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Full Length Research Paper

An evaluation of occupational ethical values of geography teacher candidates in Turkey

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Geographers can be influenced by the occupational ethical values in their cultures. In this research, the opinions of the geography teaching candidates were determined according to occupational ethical values at Marmara University, Faculty of Education, Department of Geography Teaching. Occupational ethical values identified are used to collect data by help of survey which ethical values are seen as important by geography teacher candidates. 126 geography teachers participated in the study. Findings obtained in the study and 18 ethical and 13 unethical values included in the survey were interpreted according to the results of their priority orders. The study revealed that the teachers' expectancy of ethical values, "justice" comes first as the unethical values order topped by "discrimination". The sub-outcomes that led to this conclusion of general outcome were presented in findings and discussion in the context of research aims.

Key words: Ethics, values, occupational ethical values, geography teacher candidate.

INTRODUCTION

Ethics is a word derived from the Greek word "ethos" and it deals with one's moral values personally and socially. Ethics and morality, which are the practice of ethics, are used together (Mengüşoğlu, 1965). This is because ethics consist of rules, while the essence and role of morality are the norms and values of social life, individual-society relationships, the needs of humans to live together and the aim and meaning of individual life. With ethical rules, individuals learn how to separate good from bad and right from wrong conducts. This means, people develop the consciousness of becoming individuals who form the society.

Value concepts have various definitions. Values are consolidated beliefs that end-state of existence

personally or specific behavioural patterns (Rokeach, 1973). Values are described by some researches related to culture inseparably by some researchers. Because culture is actually a combination of values and practices in the community (Geertz, 1973; Swidler, 1986), ethical education has been seen as an important increase in interest over the last decades (Melé, 2005; 97). Expectations of the individual and society stand out in the concept of values education. For this reason, it is important to acquire the younger generation whose values are seen as constructors of the future. Values need to be planned or programmed activities because they will not be automatically acquired or acquired later (Dilmaç and Ekşi, 2007).

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People try to use their learning background and educational knowledge as a tool to meet their needs and solve their problems. Education is affected by the social, cultural, political and economic conditions of the society where it is given. It contains national and global values. Individuals who shape their old or new behaviour develop a new behaviour, which is part of training. The process of education and training is a continuous activity; it started with the existence of humans. Educational process is planned by teachers in schools; therefore, teachers play an important role in education. Qualified and eligible teachers affect students positively. They make students who are the leaders of tomorrow qualify by inculcating in them the cultural values of the country in which they live. In this context, it is important that teachers with good cultural values lead the society.

School has a special role to play in the formation of national and democratic environment in society. It is one thing to know and another thing to have the ability to teach. For this reason, teaching is a profession that requires special education (Binbaşı, 2009). Teachers need to be well equipped with the educational environment and educators to deliver value education completely well. Teacher candidates who choose this profession should at least be well equipped as teachers, because they must have the values expected of tomorrow's teachers and have comprehensive knowledge of value education. In this sense, their ethical expectations must be high too.

Temperament, habit, character, is the plural form of morality that contains the spiritual principles and rules observed in interpersonal relations. The influence of morality and its sanction and compelling power are one's conscience. People see their feelings, thoughts, behaviours, attitudes and actions as right or wrong, good or bad and positive or negative by listening to the voice of their conscience. Thus, people ensure balance, order, control and harmony between themselves and others (Köknel, 1996).

Moral values may change from one society to another. Therefore, every society wants to know and applies its own values and ethical values. This can be obtained through education. Education is the act of introducing and conveying scientific, social and cultural facts to society from the earliest ages. Teachers carry out this systematically and legally. Teachers are the legal representatives and practitioners of education. That is why it is important for candidate teachers to have ethical values.

Occupational ethics and ethical values in geography teaching

Occupational ethics is a set of principles that regulate people's conducts in their profession (Şentürk, 2009).

Occupational ethics is the guiding principle for professionals; it explains the basic rules guiding any profession. Therefore, occupational ethics foresees that a profession should be carried out by competent people in accordance with the profession's needs, merits and dignity (MEB, 2016). Fulfilling the profession ethics is a question of attitude as to whether it conforms to those ethical rules or not. By observing the occupational ethics, the interests of the profession are protected and the requests of the service members and recipients can be fulfilled appropriately.

In terms of occupational ethics, whether a conduct is ethical or not is limited by that profession's basic ethical values; examples: the correctness of one's behaviour, its fairness and the public approval of this behaviour or your acceptance of the mentioned behaviour done to you. 'Is this my behaviour legal? If I was not in this profession, could I do it? Are these extra benefits given in any profession proper, like getting sick report when one is not sick, leaving classes constantly due to personal affairs, reflecting one's problems happening at home or social environment to one's students? Can one do these conducts in private sector? These unethical conducts such as discrimination, cronyism, bribery, psychological pressure, neglect, exploitation, selfishness, violence, insult, malpractice, failure to do business, request for donation and help, embezzlement and gossip can be assessed based on the ethical occupational values.

It is the duty of teachers to provide education and training service in a professional manner and it is the right of the person doing it to make a living out of it. So, teaching is the mission of an individual, who chooses this profession, aims to teach and makes a living from it. Teacher candidates acquire systematic academic knowledge and skills in relevant departments of faculties and colleges to learn how to teach. Teacher candidates are required to obtain university qualifications by receiving 15 to 20% of the total courses in world knowledge, 50 to 60% in field information and 25 to 30% in professional teaching knowledge. He/she must also obtain ethical values determined legally and socially.

It is a fact that teachers are important in the deterioration or amelioration of the ethical structure of the society in which they live. As training leaders, teachers must be a model to the society with their own conducts. They need to be aware of the necessity of setting standards for the society. Otherwise, wrong doing would become a normal conduct for them and this causes trouble for both individuals and society (Pelit and Güçer, 2006). This is because teachers are teachers of all other professions. This means that they are always respected by all segments and professions of the society. Teaching in society is accepted as a sacred duty with guiding educative role. The sacredness of the occupational ethics forces and helps teachers to be qualified and sensible to ethical values.

The professional principles of teachers consist of professionalism, respect, honesty, justice, responsibility, and tolerance (Aydın, 2015b). The responsibilities of teachers are not only restricted to themselves; they are also responsible for students and their families, colleagues, the institution where they work and the society in the wider frame. In this respect, teaching ethics has more responsibilities and liabilities than other professions. To standardize and make clear these responsibilities and liabilities, Ministry of National Education issued a circular under the heading Occupational Ethics Principles for Educators in 24.06.2015. Occupational ethics are gathered under the following headings in this circular: relations with the students, relations concerning occupational ethics, relations between educators and students' parents, school administrations and the society, school administrators and teachers and students and parents (MEB, 2015). Standards to be followed include: teachers should focus on the character development of students and have a broad world knowledge. Also, they must be professionally sufficient, be able to use self-renewing techniques, use appropriate teaching techniques, be able to use the developing teaching tools in education, and be able to identify the needs of students correctly. They must establish right relationship among the school, family and community, have a good understanding of the relationship between the philosophy of education of the country and its teaching and be able to put it into practice and be able to use the skills and abilities to the fullest (Örenel, 2005).

The implications of the major changes in geographical thought in discipline, has an influence on geography education. Just as in every discipline, geography can influence citizenship education by contributing to the education of values. Geography teachers' interest in ethical values' education has been a very important part of the history of geography teaching since the 1970s (Slater, 2001). The essence of the geography is embedded with values related to what are significant in terms of perspective and content. Some values are based on ideological and conceptual frameworks that give more priority than others such as scientific objectivity and social justice. Some educational concepts used to teach geography can be values under another name. Values can be based on a variety of educational perspectives, including liberal and constructivist paradigms. General educational objectives are always part of our specific geographic training goals (Slater, 1998).

This study is mainly interested in value-loaded content and analysis. This is obvious if someone thinks about ideological frameworks for geography. All geography is about values and preferences related to means and purposes. However, geography has many issues that give rise to the need for a discussion of rightness and

wrongness in its field (Slater, 2001). Katılmış and Balcı (2017), aimed to determine opinions of the geography teachers towards values education. The findings of this study have shown that the participants emphasize that the teacher should be a role model within the classroom activities. Morgan (2000) notes that in recent years, geographers have pointed out the role of geography in the citizenship, within which lie concepts of identity, inclusion and exclusion.

Geography provides other attitudes and values of geography as well as teaching ethics. These attitudes and values are included in the Geography Lesson Curriculum (CDÖP in original), which brings students' responsibilities in terms of having geographical awareness about our country and the world. These include the following:

- (1) Using space correctly and effectively by understanding the factors of nature and human,
- (2) Thinking about the future by paying attention to the quality of the environment,
- (3) Raising individuals who are faithful to national values and protect their country,
- (4) Having a sense of responsibility of protecting the world and humanity,
- (5) Understanding the ecological, economic, social and political relations formed by human and nature relations; being aware of the interactions of people, places and environments around the world,
- (6) Providing better opportunities for future generations and ensuring that they are raised as conscious citizens.

Attitudes and values are significant elements of the CDÖP. Attitude is the tendency of an individual, not the behaviour that can be observed; it is a condition that controls one's behaviour. Value is the common thought, aims, basic moral principles or beliefs that are accepted by the majority of the members of a group. It will be useful to keep attitudes and behaviour such as values and attitudes, solidarity, tolerance, being scientific, love, respect for individual differences, sensitivity, patriotism, peace, aesthetics, responsibility in the CDÖP (2005) within the perception of geography. It is stated that students should develop the feelings of love, respect and appreciation for people who serve Turkey, Turkish flag, Turkish army and its homeland (MEB, 2005). These values will primarily serve to protect, maintain and develop the space and spatial characteristics, which constitute the main subject of geography. They support people in learning their homeland by loving it, learning and accepting its values. As emphasized in the general aims of geography education, the social development and citizenship responsibilities of students are backed up in the CDÖP and also value education together with all the elements of the program is reinforced. In this sense, from geographical consciousness, attitudes concerning

Table 1. Demographic characteristics of the students.

Gender			
Male		Female	
f	%	f	%
60	47.6	66	52.4

nature and human are the requirements that will be developed through the program (Ünlü, 2014). The occupational ethics of geography teachers must include these values mentioned earlier.

The direction of the study determines that it is expected of the geography teacher candidates that prepare personals for the future to have good morals and values. This article selectively investigates priority order of occupational ethical values of geography teacher candidates in Turkey.

METHODOLOGY

In the study, survey was used to collect data. The sample of the study consists of students of geography teaching department, Ataturk Faculty of Education at Marmara University in Turkey. It was applied to all geography students receiving training in 2016-2017. The data collection tool used in the study was developed by the researcher Aydın (2015a).

This study was designed according to opinions of the geography teacher candidates focusing on been previously educated about ethical values. The behaviour observed correctly in occupational ethics is defined as ethical; otherwise, it is defined as unethical. The secondary focus was on the examination of occupational ethical values. A third focus was on the investigation of occupational unethical values. Particularly, the following research questions guide this exploration:

- (1) Are geography teacher candidates already trained in occupational ethics education?
- (2) Which occupational ethical values should be found in the geography teacher according to priority order?
- (3) Which occupational unethical values should not be found in the geography teacher according to priority order?

Table 1 shows the distribution of the sample by gender. Female 66 (52.4%) and male 60 (47.6%) teacher candidates totalling 126 participated in the study.

FINDINGS AND INTERPRETATION

Geography teacher candidates 33 (26.2%) had not previously been trained on occupational ethics education, while 93 (73.8%) were previously trained in occupational ethics.

In the study, 18 ethical and 13 unethical values included in the survey were interpreted according to the results of their mean values. The distribution of the results is shown in Table 2.

To make clear the expectations of teacher candidates' occupational ethical values, an order of the importance of ethical and unethical behaviors was made (Table 2). Here, the most important ethical value is the sense of justice, with 2.71. Later concepts are seen to be collected at certain values. Values around 6 are honesty and integrity, respect, and equality. Values around 8 are neutrality, democracy, remuneration, tolerance, love, justification, and freedom. Around 10 values, responsibility is positive human relationships and openness. The last cluster's concepts include: humanism, resistance to illegal orders, loyalty to the institution, raising the standards of the service and lastly springiness with 14.93 in order of importance.

According to the order of priority of non-ethical behaviours, discrimination (4.27) is in the first place. Then favouritism, bribery, malpractice and violence follow. Another group consists of violence, insult and neglect of one's duties followed by exploitation, mobbing, and embezzlement. In the last group, selfishness, neglect and gossip (8.98) were listed.

The concept of "justice" comes first in the ethical behaviours and its opposite meaning "discrimination" also comes first in its ranking. Likewise, "honesty and accuracy" and its opposite favouritism get the same position in their rankings. This indicates that teacher candidates' answers are consistent and this helps to raise the reliability of the study.

CONCLUSION AND SUGGESTIONS

In recent years, values education has been an issue discussed frequently in academic and popular publications. In this study, the priority order of occupational ethics values is determined by geography teacher candidates.

