not use institutions' resources for his/her own private business", "must be honest", "must respect the rights of staff", "should not discriminate between employees", and "be aware of his/her responsibilities towards students" codes are included. It is noteworthy that the administrator category is one of the categories in which the opinions of prospective teachers on the concept of ethics are grouped. This shows that prospective teachers think about the educator, student, and administrator, as related stakeholders of the education process. Instructors, researchers, students, and all members of the academic institution are expected to behave with justice, respect, honesty, trust, and responsibility and produce original works (Bretag, 2016; Lars, 2011)

Participants developed 12 different metaphors for the concept of science and research ethics (Table 7). Developed metaphors are grouped under categories of "science and research ethics as a guide", "science and research ethics associated with values", "science and research ethics as a supporting element", and "science and research ethics as a regulator". Metaphors that prospective teachers developed for the concept of science and research ethics were "guide", "teacher", "compass", "traffic light", "book", "light", "flashlight", "conscience", "turtle shell", "building foundation", "prosecutor" and "sieve". All of the metaphors developed are concrete concepts, except "conscience". Evaluating the reasons for the creation of these metaphors, it is seen that the importance of ethics in scientific studies is emphasized. Correspondingly, explanations of science and ethics, such as to provide a framework for the research on science and research ethics to reach its goals (Shrader-Frechette, 1994), to ensure research is designed realistically and accurately (Ersoy, 2015), and to determine the ethical principles and rules that must be followed at every stage of the scientific research process (Irzık & Erzan, 2008) are included. The opinions of prospective teachers were also sought in order to analyze their perceptions of the concepts of science and research ethics in detail.

From the point of view of scientific research, the concept of ethics is of great importance. Ethical behaviors should be included in all stages of scientific studies. In the study, prospective teachers' opinions on the concept of science and research ethics were grouped under the categories of "determination of the subject", "conducting studies" and "publication of the studies". In the category of determination of the subject, "should contribute to the literature", "the literature should be scanned in detail", "original topics must be found", "other people's ideas should not be used without permission", and "should benefit society" codes are included. In the category of conducting the studies, "ethics committee permissions should be obtained", "application permissions must be obtained", "should avoid plagiarism", "research data shouldn't be falsified", "valid and reliable sources should be used", "research method should be applied correctly", "research participants should be informed about the research", and "practices that will harm the participants should be avoided" codes are included. In the category of publication of studies, "the work should not be published in pieces in such a way that its integrity will be disrupted", "the work should not be published in more than one place", and "those who do not contribute to the study should not be registered as authors" codes are included. The resulting categories show that prospective teachers explain the concept of science and research ethics based on the scientific research process.

Ethics supports all purposes of scientific research, including knowledge, truth, and error avoidance. Research conducted in accordance with ethical principles and rules will increase confidence in the quality and integrity of the research. Ethics in scientific research enables researchers to fulfill their responsibilities towards society. Ethics is an indispensable element in healthy collaborations in scientific research processes (Haque et al., 2022). For scientists, scientific ethics consists of a scope that is generally divided into two categories. The first addresses method and process standards, the design of research efforts, data analysis, interpretation, and reporting of research efforts. The second addresses the use of human and animal subjects in research and the ethical implications of research findings. Ethical standards, together with these two approaches, help to guide scientific research (Bolton, 2002). Going beyond ethical principles and rules in scientific research will negatively affect people, society, institutions, science, researchers, students, and all relevant stakeholders. Therefore, it is very important to comply with ethical rules in scientific research.

Prospective teachers clearly stated that plagiarism should not be done in the category of "conducting the studies". Considering that science is a cumulative process, it is clear that benefiting from previous studies while conducting a scientific study is a natural requirement. However, while benefiting from different studies, it is necessary to respect them and comply with certain rules and scientific research ethics (Markham, 2007). Internalizing the concepts of science and research ethics will enable people to be

more attentive in their academic and scientific studies. In the absence of this understanding, ethically problematic behaviors will emerge in the academic studies or professional lives of individuals.

The science and research ethics course provides important contributions to the training of prospective teachers with an ethical understanding. The science and research ethics course given within the scope of elective courses significantly reduces the academic dishonesty tendencies of prospective teachers and contributes to their education processes, personal development, and professional development. The prospective teachers gained an awareness of the concepts of ethics, science ethics, and research ethics after the lesson. While explaining their opinions, prospective teachers tried to explain the concepts from different perspectives. The inclusion of such courses in education programs will contribute to the quality of education and the training of qualified individuals and teachers.

Recommendations

- The results of this study show that the academic dishonesty tendencies of the prospective teachers who took the science and research ethics course were low. Therefore, we recommend that prospective teachers should take the science and research ethics course.
- Considering the effect of the science and research ethics course on prospective teachers, we believe that the science and research ethics course should be given as a compulsory course rather than an elective.
- Assignments such as homework and projects made by students should be checked by the faculty members in accordance with the principles of academic honesty, and with the necessary feedback and corrections, students' awareness of academic honesty should be increased.
- It should be ensured that the education on science and research ethics is given not only at the undergraduate level but at all educational levels.
- Science and research ethics course is important in terms of reducing the tendency of students to academic dishonesty and enabling them to understand and adopt the concepts of ethics, science and research ethics in different aspects. The sensitivity of students can be increased with different programs organized within universities to increase ethical awareness at regular intervals.
- This study is limited to prospective teachers who took the science and research ethics course. In order to generalize the results, different studies can be done on larger samples.
- This study is limited to the content and applications of the science and research ethics course. We suggest letting the students experience the scientific research process as well as the course process and then examining their opinions.

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