In the order of teacher candidates' expectation of ethical values, "justice" comes first as the unethical values order topped by "discrimination".

It has been determined that a geography teacher candidates attach great importance to the value of justice in the sense of occupational ethics and then honesty and accuracy, respect, equality, impartiality, democracy, doing justice, tolerance, love, right and freedom, responsibility, positive human relationships, openness, humanism, resisting to illegal orders, commitment to institution, raising service standards, and springiness. However, candidates place importance on discrimination, favouritism, bribe, malpractice, violence, insult, not perform duly one's duties, exploitation, mobbing, embezzlement, selfishness, neglect, and gossip as unethical values, respectively.

The values about occupational ethical and unethical values put forward by the geography teacher candidates and their implementation will raise expectations on forming an equitable and fair education considering the

Table 2. The occupational ethical value opinions of geography teacher candidates.

Which occupational ethical values should be found in the geography teacher according to priority order? Sort			Which occupational unethical values should not be found in the geography teacher according to priority order? Sort		
Ethical values	Rank	Point average	Unethical values	Rank	Point average
Justice	1	2.71	Discrimination	1	4.27
Honesty and accuracy	2	5.09	Favouritism	2	4.72
Respect	3	6.64	Bribe	3	4.92
Equality	4	6.78	Malpractice	4	5.13
Impartiality	5	7.51	Violence	5	5.62
Democracy	6	8.07	Insult	6	6.53
Doing justice	7	8.12	Not perform duly one's duties	7	6.78
Tolerance	8	8.29	Exploitation	8	7.27
Love	9	8.56	Mobbing	9	7.55
Right and freedom	10	8.58	Embezzlement	10	7.56
Responsibility	11	9.83	Selfishness	11	8.75
Positive human relationships	12	10.75	Neglect	12	8.90
Openness	13	10.93	Gossip	13	8.98
Humanism	14	11.83			
Resisting to illegal orders	15	13.89			
Commitment to institution	16	13.92			
Raising service standards	17	14.27			
Springiness	18	14.93			

responses given in the table. Obeying and applying the ethical and unethical behaviours put forward by the geography teacher candidates will help keep our expectations high.

Training programs need to be structured to cover occupational ethical values. This study was carried out with attendance of geography teaching candidates. For this reason, the results of the study can give more opportunity to evaluate the occupational ethics values determined by geography teacher candidates.

The values that geography teachers carried out in schools were mentioned in the introduction part of this work that there is a need to establish education. For this reason, a study that focuses on the thoughts and activities of the geography teachers about the teaching of values in order to see the current practices is suggested. In other studies on other disciplines, the expectations of occupational ethics in teaching can be done. In-service training could be helpful in the education of occupational ethics that might remain uncompleted during undergraduate study.

CONFLICT OF INTERESTS

The author has not declared any conflicts of interests.

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Full Length Research Paper

Achievement goals of medical students and physicians

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In achievement settings, the types of motivation individuals develop are crucial to their success and to the ways in which they respond to challenges. Considering the competitive nature of medical education and the high stakes of medical practice, it is important to know what types of motivation (conceptualized here as achievement goals) medical students and physicians adopt and how these may differ depending on the nuances of their achievement settings. This is a cross-sectional survey study of medical students (N=200) and practicing physicians (N=202). The online questionnaire included measures of achievement goals (performance approach, performance avoidance, mastery approach, mastery avoidance) and background characteristics. Multivariate analysis of variance was used to examine differences in achievement goals of medical students and physicians. Education/career stage, medical specialty, and practice type were used as factors in the analyses. Despite the differences in achievement settings, striking similarities in the achievement goals among medical students and physicians were observed in this study. Both students and physicians were most likely to endorse mastery approach goals (the most adaptive type of motivation) and least likely to endorse performance avoidance goals (the least adaptive type of motivation). Significant differences were observed in mastery approach goals of students and physicians, depending on education/career stage. With respect to medical specialty, although distinct patterns in achievement goals emerged in the student and physician data, the observed differences were not statistically significant. Academic physicians had higher levels of performance goals than community-based physicians. Medical students and physicians thus self-reported themselves as highly mastery approach-oriented; nevertheless, our findings suggest that these goals are more prone to fluctuations than other achievement goals, depending on the stage of one's education/career. The results largely show that medical students and physicians endorse achievement goals that are beneficial for lifelong learning, well-being, and success.

Key words: Motivation, achievement goals, medical students, physicians.

INTRODUCTION

Medical student populations tend to be homogeneous with regard to high levels of academic achievement and

motivation, as selection processes favour those who excel and are highly competitive (Dodd and McColl,

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2013; ten Cate et al., 2011). This high level of competition continues in training: failures during training may jeopardize one's graduation from medical school or securing a postgraduate (residency) placement. The pressures of being a practicing physician can be analogous to medical school and residency training, although the stakes shift. Failures in clinical practice have consequences not only for one's own career as a physician but also for patients; the stakes are literally "life or death". Furthermore, the practice of medicine is dynamic and calls for a mindset of lifelong learning in response to medical advances and patients' evolving health care needs. In achievement settings such as these, the types of motivation and implicit goals that individuals develop are crucial to their success and to the ways in which they respond to challenges. Therefore, it is important to know what types of motivation medical students and physicians adopt and how those may differ according to their achievement settings.

One well-established motivation theory that is argued to be relevant to health professions is achievement goal theory (AGT); (Cook and Artino, 2016; Elliot and Hulleman, 2017). Achievement goal theorists have posited that individuals' motivation takes shape through implicit goals that vary with regard to two dimensions: performance vs. mastery and approach vs. avoidance (Elliot and Hulleman, 2017, for a historically based overview). When fully crossed, these dimensions produce four distinct achievement goals (Elliot and McGregor, 2001; Elliot and Hulleman, 2017). *Performance approach* goals reflect the motivation to outperform others and demonstrate one's competence, whereas *performance avoidance* goals reflect the motivation to avoid looking incompetent relative to others. *Mastery approach* goals reflect the motivation to improve one's performance and gain new knowledge or skills, whereas *mastery avoidance* goals reflect the motivation to avoid incompetence (that is, students striving to attain the required knowledge/skills and professionals striving to maintain the acquired knowledge/skills). Mastery approach goals have been shown to promote interest, satisfaction, engagement, use of deep learning strategies, and self-directed learning, all of which are important attributes for physician lifelong learning. Performance approach goals, although linked to high achievement, are generally regarded as less adaptive because these goals can relate to undesirable outcomes such as cheating, self-handicapping, and surface learning (Elliot and Hulleman, 2017; Kaplan and Maehr, 2007). Avoidance goals are considered maladaptive as they are associated with low performance and poor psychological well-being and coping (Elliot and Hulleman, 2017; Kaplan and Maehr, 2007, for reviews of findings).

Published research indicates that in undergraduate student populations, mastery approach and both types of avoidance goals largely tend to decrease as students advance in their studies, whereas performance approach

goals remain relatively stable (Fryer and Elliot, 2007; Corker et al., 2013). The decline in mastery approach goals is regarded as a negative trend because these goals are important for students' engagement and self-directed learning (Corker et al., 2013). The declines in avoidance goals suggest that students become less concerned about seeming incompetent (performance avoidance) or failing to develop their competence (mastery avoidance) as they progress in their studies. The declines in avoidance goals are speculated to be due to increases in self-efficacy as students become more comfortable with the expectations of the school environment (Corker et al., 2013; Elliot and McGregor, 2001).

Compared to general student populations, different patterns of achievement goals have been reported in professional education programs. For example, a longitudinal study conducted with learners in a teacher education program reported a relative stability of mastery (approach and avoidance) goals between pre-service education and two years in professional practice, whereas performance (approach and avoidance) goals appeared to decline (Daniels, 2015). A study with health professions students in the Netherlands reported a relative stability of both mastery and performance goals over the course of six semesters, with students being on average more mastery- than performance-oriented (Kool et al., 2016). In this latter study, however, mastery and performance goals were not examined along the approach-avoidance dimension. Research examining achievement goals along the career trajectory in adult populations is still sparse, though one line of evidence indicates that people in late adulthood are more likely than young adults to pursue mastery avoidance goals and strive toward maintenance and prevention of skill loss and decline in performance (Kooij et al., 2011; Senko and Freund, 2015).

To date, there does not appear to be any published research that examines the levels of achievement goals of physicians who are at various career stages such as early, mid- or late-career. In addition to these stages of professional practice, medical school is also marked by distinct stages. For example, in many North American medical school structures, which are typically four years in duration, the first two years are more heavily weighted toward pre-clinical classroom-based learning, whereas learning in clinical settings predominates in the last two years. Therefore, each distinct stage of medical school and stage of professional career may represent a slightly nuanced achievement setting and, hence, warrants investigation.

The examination of achievement goals in medical students and physicians would not be complete without a consideration of medical specialties, which vary with respect to duration of postgraduate training, the competitiveness of getting into residency programs and securing a position after graduation, and work-life

balance, among other factors. Furthermore, depending on the type of practice settings (academic vs. community-based) in which physicians practice, the amount of time physicians spend on patient care, teaching, and research activities varies. Namely, community-based physicians are more likely to spend more time on patient care, whereas physicians who work in academic medical centres are more likely to be involved in teaching and research activities. To the best of our knowledge, no research has yet been conducted to compare achievement goals of students aspiring to certain medical specialties and physicians practicing in those specialties and in different practice settings. As such, the contribution of the research presented herein stands to highlight the achievement goals of medical students and practicing physicians in an unprecedented fashion by looking at education/career stage, medical specialty, and practice type. Specifically, the following research questions guided the study:

- i) Are there differences in achievement goals of medical students and physicians based on education/career stage, medical specialty, and practice type?
- ii) Are there differences in achievement goals between medical students and physicians?

The answers to these questions are important as we strive to understand the types of achievement motivation that medical students and physicians develop and draw upon in high-stakes, high-stress settings.

METHODS

Study design and procedures

This was a cross-sectional study. Using an online questionnaire, quantitative data from medical students at a large university in Canada were collected in February-March 2017; three reminders were sent to those students who had initially agreed to participate in the study (267 out of 640 medical students agreed to participate). Data from physicians were collected between November 2016 and April 2017. The link to the physician questionnaire was circulated using mailing lists and word of mouth (e.g., announcements made at national and local professional gatherings/events and online forums). Participation in the study was voluntarily and participants could choose not to respond to a question if they did not feel comfortable. Ethics approval was obtained from the institution's Human Research Ethics Board prior to data collection.

Measures

Background characteristics

All participants (students and physicians) were asked to indicate their gender and age. Students were asked to indicate their year in the medical program (years 1, 2, 3, 4) and if known, their preferred specialty choice. Physicians were asked to indicate their specialty and how many years they had been in practice by selecting one of the following response options: 'I am a resident', '5 or less', '6-10', '11-15', '16-20', '21-25', and '26 or more'. Physicians also were

asked about their current practice type by selecting one of the two options: 'I consider myself an academic practitioner' or 'I consider myself a community-based practitioner'. Finally, physicians were asked if they were involved in clinical teaching (yes/no).

Achievement goals

Achievement Goals Instrument in a Work Domain (Baranik et al., 2007), which had been initially validated with introductory psychology students who held jobs, was used in the present study. To better reflect the nature of the medical profession, minor changes were made in item wording. Specifically, the words 'coworkers', 'projects', and 'job' were changed to 'others in my program/at work', 'tasks', and 'program/work' in the student and physician questionnaires, respectively. Using a seven-point Likert-type scale (1—not at all true of me; 7—yes, very true of me), students and physicians were asked to indicate the extent to which each statement was true of them in relation to their medical program and work, respectively. In total, 16 statements were used to measure performance approach (e.g., "I prefer to work on tasks where I can show my competence to others"; $\alpha=0.73/0.80$ in student/physician data), performance avoidance (e.g., "I prefer to avoid situations in my program/at work where I might perform poorly"; $\alpha=0.83/0.82$), mastery approach (e.g., "I enjoy difficult tasks in my program/at work where I will learn new skills"; $\alpha=0.72/0.82$), and mastery avoidance (e.g., "In my program/at work, I focus on not doing worse than I have personally done in the past"; $\alpha=0.50/0.40$) goals. The reliability levels, with the exception of that of mastery avoidance goals, were deemed acceptable (Schmitt, 1996). In terms of mastery avoidance goals, it is worth noting that SPSS did not indicate that deletion of any of mastery avoidance items would increase internal consistency. Considering the four mastery avoidance items captured conceptually distinct aspects of mastery avoidance goals (that is, content validity; DeVellis, 2012), all items were retained. With the score range of 4-28 (midpoint =16) on each achievement goal, higher scores were indicative of greater endorsement of those achievement goals.

Participants

Two hundred undergraduate medical students completed the online questionnaire; amongst whom five student participants chose not to disclose their gender and age. Overall, 58% of student participants were female and 93% were under 30 years of age. With respect to the year in the program, 23% of participating students were in year 1, 30% in year 2, 21% in year 3, and 26% in year 4. One hundred and thirty students (65%) indicated their preferred specialty choice: of these, 37% indicated family medicine (FM) and 63% indicated non-FM specialties (13% internal medicine and related specialties, 10% pediatrics, 11% surgery, and 29% other specialties).

Two hundred and two physicians participated in the study; two physician participants chose not to disclose their gender and age, five participants did not indicate their specialty, and three participants did not specify their practice type. Overall, 66% of physician participants were female and 77% were under 50 years of age. Almost 40% of the physicians in this study had been in practice for more than 10 years. Among the respondents, 49% were FM physicians and 51% were in non-FM specialties (15% internal medicine and related specialties, 7% pediatrics, 14% surgery, and 16% other specialties). With respect to practice type, 52% of the physicians in this study considered themselves community-based practitioners, whereas 48% considered themselves academic practitioners. Of the community-based practitioners, the majority (75%) were FM physicians, whereas the majority of the academic practitioners (78%) were non-FM specialists. The majority of the physicians in this study (91%) reported being involved in clinical

Table 1. Students' achievement goals by year in program and specialty choice: means and SDs.

Variables	Year in Program (n=200)					Specialty Choice (n=130)	
	Overall (n=200)	Y1 (n=46)	Y2 (n=60)	Y3 (n=42)	Y4 (n=52)	FM (n=48)	Non-FM Specialty (n=82)
Performance Approach	16.3 (4.51)	16.8 (3.80)	15.0 (5.00)	16.8 (4.84)	17.0 (3.99)	16.2 (4.45)	17.2 (4.94)
Performance Avoidance	13.7 (4.40)	14.3 (3.87)	12.9 (4.71)	13.9 (4.17)	13.8 (4.65)	14.4 (4.19)	13.4 (4.78)
Mastery Approach	22.0 (3.00)	21.5 (2.68)	21.8 (2.99)	21.9 (2.84)	22.7 (3.32)	21.3 (3.23)	22.5 (3.08)
Mastery Avoidance	16.5 (3.60)	17.0 (3.79)	16.1 (3.48)	17.4 (3.64)	15.9 (3.46)	17.3 (3.80)	16.2 (3.43)

SD – standard deviations are shown in parentheses next to corresponding means; FM – family medicine. Mastery Approach by Year in Program: $p=0.032$. Mastery Avoidance by Year in Program: $p=0.047$. No pair-wise comparisons were significant when Bonferroni correction was applied.

teaching, including teaching medical students.

Analyses

All analyses were conducted in SPSS 24.0. Means and standard deviations (SD) of the achievement goals were computed by year in the program and specialty choice for students and by years in practice, specialty, and practice type for physicians. First, we examined differences in achievement goals separately for medical students and physicians. To do this, multivariate analysis of variance (MANOVA) was used to test for the overall mean differences in the four achievement goals within medical students and physicians. Following this, year in the program and specialty choice were entered as factors in the student data. Years in practice, specialty (FM vs. non-FM specialties), and practice type (academic vs. community-based) were entered as factors in the physician data. Second, to compare achievement goals between medical students and physicians, we performed independent-samples t-tests. The overall significance level was set at 0.05, with Bonferroni corrections used for pair-wise multiple comparisons. Cohen's d was used as a measure of the standardized difference between two means (effect size), with d values of <0.5 , $0.5 - 0.8$, and >0.8 representing small, moderate, and large effect sizes, respectively (Cohen, 1992).

RESULTS

Students' achievement goals

Means and SDs for the achievement goals in the student data are shown in Table 1. The MANOVA results indicated significant overall mean differences in the levels of the achievement goals of medical students (Wilks' Lambda=0.01; $p<0.001$). Students endorsed performance avoidance goals the lowest and mastery approach goals the highest. Students' performance approach and mastery avoidance goals were on average at the midpoint of their respective scales (that is, 16).

Next, the interaction of the year in the program with specialty choice and the main effect of specialty (FM vs. non-FM) were non-significant in the student data (both $p's>0.05$). The main effect of the year in the program on achievement goals was significant (Wilks' Lambda=0.81; $p=0.01$); however, this was the case only for mastery approach ($p=0.032$) and mastery avoidance goals ($p=0.047$). Mastery approach goals showed a gradual

increase from the first to the fourth years in the program (Table 1). Mastery avoidance goals were lower in the second and the fourth years, compared to the first and the third years in the program. Noteworthy, although not statistically significant, performance (approach and avoidance) goals were the lowest in the second year. Finally, those students who indicated their choice of non-FM specialties scored higher on approach goals and lower on avoidance goals than those students who indicated FM as their choice (Table 1); however, the observed differences did not reach statistical significance.

Physicians' achievement goals

Means and SDs for the achievement goals in the physician data are shown in Table 2. The MANOVA results indicated significant mean differences in the levels of achievement goals of the physicians in this study (Wilks' Lambda=0.01; $p<0.001$). Physicians scored lowest on performance avoidance goals and highest on mastery approach goals. Performance approach and mastery avoidance goals were slightly below the midpoint of their respective scales.

Next, the interactions among years in practice, specialty (FM vs. non-FM specialties), and practice type (academic vs. community-based) were non-significant in the physician data (all $p's>0.05$). The main effect of years in practice on physicians' achievement goals was determined to be significant (Wilks' Lambda=0.78; $p=0.016$); however, this was the case only for mastery approach goals ($p=0.005$). Post-hoc analyses revealed a significant difference in these goals between resident physicians and those physicians who had been in practice 21-25 years ($p=0.026$; Table 2). Although not statistically significant, distinct patterns in other achievement goals emerged in the physician data. Performance approach goals remained stable during the first 15 years of practice but decreased in subsequent years. Avoidance (performance and mastery) goals were lowest at 11-15 years and at 26+ years in practice. The main effect of practice type (academic vs. community-based) on physicians' achievement goals was found to be significant (Wilks' Lambda=0.92; $p=0.009$); however,

Table 2. Physicians' achievement goals by years in practice and specialty: means and SDs.

Variables	Overall (n=202)	Years in Practice (n=202)							Specialty (n=199)		Practice Type (n=197)	
		Res (n=21)	<5 (n=67)	6-10 (n=35)	11-15 (n=27)	16-20 (n=21)	21-25 (n=8)	26+(n=23)	FM (n=96)	Non-FM Specialty (n=101)	Academic (n=97)	Community-based (n=102)
Performance Approach	15.2 (4.72)	15.2 (5.41)	15.4 (4.82)	15.5 (4.57)	15.5 (3.80)	14.4 (5.62)	13.3 (5.29)	15.1 (4.14)	14.3 (4.62)	16.0 (4.74)	16.2 (4.69)	14.2 (4.59)
Performance Avoidance	13.1 (4.51)	12.8 (5.33)	13.7 (4.04)	13.9 (4.94)	11.0 (3.79)	14.6 (4.62)	14.0 (3.74)	11.6 (3.74)	13.0 (4.38)	13.2 (4.70)	13.7 (4.64)	12.8 (4.24)
Mastery Approach	22.3 (3.26)	23.7^a (3.40)	21.9 (2.78)	21.2 (3.90)	23.4 (2.45)	22.1 (2.54)	20.4^a (5.04)	23.5 (3.19)	22.3 (3.26)	22.3 (3.28)	22.7 (2.96)	21.9 (3.46)
Mastery Avoidance	15.1 (3.69)	15.9 (3.31)	15.7 (3.69)	15.2 (4.25)	13.3 (3.35)	15.2 (3.35)	15.1 (5.00)	14.7 (3.02)	15.4 (3.66)	14.8 (3.74)	15.2 (3.65)	15.2 (3.64)

SD – standard deviations are shown in parentheses next to corresponding means; FM – family medicine. Performance Approach by Practice Type: $p=0.001$. Performance Avoidance by Practice Type: $p=0.043$. Mastery Approach by Years in Practice: $p=0.005$. ^a Indicates significant difference in two means ($p=0.026$), based on pair-wise comparisons following the omnibus test, using Bonferroni correction.

this was the case only for performance approach ($p=0.001$) and performance avoidance goals ($p=0.043$). Namely, academic practitioners endorsed performance (approach and avoidance) goals more strongly than did community-based practitioners (Table 2). The main effect of specialty (FM vs. non-FM) was non-significant ($p>0.05$).

Comparison of students' and physicians' achievement goals

Overall, both students and physicians in this study appeared to largely report endorsing mastery approach goals (Table 3). The only significant differences between students' and physicians' achievement goals were observed in performance approach ($p=0.017$) and mastery avoidance ($p<0.01$) goals, with effect sizes (Cohen's d) being small.

DISCUSSION

By drawing on achievement goal theory, the present study provides insights into the motivation

of medical students and physicians, depending on education/career stage, medical specialty, and practice type. Despite the differences in achievement settings, we observed striking similarities in self-reported levels of achievement goals among students and physicians in this study, supporting others' finding that these populations are relatively homogenous in terms of motivation (Dodd and McColl, 2013; ten Cate et al., 2011). Both students and physicians were most likely to endorse mastery approach goals and least likely to endorse performance avoidance goals. Significant differences were observed in the achievement goals adopted by students and physicians, depending on education/career stage and practice type in case of physicians. With respect to specialty, although distinct patterns in achievement goals emerged in the student and physician data, the observed differences were not statistically significant.

Out of the four achievement goals examined in this study, medical students reported lowest endorsement of performance avoidance goals and highest endorsement of mastery approach goals, which is consistent with the results of published research with students in professional education

programs (Daniels, 2015; Kool et al., 2016). However, in contrast to the published research (Corker et al., 2013; Kool et al., 2016), an upward trend in mastery approach goals among the students in the present study was observed across the four years of medical school. We speculate that these findings could be partially attributed to at least two factors that are specific to the medical school where this research was conducted: a rigorous selection process for admission and a curriculum that includes both problem- and team-based instruction and learning principles. While the former increases the likelihood of selecting highly internally motivated and committed students into the program [e.g., Wouters et al. (2016) for effects of various selection processes on student motivation and learning outcomes], the latter aims to emphasize personal mastery and group learning and de-emphasize performance, competition, and social comparison. Specifically, the problem-based learning model uses small-group learning, guided by group facilitators, to help students work through cases. Facilitators provide feedback to the group and to each individual student to help improve learning. In team-based learning, students

Table 3. Mean, SD, p-value and Cohen's *d* values of achievement goals of medical students and physicians.

Variables	Students (n=200)	Physicians (n=202)	p-value	Cohen's <i>d</i>
Performance Approach	16.3 (4.51)	15.2 (4.72)	0.017	0.24
Performance Avoidance	13.7 (4.40)	13.1 (4.51)	0.18	0.14
Mastery Approach	22.0 (3.00)	22.3 (3.26)	0.34	0.10
Mastery Avoidance	16.5 (3.60)	15.1 (3.69)	0.0002	0.38

SD – standard deviations are shown in parentheses.

are given more autonomy and work as a team to solve clinical problems, with an emphasis on formative feedback from peers. It is important to emphasize that in both of these learning approaches students receive formative feedback in an ongoing manner from instructors and peers, which is known to support the development of mastery goals (Pekrun et al., 2014). Furthermore, the medical school where this study was conducted has a pass/fail system. The focus is on mastering the material and demonstrating understanding and not on obtaining the highest marks.

For physicians in this study, mastery approach goals were also consistently high, which is in line with the lifelong learning mandate of the medical profession (Babenko et al., 2017; Frank et al., 2015; Hojat et al., 2009). The ever-changing and dynamic practice of medicine calls for the mindset of lifelong learning and adoption of mastery goals to effectively respond to patients' health care needs. Furthermore, the majority of physicians in the present study were involved in clinical teaching and thus, are in an important position to reinforce mastery approach goals for medical students through explicit modeling of learning in and from one's clinical practice. Medical students would benefit from repeated reminders that the acquisition of expertise is ongoing, over the course of one's career as a physician, and that learning does not stop following formal training.

Notably, however, physicians in this study who were in the first 10 years of their practice and those with 16-25 years of experience were less likely to endorse mastery approach goals and more likely to endorse performance avoidance goals. For the physicians who were in their first 10 years of practice, we speculate that the steep learning curve of early independent practice and the accompanying fear (implicit or explicit) of making a poor clinical decision could contribute to the observed higher level of endorsement of performance avoidance goals than physicians who were in practice 11-15 years. For those physicians who were 16-25 years in practice, we speculate that similar forces may be operating: these physicians are under pressure to keep up to date with treatments and guidelines that are rapidly changing, while facing the decrease in energy and cognitive flexibility that accompanies ageing. Nevertheless, in contrast to the reported decline in mastery approach goals and the increase in mastery avoidance goals in late adulthood

(Kooij et al., 2011; Senko and Freund, 2015), our findings indicate that physicians continue to be highly mastery approach-oriented over the course of their careers.

With respect to performance approach goals in the physician data, these goals remained relatively stable at various stages of physicians' career paths; however, community-based physicians endorsed performance approach goals to a lesser extent than did academic physicians. We speculate that this difference speaks to the fact that community-based physicians tend to spend more time in patient care activities, whereas academic physicians tend to be more involved in scholarly and research activities that are often competitive in nature (e.g., pursuing research funding; dissemination of research findings through publications and presentations) and thus, call for particular motivational styles.

With regard to specialty, although not statistically significant, we observed that students interested in non-FM specialties tended to be more approach-oriented and less avoidance-oriented than students interested in pursuing family medicine. Both students aspiring to the practice of family medicine and practicing family physicians were less performance approach-oriented than students interested in non-FM specialties and non-FM physicians, respectively; this may perhaps reflect a lower importance placed on competition with others in family medicine.

Study limitations and future research

This study employed a cross-sectional design, with different groups of medical students and physicians at various stages of education and career. This allowed us to examine achievement goals along the education and career continuum, spanning over 30 years. Nevertheless, we were not able to control for potential variations in the groups, something that a longitudinal design could have allowed for. Next, survey studies rely on voluntary participation. As such, it remains unknown whether achievement goals observed among the participating students and physicians are similar to those of the students and physicians, who, for whatever reasons, chose not to participate in the study. Student participants in this study came from one medical school. Although students in our medical program are largely representative

of the population of medical students in Canada, we cannot generalize our findings to other medical programs. Future studies are needed to examine achievement goals of students in other health professions programs and health care professionals (e.g., dentists, pharmacists, nurses). Finally, considering that people in late adulthood are more likely than young adults to pursue mastery avoidance goals (Kooij et al., 2011; Senko and Freund, 2015), future research could specifically examine achievement goals of older students.

Conclusions

Medical education and practice present unique challenges, while also requiring a mindset of ongoing mastery and lifelong learning. In this study, we found medical learners and practitioners to be highly mastery approach-oriented; nevertheless, our findings suggest that these goals are more prone to fluctuations than other achievement goals, depending on the stage of one's education/career. As such, mastery goals need to be nurtured and actively encouraged throughout medical studies, and support should be provided to early career physicians and those at later stages (that is, 15-25 years in practice) as they face unique challenges (e.g., perhaps assuming more leadership roles). Our research results largely show that medical students and physicians hold achievement goals that are beneficial for lifelong learning, well-being, and success. The next step is to examine if indeed mastery approach goals are beneficial for these high achievers and their patients as has been seen in other achievement settings.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Primary school students' views about science, technology and engineering

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Some of the main goals of science education are to increase students' knowledge about the technology and engineering design process, and to train students as scientifically and technologically literate individuals. The main purpose of this study is to find out primary students' views about science, technology and engineering. For this aim and in order to increase students' knowledge and understanding of science, technology and engineering, a module named "Engineering and Technology Lessons for Children" developed by the Museum of Science was applied to 88 students who were in 4, 5 and 6th grades. The science topic was 'balance and forces', and the engineering field was 'civil engineering'. The module took five days and consisted of interactive teaching techniques such as experiments, science trips, observations, creative drama and designing. Out of these 88, 23 students took part in interviews to find out their views about science, technology, and engineering in detail. The students were attending a comprehensive primary school in an urban district of Izmir, which is the third biggest city in Turkey. Specifically, this school was chosen since it was a sister school to the university which means the university and the school had an agreement on benefiting from each other's competences and facilities. Since the school was a sister school it was a convenience sample and this was the main reason for choosing these students. This study is a case study survey type of research and is also a simple descriptive design. As an instrument, a semi-structured interview was used. According to the results of the analysis of the data, after implementing the module, students' awareness in terms of science, technology and engineering increased.

Key words: Engineering design process, understanding of science, understanding of technology, understanding of engineering.

INTRODUCTION

In the context of the National Center for Technological Literacy (NCTL), 'Engineering is Elementary' (EIE) prepared an education module called 'Engineering and Technology Lessons for Children' to teach science,

engineering, design and the connection between these terms to develop children's natural sense of wonder (<http://www.eie.org/>). One of the main aims of this module is to make children technologically literate individuals

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(Roehrig et al., 2012). Some of the reasons why this is important are summarised as follows on the EIE website: Students need to be aware that if they design anything they should be working like engineers. This causes them to develop positive attitudes towards science, technology and engineering. Engineering needs the integration of other disciplines such as maths and science in order to solve problems. Design-technology-engineering applications develop the skills of awareness of problems, solving problems and producing alternative solutions. Design-technology-engineering applications should be a part of project-based learning and promote hands-on learning. This curriculum relates to life skills everyone needs to use.

In this regard, the purpose of this study is to find out whether primary (4, 5, and 6th graders) students' views of science, technology and the engineering design process developed or not after the implementation of the EIE curriculum module.

The conceptual framework

In the last decade, the science curriculum committee in Turkey has included some basic skills in the curriculum: scientific process skills and life skills such as analytical thinking, decision making and creative thinking (MEB, 2005, 2006, 2013, 2017). The emphasis was also on raising scientifically and technologically literate individuals so that children would understand science (Dindar and Taneri, 2011). The current science curriculum (MEB, 2017) emphasises other skills that are called 'engineering and design skills'. The explanation of these skills is as follows: 'students need to think and use science, maths, technology and engineering in a holistic way; with the interdisciplinary point of view, students can solve problems in an innovative way; they should learn strategies to make and develop products'. It is explained that the reason for putting this new field in the curriculum is that students' experiences of science and engineering are important in terms of increasing the capacity for the development of scientific research, technology, socio-economic status and competitiveness of the country. It is now clear that there is a necessity for finding ways to improve student understanding of the terms, technology and engineering design process.

In this study, a module titled 'Engineering and Technology Lessons for Children', developed by the National Center for Technological Literacy led by the Museum of Science in Boston (www.mos.org/engineering-curriculum), was used. The museum was founded in 1830 in Boston. It was the first museum to embrace all the sciences under one roof and the first science and technology center in the USA.

The 'Engineering is Elementary' (EiE) Project (eie.org/eie-curriculum) is one of the projects developed by the Museum of Science in 2003, for children in grades

1 to 5, and they state that 'it is the nation's leading engineering curriculum for grades 1 to 5'. Cunningham and Lachapelle (2016) stated that since 2003, in the USA, approximately 10 million children have been taught with the curriculum and 110,000 teachers have used the materials. The EiE curriculum consists of three components for all units: a teacher guide, story book and material kit. All the EiE units complement the science topics that teachers teach and each unit has an engineering field. The components, except for the material kit, were bought from the Museum of Science, USA. The EiE curriculum created a simple Engineering Design Process (EDP) to guide students through engineering design challenges. This EDP has just five steps and uses terms that children can understand:

'ASK: What is the problem? How have others approached it? What are your constraints?

IMAGINE: What are some solutions? Brainstorm ideas. Choose the best one.

PLAN: Draw a diagram. Make lists of materials you will need.

CREATE: Follow your plan and create something. Test it out!

IMPROVE: What works? What doesn't? What could work better? Modify your designs to make it better. Test it out!' (<http://www.eie.org/eie-curriculum/engineering-design-process>).

Detailed information about the module is given in the methodology section in this paper.

RELATED RESEARCH IN THE LITERATURE

The literature illustrates that some of the research was conducted with students to find out their understanding or to find out the effectiveness of the activities which were carried out in the context of technology and engineering. On the other hand, some of it was carried out with teachers to find out their teaching abilities and their development of teaching the subject.

Cunningham and Lachapelle (2010) carried out a research with a huge sample (experimental group of students $n=5139$ and control group $n=1827$) to find out the effectiveness of the EIE curriculum. They found significant differences between the experimental and control groups in that the experimental group of students had a better understanding of engineering and science. Another study (Lachapelle et al., 2013) was done to find out primary students' ($n=789$) views about technology. They used a "what is technology (WT)?" instrument for pre- and post-test. According to the results, most of the students relate technology to electronics. After teaching technology, although students' misconceptions decreased, some of the students still had misconceptions about technology.

In the same research the researchers also stated that

post-test results showed that EIE materials had a positive effect on students' interest in being engineers. Similarly, students were more interested in engineering subjects and science.

The EIE curriculum's effectiveness was proved once again in another study (Lachapelle et al., 2011). They also tested students' scientific content knowledge and the students' achievement was higher than that of the control group students. Lachapelle et al. (2011) results were similar to those of the other research about the effectiveness of the EIE curriculum. Similarly, Lachapelle et al. (2017) assessed the effects of EIE intervention for elementary school students and they found that intervention students showed great improvement in science content outcomes.

Cunningham et al. (2005) asked students to draw an engineer. It was understood that most of the students had limited or wrong knowledge about what an engineer did. Lachapelle et al. (2012) developed a scale which measured students' knowledge about what engineers do. The results revealed that students believed that engineers repaired cars, computers, televisions, etc. However, they did not believe that engineers worked with non-electronic objects.

Karahan et al. (2015) investigated the effect of science, technology, engineering and mathematics integrated media design processes on 8th grade students' attitudes towards science classes. During media design processes learners design digital media artifacts. The result shows that learning STEM affected students' attitudes towards science class as EIE stated.

Other research was conducted with teachers. For example, Cunningham et al. (2006) aimed to find out teachers' knowledge and attitudes towards engineering and technology. They found that teachers had some difficulties when teaching engineering and technology. When they taught with the EIE curriculum, their tendency to use the engineering concept during classroom activities increased. Another developed program was "Pre-College Engineering for Teachers" (PCET) (Lachapelle et al., 2008). The researchers found that when teachers used PCET with their students, the students learned science, engineering and technology better. McKay et al. (2008) organised a project to educate teachers in order to increase their engineering content knowledge. At the end of the project it was proved that teachers' understanding of the engineering design process and science content were increased.

It is believed that it is important to develop an understanding of the engineering design process as Cunningham and Kelly (2017) stated that this could help to teach science and that 'engineering offers ways of knowing that it can be educative beyond just servicing science learning' (p.498). Hertel et al. (2017) have done research to find out the effect of notebooks on students' learning through engineering design activities. As a conclusion, they suggested that since notebooks play

important roles and engineering is becoming a more common discipline in elementary classrooms, teachers should gain better understanding of the engineering design process and of implementing it in classroom activities.

METHODOLOGY

This study is a case study survey type of research, which is described as follows "it is a research design in which a survey is administered to a case, either a small sample or an entire population of individuals, to describe an aspect or characteristic of that population. Researchers ask individuals in the population questions to examine individual self-reports of opinions, behaviors, abilities, beliefs, or knowledge. The responses are analyzed to describe population trends or to test questions or hypothesis" (Mills et al., 2010). Mills et al. (2010) also stated that simple descriptive design is one of the designs of case study research. This study is also a simple descriptive design which "is a one-time-only survey that is used to describe the characteristics of a sample case at one point in time" (Mills et al., 2010). As an instrument, a semi-structured interview was used for data collection.

The sample of the study was made up of 4th (n=28), 5th (n=30) and 6th (n= 30) grade students in a primary school. The ages of the students were 9, 10 and 11, respectively. The school is a comprehensive school in a rural area in a big city. Specifically, this school was chosen since it was a sister school to the university which means the university and the school had an agreement on benefiting from each other's competences and facilities. For instance, the school students were given the opportunity to visit the university and had some free courses from the academic staff, or teachers from the school could be involved in the in-service teacher training programme. Since the school was a sister school, it was a convenience sample, and this was the main reason for choosing these students. To increase primary students' understanding of science, technology and engineering, a module named "Engineering and Technology Lessons for Children" developed by the Museum of Science was applied to the 88 students. However, among them only 23 students took part in the interviews. Table 1 shows the distribution of the sample in terms of their gender and grade.

Before collecting data from the students, permission was received from the parents and the management of the school. Separately, each group in the sample was instructed about the module, which was about science, technology and engineering. The details of the module have been given earlier in this paper and can also be found at <http://www.eie.org>. As Lachapelle et al. (2017) stated during the application of the module, students read a story which includes a design challenge. In this research, the unit titled 'To Get to the Other Side: Designing Bridges' was used. The science topic was 'balance and forces' and the engineering field was 'civil engineering'. The module took five days and consisted of interactive teaching techniques such as experiments, science trips, observations, creative drama and designing. The story was about trying to find a solution for reaching the other side of a river. After reading the story students were encouraged to find a solution by making a secured bridge. They also visited the department of civil engineering and the laboratories, and they were introduced to some civil engineers. They learned about the types of bridges and how to work as engineers with the engineering design process. Table 2 shows the content of the intervention.

Before and after the module, two instruments titled 'What is Technology' and 'What is Engineering', were applied as pre- and post-tests to all 88 students. At the end, in order to find out the effectiveness of the module and the level of their knowledge about

Table 1. The distribution of the sample in terms of their gender and grade.

Grade	Female (n)	Male (n)	Total (n)	Interviewed (n)
4th grade	14	14	28	10
5th grade	24	6	30	5
6th grade	21	9	30	8
Total (n)	59	29	88	23

Table 2. The content of the module.

The activity	Content
Preparation	Revealing students' ideas about engineering and the engineering design process. Drama
An Engineering Story	Reading the story Types of bridges Civil engineering Civil engineering department visit Design process
Science Topic	Pull and push forces Experiments Balancing the forces and civil engineering
Design challenge and data collection	Making and introducing three types of bridges Testing which type of bridges carry the most weight Observing the effect of different weight amounts on the bridges. Drama
Designing continues	Designing a bridge with basic materials by using the engineering design process. Developing their design.

technology, engineering and science in detail, interviews were conducted with 23 students. Although only the interview results will be presented, the results will also be related to the answers to the two instruments stated earlier.

It was stated that by conducting interviews, in-depth data can be collected about students' views (Cohen and Manion, 1994; Drever, 1995; Mertens, 1998). During interviews, the data can be collected more qualitatively by asking probing questions such as 'why?', 'what do you mean by saying that?' (Drever, 1995), and also the questions are narrowing of the central questions and subquestions in the research (Creswell, 2013). This was the reason why the semi-structured interviewing technique was used.

Before conducting the interviews, the participants were informed about the details of their interviewing process. During the interviews, the researcher used prompts, probes and follow-up questions to encourage the interviewees to clarify their answers. Because of the responsibility of being respectful to the participants in terms of not making them feel that they were being judged, there were no direct questions such as 'what is technology', 'what is engineering'. Instead the questions were in the 'what do you think?' format. A comfortable environment was created for the participants.

Each interview was recorded and then transcribed for more

detailed examination. The interview questions were as follows:

- (1) What do you understand when they say 'technology'?
- (2) How would you understand if an object is a technological product or not?
- (3) Do you think technology is harmful?
- (4) What do you think that engineers do? What kind of people do you think we call engineers?
- (5) What do you understand when they say science?
- (6) Science, technology and engineering: is there any relationship?
- (7) What would you say about the engineering design process?
- (8) After the module, what did you learn that you did not know before?
- (9) Would you like to take part in that kind of learning again?

The instrument called "What is Technology" included pictures of some objects (16 objects) and the participants were asked to choose the objects that they thought were technological products. The objects were: shoes, subway, dandelions, cellular phone, oak tree, bridge, television, cup, bird, factory, bandage, house, power wires, bicycle, lightning and books (the objects that are written in bold are the correct answers). Finally, the participants were also

asked "How would you understand if an object is a technological product or not?" This instrument was first developed by Cunningham et al. (2005), and was used to determine students' knowledge and understanding about technology. It was then applied to 550 students (3rd, 4th and 5th grade students) as pre- and post-test (Lachapelle and Cunningham, 2007). They gave 1 point for each correct answer and 0 points for each wrong answer. Total score was calculated and internal reliability coefficients were found to have a Cronbach's α of 0.853 ($n=479$).

The other instrument, called "What is Engineering?", also included pictures of some types of work (16 types of work) and the participants were asked to choose the types of work that they thought engineers do for their jobs. The types of work were: improve bandages, develop better bubble gum, design ways to clean water, construct buildings, drive machines, arrange flowers, read about inventions, figure out how to track luggage, work as a team, create warmer kinds of jackets, install wiring, sell food, repair cars, design tunnels, clean chimneys and write computer programs (the jobs that are written in bold are the correct answers). The last question asked to the students was 'If a friend of yours asked you what an engineer is what you would say to your friend?' This instrument was used to determine students' knowledge and understanding about engineers (Cunningham et al., 2005). When tested for internal reliability, this scale produced a Cronbach's α of 0.881 ($n=863$).

RESULTS

According to the results of the 'What is Technology?' instrument the module had an effect on developing students' understanding of technology. The statistical difference showed that the module was more effective on 4 and 6th graders than on 5th grade students. The results of the 'What is Engineering?' instrument showed that the module was not effective on 4th grade students but that there was a difference regarding 5 and 6th grade students' understanding in a positive way. The module was more effective for 5th grade students than for 6th grade students. In this research the focus will be on the result of the interviews.

Results from the interviews

The qualitative data were manually analysed by the researcher by categorising the answers. Cohen and Manion (1994) suggested that there should be an acceptable level of agreement between people as to how to describe data. Accordingly, after transcribing the recorded interviews the transcriptions were analysed by another researcher who was working on similar projects. A high degree of agreement was achieved. First, long statements were compressed into briefer statements in which the main sense of what was said was rephrased in a few words. These were then grouped into simple categories, which made it possible to present the large amount of data in a few tables. The results will be given in detail as the following.

The views of students about technology

One of the aims of the study is to find out students' views

about technology. Table 3 presents their views about technology. In Table 3, the students' answers are given in brief sentences. This was done before categorising. It is preferred to give Table 3 because it is thought that it is wise to give the idea of how to analyse data to the readers.

Following Table 3, Table 4 was constructed by making a classification according to the answers earlier mentioned.

The first and second category could be in the same category since the computer, television, etc., are all electronic devices. Most of the students (18 out of 23) thought of electronic equipment when technology was mentioned.

As stated earlier, for the 'What is Technology' scale, the students were given the names of 16 items and asked which of these were technological products. These items are: (1) shoes, (2) subway, (3) dandelion, (4) cellular phone, (5) oak tree, (6) bridge, (7) television, (8) cup, (9) bird, (10) factory, (11) bandage, (12) house, (13) power wires, (14) bicycle, (15) lightning, and (16) books. The items numbered 1, 2, 4, 6, 7, 8, 10, 11, 12, 13, 14, and 16 are the correct items. The maximum number of points that could be obtained from the instrument is 12 since 12 items are correct. Table 5 shows the average points that all the groups obtained out of 100. This table represents the result statistically.

While the 4th grades did not indicate items that were wrong answers before or after the training, only one person in the 5th grade gave the wrong answer, 'oak tree', as a technological product after the training. Surprisingly, from the 6th grades, 4 students indicated the dandelion flower and 2 indicated lightening as technological products following the training. Qualitatively the researcher would like to point out that subway, cellular phone, television and power wires were mostly mentioned both before and after the intervention. It is quite pleasing that while no one marked shoes, cup, bandage or books in the pre-test, the number of marks for these items was increased in post-test. This proves the effectiveness of the module.

During the interview, before the module and also after the module the participants were asked how they would understand whether an object is a technological product or not. The categories are stated in Table 6.

From the interviews, it was found out that there are some similar answers. For example, "it helps us" or "it makes our lives easier" or "it fulfils our needs" could all be in the same category: "Technological products fulfil our needs". The categories obtained from this part of the interviews are listed as follows:

- (1) Technological products fulfil our needs.
- (2) They are electronic.
- (3) They can be improved.
- (4) They have mechanisms.

Except for 6 students they all answered correctly when

Table 3. Students' views on 'What is Technology?'

Grade/No.	Answers
4/1	When it is dark we put the lights on, we use the oven in the kitchen. They are technology.
4/2	Telephone, computer.
4/3	Electricity, bulb, oven in my home.
4/4	Telephone, iron, computer, etc., electrical things.
4/5	Telephone, computer, television.
4/6	Objects that fulfil the needs or desires of humans such as computer, table, blackboard, mug.
4/7	Electronic or non-electronic objects that fulfil our needs.
4/8	Technological products. Technological products should be improved, and should help us.
4/9	Scientists, computers, technological devices, money case, electronic devices.
4/10	Electronic devices.
5/11	Objects that work with electricity, computer, television, electricity wires.
5/12	Making devices to fulfil the needs of humans. Telephone, television, computer, etc.
5/13	Dish washer, telephone, and computer.
5/14	Useful devices for us.
5/15	Telephone, we use it in an emergency, that is, why it is a very important need.
6/16	Computer and electronic devices.
6/17	Computer, projector.
6/18	Media devices that scientists invent, computers, telephones.
6/19	I think of radiation, the harm to the world comes to my mind.
6/20	Internet, television, telephone.
6/21	The devices that fulfil our needs.
6/22	-
6/23	-

Table 4. 'What is Technology?' categorisation.

Categories	Numbers of students			
	4th grade	5th grade	6th grade	Total
Computer, television, telephone, internet, etc.	4	2	4	10
Electronic devices.	6	1	1	8
Devices that fulfil our needs.	4	2	1	7
Improved products.	1	-	-	1
Scientists.	1	-	-	1
Harm to the world such as radiation.	-	-	1	1

Table 5. Interview participants' average points from the "What is Technology?" instrument.

4th grade		5th grade		6th grade	
Pre-test score	Post-test score	Pre-test score	Post-test score	Pre-test score	Post-test score
35	86	28	73	37	98
Total (4, 5, and 6th grade)		Pre-test: 34		Post-test: 87	

they talked about the property of a technological product as fulfilling humans' needs. The increasing number of students that realised the meaning of technology can be seen. However, 4 students added that the products

should be electronic. This was the belief of most of the students before the module. There was another interesting view; "It helps us, for example a plant, if it is a cure for our health then it is a technological product.

Table 6. How they would understand if an object is a technological product or not.

Grade	Before the intervention (What is technology instrument)	After the intervention (What is technology instrument)	Interview	
4th grade	1	Technological products fulfil our needs	Technological products fulfil our needs They are electronic	
	2	-	-	
	3	They have wires	Technological products fulfil our needs. They are electronic	-
	4	-	Technological products fulfil our need	Technological products fulfil our needs
	5	Technological products fulfil our needs	-	Technological products fulfil our needs
	6	They have wires, they have volume or screen	Technological products fulfil our needs	Technological products fulfil our needs
	7	They are electronic	-	Technological products fulfil our needs
	8	Technological products fulfil our needs	Technological products fulfil our needs	Technological products fulfil our needs They have to be improved
	9	-	-	Technological products fulfil our needs They are electronic They have a mechanism
	10	-	Technological products fulfil our needs	Technological products fulfil our needs
5th grade	11	Technological products fulfil our needs	Technological products fulfil our needs They are electronic	
	12	-	Technological products fulfil our needs	Technological products fulfil our needs
	13	They are electronic	Technological products fulfil our needs	Technological products fulfil our needs
	14	-	-	-
	15	Technological products fulfil our needs	-	Technological products fulfil our needs
6th grade	16	Technological products fulfil our needs They are electronic They work with petrol	Technological products fulfil our needs They are electronic	
	17	They have to be designed, drawn or planned	Technological products fulfil our needs	Technological products fulfil our needs
	18	-	Technological products fulfil our needs	Technological products fulfil our needs
	19	They have to be improved They are new models	Technological products fulfil our needs	Technological products fulfil our needs

Table 6. Contd.

20	They are electronic	Technological products fulfil our needs	Technological products fulfil our needs
21	-	Technological products fulfil our needs	-
22	They are electronic	-	-
23	-	Technological products fulfil our needs	-

Water, we need it, and then it is a technological product”.

Quite a few participants stated that simple objects in everyday use such as a tray, pencil, glass, table, shoes, sunglasses, bandages, chair, ruler, bicycle, and notebook are not technological products, or if an object is simple, not complicated like the computer then it is not technology. One student from 5th grade stated that the horse is technology because horses are used for transportation.

The views of students about the harmful effects of technology

When students were asked about the harmful effects of technology they thought that there would be harmful effects in terms of health and social life. Regarding health, for example, students were aware of the radiation from computers, televisions and cellular phones, the harmful effect of television for our eyes, and the harmful effect of cellular phones for our ears. One participant stated that young people could find unsuitable friends by using the internet and another stated that excessive use of cellular phones could cause communication and economic problems in the family. Another view mentioned the problem of spending too much time by using the internet and watching television, which would cause them not to spend enough time for studying. The other problems stated were

traffic accidents and watching too much television.

The views of students about engineering

As stated in the methodology of this paper, students were asked to choose what an engineer does. There were 16 types of work presented to the students and 10 of them were correct. Table 7 shows the average points all the groups obtained out of 100. This table represents the result statistically.

Secondly, they were asked to write their description of an engineer. Ten students described engineers as people who construct or design buildings. The reason why they first thought about civil engineering was asked during the interviews and it was found out that in the areas where the participants lived, most of their fathers were working as construction foremen. When they described an engineer, none of them used the words “designing” or “drawing a project” before the intervention. One student described engineers as scientists and two students stated that an engineer was a person who helps people.

When Tables 5 and 7 were compared, it is clear that the increase in students’ understanding of technology was higher than the increase in their understanding of engineering. Most of them had difficulty in accepting that constructing buildings, driving machines, installing wiring and repairing cars were not engineers’ jobs. During the interview, participants were asked about their

views of engineers: what kind of work they do and who they are. Sixteen students mentioned that engineers draw and design projects. Three of them stated that engineers construct buildings, bridges or computers, while two of them said that engineers make inventions. “Engineers teach workers how to use machines”, “they produce knowledge” and “they do research” were the other ideas.

Before receiving the module they only knew about civil engineering but after the module they also stated the other engineering fields: computer engineering, electronic engineering, environmental engineering, mechanical engineering, food engineering and textile engineering. Their awareness had increased. However, the participants did not talk about EDP.

Students’ understanding of the engineering design process

Seventeen students did not remember the engineering design process. They simply did not state the steps of the process as *ask, imagine, plan, create and improve*. They could not give any examples.

At the end, they stated that they agreed to participate in that kind of training again. The things that they did not know before the module are listed as follows:

- (1) Knowledge about engineering such as

Table 7. Interview participants' average points from the "What is Engineering?" instrument.

4th grade		5th grade		6th grade	
Pre-test score	Post-test score	Pre-test score	Post-test score	Pre-test score	Post-test score
34	46	22	49	31	56
Total (4, 5, and 6th grade)		Pre-test: 30		Post-test: 50	

different types of engineering and the work that engineers do.

(2) Technology and technological products: one student stated that "I have learned that technological products are not only electronic devices but that any man-made devices that help humans or make contributions to human life are technological products".

(3) Differences and common points between scientists and engineers.

Participants' views of science

Students' views about science and the relationship between science and engineering and technology were examined. When they heard the word 'science' most of them thought of scientists, while two of them said that it was a kind of profession in which you had to work hard. One student stated that science is everything and one of them remembered astronauts and space. When they were asked to give some scientists' names, while 8 students could not give any names the others gave examples such as Edison, Einstein, Alexander Graham Bell and Ali Kuscü (a mathematician and astronomer who lived in the 15th century during the Ottoman Empire).

"What kind of work do scientists do?" was another question. The responses are categorised as follows: they develop technology, design projects, do research, make inventions, use technology, work in a laboratory, produce devices that make our lives easier, and are clever and inventors.

When they were asked about the relationship between science, technology and engineering, most of them did believe that there was a relationship. According to them, a scientist takes advantage of technology. For example, a scientist can use machines to produce knowledge. They also emphasised that a scientist produces knowledge and that an engineer uses that knowledge. Another view is that a scientist and an engineer improve technology, such as improving cellular phones.

DISCUSSION

Although the raising of technologically-literate individuals, which is widely accepted as one of the basic aims of science education, that is to say, science-technology-engineering-mathematics (STEM) integration, was

included in the Turkish science teaching curriculum in 2017, this need had already been recognised by science educators and studies and research related with STEM had already begun (Corlu et al., 2014; Corlu, 2013). Akgunduz et al. (2015) stated the importance of adding this field in the curriculum. They believed that "it will not be possible to compete in the global economic system that will enter a more challenging course in the 21st century without forming an educational culture and without raising a generation that has gained an understanding of science, mathematics, engineering". One of the results of this research was the inclusion of this subject in the syllabus. This research, aimed at developing the knowledge and understanding of primary school students with regard to science, technology and engineering, was also one of the studies mentioned. One of the modules developed by EİE had already been used in the study, since the research related with these modules had been examined and it was shown that the modules applied to large samples were beneficial both for students and for teachers (Cunningham and Lachapelle, 2010; Lachapelle et al., 2013, 2011a, 2011b, 2017, 2008; McKay et al., 2008). Sixteen of these modules, which were developed with great care and which were proven to have positive effects, were purchased from EİE to be adapted and used in Turkish. It is believed that every module, along with the results obtained from this study, will contribute to STEM education and that this will be important for education policy. For this reason, the contribution made by the implementation and translation into Turkish of each model in turn is pleasing for me as a researcher. Just as valuable results have been obtained from the work carried out with each module, so have both anticipated and striking results have been obtained from this study. Since what students say is important, the data were collected through one-to-one interviews. The participants who took part in the interviews actually said very little. It seemed that they had a lack of self-expression. More meaningful results were obtained from instrument 1 than from the interviews. Their lack of self-expression or the fact that the instruments have pictures might explain that conflict. The results were collected under the headings of students' views about technology and technological products, their opinions about the harmful effects of technology, and their views about engineering and science. In this way, in short, an attempt was made to determine whether the views of students with regard to the STEM sub-headings of science,

technology and engineering had developed after the module.

The categorisation made in terms of technology showed that electronic devices such as computers, television, and telephones came to the students' minds. Lachapelle et al. (2013) obtained the same result. They studied with primary students' (n=789) and used a "what is technology (WT)?" instrument for pre- and post-test. According to the results, most of the students relate technology to electronics. After teaching technology, although students' misconceptions decreased, some of the students still had misconceptions about technology. In both studies, too, it was shown that a few students could have misconceptions with regard to technology even after the intervention. It may also be concluded from this study that some of the sample students were confused in terms of their definition of technology. For example, one student, based on the definition, "technology means things which make our lives easier and are beneficial to us", defined the horse as a technological product since it makes transport easier for us, while another defined the lime flower as a technological product, since if we drink it when we are ill, it is beneficial to us. In that case, we must consider redefining the term technology. Is a technological product a natural object or is it made by people? The horse and the flower are each products of nature; therefore they are not technological products. Let us give a similar example for stone. Stone is a natural product and when it is found in nature it is not a technological product. Yet when we take it and use it to hit a nail, it becomes a technological product. This result of the study has created the idea that further research needs to be done on the subject of how the definition of technology should be given to students. For example, the sentence "things which meet the needs of people are technological products", given as an answer by students, could be the starting point for a study entitled "What is technology and how should it be taught?"

The change in the students' views with regard to engineering and technology was not easy. Just as in the studies by Cunningham et al. (2005) and Lachapelle et al. (2012), the results that appeared in this study revealed that students possessed the belief that the jobs to be done by technical staff were done by engineers. Yet the results of the questionnaire showed that following the module, the words 'engineering' and 'design' had begun to be used in association by students. The fact that the educational module was effective in this sphere had already been determined in previous studies (Cunningham and Lachapelle, 2010; Lachapelle et al., 2013; Cunningham et al., 2006). For instance Cunningham and Lachapelle's (2010) sample is very huge (experimental group of students n=5139 and control group n=1827) and they found significant differences between the experimental and control groups in that the experimental group of students had a better understanding of engineering and science. Yet it was

observed that the module was not effective in teaching of the engineering design process. In fact, it was reported that this method was very important for students not only to learn science subjects but also to learn the ways of knowing them (Cunningham and Kelly, 2017). In this context, the teacher training and educational module development projects were initiated. Not only the module developments but also the developments of some scales, which determine the ideas of students about science, technology and engineering, are needed. For instance, Koyunlu Unlu et al. (2016) have adapted science, technology, engineering and mathematics career interest survey into Turkish and the scale can be used to find out middle school students' interest in the subject. Very few studies have been conducted in Turkey about the effectiveness of science, technology and engineering education (Sahin et al., 2014; Corlu et al., 2014; Akgunduz et al., 2015). This study will contribute the curriculum developments with the example of a module.

CONFLICT OF INTERESTS

The author has not declared any conflicts of interests.

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Full Length Research Paper

Examination of attitudes to learning and educational stress in prospective primary school teachers: İzmir-Buca sample

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Many factors interact with each other in learning and internalizing a subject along with performing a new task. Attitudes and stress are the two of these factors. The aim of this study was to examine attitudes to learning and educational stress in third and fourth year students as prospective primary school teachers. The relational model was used and data were collected with Educational Stress Scale for Adolescents and Scale for Attitudes to Learning. The population of the study includes the students in the Education Faculty of a university where the researcher worked and a total of 189 third-year and fourth-year students formed the study sample. While the students' attitudes to learning differed in terms of subscales of educational stress, they either mostly agreed or were indecisive about their attitudes and stress. They also got low scores for educational stress; and a significant difference in attitudes to learning and expectations from learning in favor of the female students was observed. Similarly, the female students got higher scores for pressure from study, self-expectation and educational stress in general. No significant difference was found between the third-year and the fourth-year students in terms of their attitudes to learning, but the fourth-year students had a higher self-expectation. The sections of the students did not create a difference. There were relations between subscales of the scales. In view of these results, it can be suggested that educational stress can be reduced by using appropriate interventions designed to decrease worries about grades and workload and to support expectations of students.

Key words: Prospective primary school teacher, attitudes to learning and educational stress.

INTRODUCTION

The factors affecting individuals during the education and teaching processes are teachers, learning environment, teaching methods and techniques, learning strategies, background information, interactions with family and social milieu, attitudes, motivation, anxiety, self-efficacy, self-respect, self-concern and educational stress.

Learning and internalizing a subject and performing a new task can be achieved by interplay of abovementioned and more factors. Although learning and internalizing a subject (Özden, 1997: 24) along with accomplishment of what has not been achieved before (Kara, 2010) can have various definitions such as

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relatively permanent changes (Senemoğlu, 2005: 88) in a repertory of behavior (Cangöz, 2012: 10), their outcomes can be observed in their effects on individuals' lives. According to Smith and Ragan (1999), who divided factors effective in learning into cognitive, affective, social and physiological categories, attitudes, anxiety and self-efficacy related beliefs can also be considered as affective factors (Smith and Ragan, as cited in Kuzgun and Deryakulu, 2004: 9). Attitudes towards learning and educational stress, dealt with in the present study, can also be considered as affective factors.

Educational stress

Stress can be defined as changes experienced due to internal and external causes. Izgar (2008) stated that these changes may lead to physical and psychological outcomes, which may vary with personality and external conditions. Considering that stress is created by problems experienced, it clearly arises from many factors such as physical, psychological, social, mental, and work related and temporary factors (Izgar, 2008, as cited in Izgar, 2015: 387-388). Naturally, academic processes may also cause stress. Attempts to adapt to the academic environment and to be successful in this environment can be considered as sources of stress. Li and Zhang (2009) listed familial pressure, high cognitive expectations, high personal expectations, anxiety about failure, exam pressure, heavy loads of courses, low mental capacity, financial problems, competitive classroom environment and other problems arising from school environment as factors affecting stress in the school atmosphere (Li and Zhang, as cited in Seçer et al., 2015: 218).

Ways of coping with sources of stress have been examined in adolescents (Sun et al., 2013), nursing students (Reeve et al., 2013), medical students (Laakkonen and Nevgi, 2014) and university students in general. Regehr et al. (2013) conducted a meta-analysis including 24 studies about sources of stress and ways to decrease stress in 1431 university students. The results of the analysis underlined the fact that universities have to initiate programs to prevent stress and to decrease stress related anxiety and depression.

Stress experienced by teachers due to their profession has also been addressed in the literature. Bowen (2016) determined three main sources of stress in language teachers in North Africa; that is, job of teaching, relationships at work and organizational issues. A qualitative and quantitative study on primary school teachers in Sakarya, Turkey, by Aydın and Kaya (2016) revealed similar results. Using a stress scale and a semi-structured interview, the researchers found that difficulties caused by school administration, the teaching profession and conditions in schools were the sources of stress.

However, school administrators, considered as a

source of stress by teachers, also complained about the forgoing sources of stress. Beausaert et al. (2016) performed four longitudinal studies between 2011 and 2014 to reveal sources of stress and burnout in 3572 administrators of primary and secondary schools in Australia. They showed that a person's surroundings could be sources of stress and that social support could reduce stress and burnout.

As emphasized in the literature above, stress can be due to personal characteristics, working conditions, insufficient resources and a person's surroundings. Considering conditions in Turkey, problems likely to appear after graduation can also be a cause of stress for the students obtaining the right to study at university after a very difficult exam, KPSS (a national exam administered in Turkey to employ individuals as state officers/teachers when they become fourth year students). Therefore, third-year students were enrolled into the present study.

Attitudes to learning

The competencies individuals achieve at the end of their learning period are related to their experiences during their learning period. One of the factors effective in this process is attitude. The term attitude is defined as intentions of individuals influencing their acceptance or rejection of the opposite (Başaran, 1990). Attitudes are acquired by means of modelling behavior of others, identification and experiences. Attitudes to learning may result from the same factors.

Since attitudes can be effective in learning as mentioned above, there have been studies about effects of attitudes on learning in various fields of study including science, mathematics, Turkish language, learning a foreign language, use of technology and acquisition of communication skills (Akamca and Hamurcu, 2005; Ünal and Ergin, 2006; Özgen and Pesen, 2008; Bosede, (2014); Yaman, 2014; Harb et al., 2014; Kovac and Zdilar, 2017; Wan and Lee, 2017). Also, there have been many studies showing that attitudes towards teaching as an occupation varied with gender, field of study, age and personality (Oral, 2004; Doğan and Çoban, 2009; Başbay et al., 2009; Bulut, 2009; Demirtaş et al., 2011; Bulut, 2011; Aslan and Yalçın, 2013; Edwards, 2014).

Sade et al. (2007), in their study on attitudes towards online learning and Pierce et al. (2007, as cited in Kara, 2010), in their study on learning mathematics through technology found that attitudes of students affected their behavior during the learning process. Positive attitudes towards learning have been reported to cause greater attempts.

Relationships between Educational Stress and Attitudes to Learning

Educational stress resembles occupational stress due to

work life. It can be affected by various factors. Relations between educational stress experienced during the learning process and various factors have been the subjects of several studies. Its relations with such factors as success, learning strategies (Laakkonen and Nevgi, 2014) and gender (Bonneville-Roussy et al., 2017) were dealt with in the literature. Yıldırım et al. (2017) examined the relations between educational stress and ways of coping with stress and self-respect, social support and general health status in 517 nursing students and found that educational stress and ways of coping with stress are significantly related to self-respect and social support and are affected by general health status.

Aktürk (2012) carried out a study using Scale for Attitudes to Learning in 200 prospective teachers to reveal the relation between attitudes to teaching and reasons for wanting to become a teacher and academic performance. The researcher found that the participants wanting to be a teacher for internal reasons were more open to learning, had higher levels of expectations from learning and had lower anxiety about learning. In addition, a significant positive relation was detected between academic performance and the subscale nature of learning in Scale for Attitudes to Learning.

Wang et al. (2015) performed a study to investigate learning pressure, learning attitudes and achievement in Macau undergraduates. Their study comprised 135 Chinese volunteers from two public universities and one private university in Macau. Out of 135 volunteers, 55 were male and 80 female, and 39 were first-year, 33 second-year, 34 third-year and 29 fourth-year undergraduates. They reported that learning pressure had a significant, moderate, and positive correlation with learning attitudes and had a negative correlation with academic achievement.

The relation between educational stress and attitudes as an emotional factor has also been the focus of interest in the literature. Izgar (2015) conducted a study on students at an education faculty (n=208) and on students taking pedagogical formation courses (n=107) to deal with both educational stress and learning attitudes. In his study, there was a significant difference in scores for attitudes to learning in favor of male students. However, there was not a significant difference in educational stress between genders. The researcher attributed this to the fact that all the students had severe stress due to KPSS regardless of gender. It seems to be important to search the relations between educational stress and various factors in order to elucidate problems experienced in education systems. Therefore, this study, using data collection tools similar to those in Izgar's study, was performed in a different sample and at a different university and time.

Aim and research questions

Cognitive, affective and psychomotor knowledge and

skills of prospective primary school teachers become important considering their effects on their occupation after graduation. These will offer education to primary school students by using the abovementioned knowledge and skills, and thus equipping the students with the knowledge their teachers have and are affected by their teachers' attitudes and stress.

The aim of the study is to examine prospective primary school teachers' attitudes towards learning and educational stress levels. The term "prospective primary school teachers" refers to the "third- and fourth-year students" included in the sample. This is the first study performed only on students studying primary education in an education faculty to determine prospective primary school teachers' attitudes to learning and educational stress levels. Prior research has not mostly focused on both attitudes to learning and educational stress. In fact, there have been only two studies about the relation between these variables, conducted by Izgar (2015) and Wang et al. (2015). Although Izgar's study used the same methodology as the current study, his study included both students in an education faculty and students not studying education but taking pedagogical courses. Wang et al.'s study comprised of first-year, second-year, third-year and fourth-year university students. The research questions of the present study are as follows:

- 1) What are the students' attitudes to learning and educational stress in general?
- 2) Is there a difference in attitudes to learning and educational stress between the female and the male students?
- 3) Is there a difference in attitudes to learning and educational stress between the third-year and the fourth-year students?
- 4) Is there a difference in attitudes to learning and educational stress between the students in the four sections they were assigned into at the beginning of the term?
- 5) Is there a relation between the students' scores for their attitudes to learning and those for their educational stress?

METHODS

The study is based on the relational model. This model deals with presence of a relation between two or more variables and its degree (Karasar, 1991: 81). In this study, the relation between students' attitudes to learning and educational stress was examined.

Sample and its characteristics

The study population included all the students in the Department Of Primary School Education at the university where the researcher worked. The reason for selection of this population was that it was easily accessible. Convenience sampling was used, and the study sample included the third-year students, who started practicum

Table 1. Characteristics of the students included into the sample (n=189).

Variables	Characteristics	N	%
Gender	Female	136	72
	Male	53	28
Year of study	Third year	108	57
	Fourth year	81	43
Sections	4A	49	26
	4B	32	17
	3A	52	27
	3B	56	30

classes, and the fourth-year students, who were getting prepared for KPSS. A total of 244 third- and fourth-year students completed the data collection tools at the end of the academic year of 2016-2017. After elimination of the measures with missing responses, data from 189 students were analyzed. The response rate was 77.46%. Table 1 presents characteristics of the students included into the sample.

As shown in Table 1, the number of the female students was higher than that of the male students. This difference was also shown in other studies performed by Hamurcu (2006, 2010) and Pamuk et al. (2014) in the same study setting at different times. It may be that teaching as a profession is more popular with females. The reasons for the high number of female students could be examined in further studies.

The sample included a total of 189 students, of whom 136 were female and 53 were male. Out of 49 students in 4A, 17 were male and 32 were female. Out of 32 students in 4B, nine were male and 23 were female. Out of 52 students in 3A, 12 were male and 40 were female. Out of 56 students in 3B, 15 were male and 41 were female.

Data collection tools

Data were collected with Educational Stress Scale for Adolescents and Scale for Attitudes to Learning. Educational Stress Scale for Adolescents was developed by Sun et al. (2011) to measure levels of stress resulting from academic factors. It is a five-point self-report Likert scale and has five subscales and 16 items. The subscale pressure from study involves four items, workload three items, worry about grades three items, self-expectation three items and despondency three items. The scale was translated into Turkish and its validity and reliability for the Turkish population were tested by Akin et al. (2012). Construct validity of the scale was tested on 300 university students. According to the explanatory factor analysis made after achievement of the construct validity, Kaiser Meier Olkin value was 0.81 and the Bartlett's Sphericity test result was as follows: χ^2 : 3488.103. Sixteen items and five subscales explained 83% of the total variance. The internal consistency analysis made to determine the reliability of the scale showed that Cronbach's alpha was 0.86 for the scale and 0.87 for pressure from study, 0.93 for workload, 0.90 for worry about grades, 0.90 for self-expectation and 0.91 for despondency (Akin et al., 2012). Cronbach's alpha was 0.77 for the scale in the present study. Scale for Attitudes to Learning was developed and its validity and reliability were tested by Kara (2010). It is a five-point Likert scale

and has four subscales and 40 items. The subscale nature of learning involves seven items, expectation nine items, openness eleven items and anxiety thirteen items. The scale is composed of 29 positive items and eleven negative items. The construct validity of the scale was tested on 285 university students. According to the factor analysis for repeated measures, Kaiser Meier Olkin value was 0.79 and Bartlett's Sphericity value was as in the following: χ^2 : 3101,363. The internal consistency analysis, made to test the reliability of the scale, showed that Cronbach's alpha was 0.73 for the scale, 0.77 for nature of learning, 0.72 for expectations, 0.78 for openness and 0.81 for anxiety (Kara, 2010). Cronbach's alpha was 0.68 for the scale in the present study.

Analysis of data

Data obtained were analyzed with Statistical Package Program for Social Sciences for WINDOWS 17.0. Frequency, mean, standard deviation, mode and median were utilized for analysis of the data. Since the data did not have a normal distribution, the non-parametric tests, Kruskal Wallis, Mann-Whitney U test and Chi-square test and Pearson correlation analysis were employed for comparisons. $p < 0.05$ was accepted as significant.

RESULTS

Obtained results are dealt with and discussed in accordance with the research problems. To deal with the first research question "What are the students' attitudes towards learning and educational stress", the data are presented in Table 2.

Table 2 shows mean scores for subscales of the scales. Since the data collection tools are five-point Likert scales, they have four ranges and each range corresponds to the score of 0.80. Depending on the number of the items in the subscales, ranges can be calculated.

The lowest and the highest scores for Scale for Attitudes to Learning are 40 and 200 respectively. The students got the mean score for the scale was 151.21, corresponding to "mostly agree". They had a positive attitude to learning in terms of the nature of learning,

Table 2. Descriptive characteristics of data from Educational Stress Scale for Adolescents and Scale for Attitudes to Learning (n=189).

Scale	Subscales	Mean	Median	Standard deviation	Mode	Range
Scale for Attitudes to Learning	Nature of learning	31.11	32.00	3.49	22.0	13.0-35.0
	Expectation	39.69	40.00	4.41	25.0	20.0-45.0
	Openness	44.97	46.00	5.76	28.0	27.0-55.0
	Anxiety	35.42	36.00	7.79	38.0	13.0-51.0
	Total	151.21	152.00	9.45	75.0	100.0-175.0
Educational Stress Scale for Adolescents	Pressure for study	11.34	11.00	3.33	16.0	4.0-20.0
	Workload	9.37	9.00	2.49	12.0	3.0-15.0
	Worry about grades	8.87	9.00	2.84	12.0	3.0-15.0
	Self-expectation	10.7	11.00	2.52	11.0	4.0-15.0
	Despondency	8.74	8.000	2.61	12.0	3.0-15.0
	Total	49.14	48.00	9.17	50.0	24.0-74.0

expectations from learning, openness to learning and anxiety.

The highest and the lowest scores for Educational Stress Scale for Adolescents are 16 and 80 respectively. Higher scores for the scale indicate severe educational stress (Akin, 2012: 105). In the present study, the students got the mean score of 49.14 for the scale, which corresponds to indecisiveness. However, they got 10.7, a high score for the subscale self-expectation.

The second research question of the present study was whether the students' attitudes to learning and educational stress differed in terms of their gender. Table 3 presents a comparison of the scores for attitudes to learning and educational stress between genders according to the analysis with Mann-Whitney U test.

As shown in Table 3, there was a significant difference in scores for attitudes to learning in general and the subscale expectation between genders ($p < 0.05$). Similarly, the difference in scores for the subscales of educational stress, pressure from study and self-expectation between the genders was significant ($p < 0.05$).

The third research question of this study was whether there was a significant difference in attitudes towards learning and educational stress in terms of the year of study. According to the analysis with Mann-Whitney U test, the differences between the third-year and the fourth-year students in attitudes to learning and educational stress are shown in Table 4.

As presented in Table 4, there was not a significant difference in attitudes to learning between the third-year students and the fourth-year students. However, concerning with educational stress, there was a significant difference in self-expectations between the third-year and the fourth-year students $p < 0.05$. This difference resulted from the higher scores of the fourth-year students for self-expectations.

The fourth research question of the present study was whether the students differed in their attitudes to learning

and educational stress in terms of their sections. The students were receiving education in four different sections. They were assigned into these sections according to the last digit of the numbers in their student IDs at the beginning of the term. Kruskal Wallis-H test was performed to reveal possible differences. Table 5 shows the mean rank scores of the students in four sections and Table 6 reveals a comparison of the mean rank scores between the four sections; that is, 4A, 4B, 3A and 3B.

As shown in Table 5, there were small intragroup and intergroup differences in the mean rank scores for attitudes to learning and educational stress. To determine whether these differences were significant, Kruskal-Wallis analysis was performed. Chi-square and p values obtained through this analysis are shown in Table 6.

As seen in Table 6, no significant difference was found between the sections in terms of attitudes to learning and educational stress. The small differences shown in Table 5 were found to be insignificant. The students receiving education in four sections did not differ in their attitudes to learning and educational stress they experienced.

The fifth research question was whether there was a relation between the scores for attitudes to learning and those for educational stress. Pearson correlation analysis was made to determine the presence of this difference and the results of the analysis are presented in Table 7.

As demonstrated in Table 7, significant relations were detected between several subscales of Scale for Attitudes to Learning and those of Educational Stress Scale for Adolescents. The correlation coefficients 0.70-1.00 indicate a strong correlation, 0.70-0.30 a moderate correlation and 0.30-0.00 a weak correlation. Negative correlation coefficients show an inverse relation (Büyüköztürk, 2002: 31-32). Accordingly, as shown in Table 7, the following results were obtained:

No significant relation was found between the total scores for Educational Stress Scale for Adolescents and those

Table 3. Comparison of scores for Attitudes to Learning and Educational Stress between genders.

Scales	Subscales	Gender (n)	Mean rank	Sum rank	Mann-Whitney U test	P
Scale for Attitudes to Learning	Nature of learning	Female: 136	97.33	13236.50	3287.50	0.345
		Male: 53	89.03	4718.50		
	Expectation	Female: 136	103.89	14129.00	2395.00	0.000*
		Male: 53	72.19	3826.00		
	Openness	Female: 136	98.15	13348.00	3176.00	0.204
Male: 53		86.92	4607.00			
Anxiety	Female: 136	98.40	13382.00	3142.00	0.171	
	Male: 53	86.28	4573.00			
Total	Female: 136	105.82	14392.00	2132.00	0.000*	
	Male: 53	67.23	3563.00			
Educational Stress Scale for Adolescents	Pressure from study	Female: 136	100.03	13603.50	2920.50	0.042*
		Male: 53	82.10	4351.50		
	Workload	Female: 136	95.51	12989.00	3535.00	0.837
		Male: 53	93.70	4966.00		
	Worry about grades	Female: 136	96.44	13116.50	3407.50	0.558
		Male: 53	91.29	4838.50		
	Self-expectation	Female: 136	103.82	14119.50	2404.50	0.000*
Male: 53		72.37	3835.50			
Despondency	Female: 136	95.67	13010.50	3513.50	0.787	
	Male: 53	93.29	4944.50			
Total	Female: 136	100.07	13609.50	2914.50	0.041*	
	Male: 53	81.99	4345.50			

*p<0.05 was considered statistically significant.

Table 4. Comparison of Attitudes to Learning and Educational Stress between Third-Year and Fourth-Year Students.

Scales	Subscales	Year of Study (n)	Mean rank	Sum rank	Mann-Whitney U test	P
Scale for Attitudes to Learning	Nature of learning	Third year: 108	98.27	10613.50	4020.50	0.339
		Fourth year: 81	90.64	7341.50		
	Expectation	Third year: 108	94.75	10233.50	4347.50	0.943
		Fourth year: 81	95.33	7721.50		
	Openness	Third year: 108	93.98	10149.50	4263.50	0.766
Fourth year: 81		96.36	7805.50			
Anxiety	Third year: 108	96.20	10389.50	4263.50	0.766	
	Fourth year: 81	93.40	7565.50			
Total	Third year: 108	94.54	10210.50	4324.50	0.894	
	Fourth year: 81	95.61	7744.50			
Educational Stress Scale for Adolescents	Pressure from study	Third year: 108	91.14	9843.00	3957.00	0.260
		Fourth year: 81	100.15	8112.00		
	Workload	Third year: 108	95.53	10317.00	4317.00	0.877
		Fourth year: 81	94.30	7638.00		
	Worry about Grades	Third year: 108	89.81	9700.00	3814.00	0.130
Fourth year: 81		101.91	8255.00			
Self-expectation	Third year: 108	88.04	9508.00	3622.00	0.042*	
	Fourth year: 81	104.28	8447.00			

Table 4. Contd.

Despondency	Third year: 108	95.37	10300.00	4334.00	0.914
	Fourth year: 81	94.51	7655.00		
Total	Third year: 108	91.03	9831.50	3945.50	0.249
	Fourth year: 81	100.29	8123.50		

* $p < 0.05$ was considered significant.

Table 5. Distribution of mean rank scores for Attitudes to Learning and Educational Stress in four sections.

Scale for Attitudes to Learning	Sections (n)	Mean Rank	Educational Stress Scale for Adolescents	Mean Rank
Nature of learning	1:49	91.41	Pressure from Study	107.18
	2:32	89.45		89.38
	3:52	94.91		95.63
	4:56	101.39		86.97
Expectation	1:49	95.40	Workload	95.52
	2:32	95.22		92.42
	3:52	87.88		104.67
	4:56	101.14		87.04
Openness	1:49	94.56	Worry about Grades	106.73
	2:32	99.13		94.53
	3:52	86.77		93.58
	4:56	100.67		86.32
Anxiety	1:49	102.50	Self-Expectation	101.80
	2:32	79.47		108.09
	3:52	99.42		86.39
	4:56	93.21		89.56
Total	1:49		Despondency	99.27
	2:32			87.22
	3:52			93.92
	4:56			96.71
Total	1:49	102.28	Total	103.95
	2:32	85.41		94.69
	3:52	88.54		95.13
	4:56	100.12		87.22

for Scale for Attitudes to Learning ($r = 0.363$; $p = 0.392$). However, there was a significant relation between the scores for Educational Stress Scale for Adolescents and those for the subscales of Scale for Attitudes to Learning and between the scores for Scale for Attitudes to Learning and the scores for the subscales of Educational Stress Scale for Adolescents.

There was a significant, positive weak relation between the score for the subscale self-expectation in Educational Stress Scale for Adolescents and the score for Scale for Attitudes to Learning ($r = 0.166$; $p = 0.023$).

A significant, positive weak relation was also found between the score for the subscale despondency in

Educational Stress Scale for Adolescents and the score for Scale for Attitudes to Learning ($r = 0.148$; $p = 0.043$).

No significant relation was found between the score for the subscale nature of learning in Scale for Attitudes to Learning and the score for Educational Stress for Adolescents.

A significant relation was found between the score for the subscale expectation in Scale for Attitudes to Learning and the score for Educational Stress Scale for Adolescents and its three subscales. There was a moderate negative correlation between expectation and educational stress in general ($r = -0.229$; $p = 0.002$), pressure from study ($r = -0.222$; $p = 0.002$), workload ($r = -$

Table 6. Comparison of mean rank scores for Attitudes to Learning and Educational Stress between the sections.

Scale for Attitudes to Learning	Results of Kruskal-Wallis analysis *	Educational Stress Scale for Adolescents	Results of Kruskal-Wallis analysis*
Nature of learning	Chi-square: 1.32 p: .723	Pressure from study	Chi-square: 4.02 p: .259
Expectation	Chi-square: 1.60 p: .658	Workload	Chi-square: 2.93 p: .401
Openness	Chi-square: 1.97 p: .579	Worry about grades	Chi-square: 3.74 p: .290
Anxiety	Chi-square: 3.90 p: .271	Self-expectation	Chi-square: 4.50 p: .212
		Despondency	Chi-square: 1.03 p: .793
Total	Chi-square: 3.07 p: .381	Total	Chi-square: 2.44 p: .485

* Since $p > 0.05$ for the degrees of freedom 3, there was not a significant difference between the sections.

Table 7. Results of the correlation analysis for the Relation between Attitudes to Learning and Educational Stress.

Subscales	AG	NL	E	O	A	SG	PS	WL	WG	SE	D
Pearson p n AG	1 189										
Pearson p n NL	0.520 0.000* 189	1 189									
Pearson p n E	0.701 0.000* 189	0.298 0.000 189	1 189								
Pearson p n O	0.444 0.000* 189	0.144 0.048* 189	0.644 0.000* 189	1 189							
Pearson p n SG	0.254 0.000* 189	-0.093 0.205 189	-0.326 0.000* 189	-0.631 0.000* 189	1 189						
Pearson p n PS	0.063 0.392 189	-0.005 0.947 189	-0.229 0.002* 189	-0.352 0.000* 189	0.468 0.000* 189	1 189					
Pearson p n WL	0.005 0.947 189	-0.080 0.275 189	-0.222 0.002* 189	-0.324 0.000* 189	0.407 0.000* 189	0.814 0.000* 189	1 189				
Pearson	-0.087	-0.095	-0.201	-0.266	0.248	0.575	0.450	1			

Table 7. Contd.

p		0.232	0.192	0.005*	0.000*	0.001*	0.000*	0.000*				
n	WG	189	189	189	189	189	189	189	189	189		
Pearson		-0.010	0.016	-0.097	-0.118	0.123	0.589	0.307	0.118	1		
p		0.892	0.823	0.183	0.104	0.091	0.000*	0.000*	0.106			
n	NK	189	189	189	189	189	189	189	189	189		
Pearson		0.166	0.077	0.009	-0.111	0.243	0.687	0.402	0.203	0.366	1	
p		0.023*	0.294	0.905	0.129	0.001*	0.000*	0.000*	0.005*	0.000*		
n	SE	189	189	189	189	189	189	189	189	189	189	
Pearson		0.148	0.084	-0.229	-0.334	0.518	0.617	0.431	0.167	0.119	0.339	1
p		0.043*	0.253	0.002*	0.000*	0.000*	0.000*	0.000*	0.022*	0.104	0.000*	
n	D	189	189	189	189	189	189	189	189	189	189	189

* $p < 0.05$ was considered significant. AG: Attitudes to learning in general; NL: nature of learning E: Expectation, O: Openness; A: Anxiety; EG: Educational stress in general; PS: Pressure from Study; WL: Workload; WG: Worry about grades; SE: Self-expectation; D: Despondency.

0.201; $p = 0.005$) and despondency ($r = -0.229$; $p = 0.002$).

A significant relation was detected between the score for the subscale openness in Scale for Attitudes to Learning and the scores for Educational Stress Scale for Adolescents and its three subscales. A negative moderate relation was found between the score for openness and the scores for Educational Stress Scale ($r = -0.352$; $p = 0.000$) and its subscales pressure from study ($r = -0.324$; $p = 0.000$) and despondency ($r = -0.334$; $p = 0.000$). A negative weak relation was detected between the score for openness and the score for the subscale workload ($r = -0.266$; $p = 0.000$).

There was a significant positive relation between the score for the subscale anxiety about learning in Scale for Attitudes to Learning and the scores for Educational Stress Scale for Adolescents ($r = 0.468$; $p = 0.000$) and its four subscales. Anxiety had a significant moderate relation with pressure from study ($r = 0.407$; $p = 0.000$) and despondency ($r = 0.518$; $p = 0.000$) and a significant, weak relation with workload ($r = 0.248$; $p = 0.001$) and self-expectation ($r = 0.243$; $p = 0.001$).

DISCUSSION

In the present study, the students were found to have a positive attitude towards learning. In contrast with this finding, Izgar (2015: 393) reported that the students got lower scores for their attitudes to learning. In Izgar's study, the mean score was 91.30 in the students at the Education Faculty and 87.49 in the students taking Pedagogical Formation courses, with a significant difference ($p < 0.05$). The researcher ascribed this difference with the idea that the students at the Education Faculty were more enthusiastic with becoming a teacher.

In the current study, the students received low scores for educational stress; however, they agreed that self-expectations created educational stress. It can be suggested that they did not have high levels of educational stress, compatible with the results reported by Izgar (2015: 393). In Izgar's study, the students at the Educational Faculty had a mean score of 48.8.

Causes of stress have not been elucidated completely and have been classified differently in the literature. Gupta (1981) categorized them into environmental, organizational and personal factors (Gupta, 1981, as cited in Buluş, 1999: 67). Izgar (2008) identified six factors as stated in Introduction; that is, physical, psychological, social, mental, and work related and temporary factors (Izgar, 2008, as cited in Izgar, 2015: 387-388). The reason for the changes in classification of these causes is that stress is created by interplay of numerous factors. Gender is one of these factors. While some studies did not show a relation between gender and stress (Chan, 2002; Cam, 2004; Durna, 2006; Erdoğan et al., 2009; Izgar, 2015), others revealed a significant relation between them (Aysan, 1998; Sökmen, 2005). These conflicting findings might be due to differences in setting and time of studies, characteristics of samples and multiplicity of factors causing stress.

In the present study, the female students got significantly higher scores for expectations from learning, pressure from study and self-expectations. This suggested that the female students had a higher level of educational stress due to their expectations from learning, pressure from study and self-expectations. However, Durna (2006: 374) in a study on 378 university students did not find a significant difference in stress severities between male and female students. In addition, Izgar (2015: 393) did not show a significant difference in

educational stress between the male and the female students ($t=-0.36$; $p=0.72$; $p>0.05$). The researcher attributed this to the fact that both male and female students were getting prepared for KPSS, which would take place soon.

Although several studies showed that gender did not have a significant influence on attitudes to learning (Saracaloğlu, 2000), other studies revealed a significant difference between genders (Izgar, 2015; Wan and Lee, 2017). The present study revealed that the female students had higher self-expectations. It may be that they were more willing and assiduous to receive education and have an occupation. In contrast with the finding in the present study, Izgar (2015: 392), in his study on 182 female students and 133 male students found a significant difference in attitudes to learning in favor of the male students ($t=-2.03$; $p=0.04$; $p<0.05$). The researcher suggested that the male students were more willing to learn. The conflict between the current study and Izgar's study might have been due to differences in stress related factors. Like Izgar, Wan and Lee (2017) showed that male students had significantly more favorable attitudes to science in terms of the subscales self-concept in science, enjoyment in science, learning in and outside the classroom and future participation.

The year of study did not have a significant influence on attitudes to learning. This indicates that the year of study was not predictive of attitudes to learning. However, it had a significant influence on expectations. In fact, the fourth-year students had higher expectations about their academic success and their life in the future. Therefore, they experienced more severe educational stress. Considering that the subscale self-expectation has items about hopes for the future, the finding is indicative of their stress and anxiety about their life in the future.

In the current study, self-expectations and despondency had a positive weak relation with attitudes to learning. This suggests that self-expectations and despondency slightly affect attitudes to learning. The nature of learning had no significant relation with educational stress. This indicates that it did not produce educational stress.

Educational stress in general, pressure from study, workload and despondency had moderate, negative correlations with expectation. This finding is suggestive of a moderate, negative effect of educational stress in general, pressure from study, workload and despondency on expectations related attitudes.

Educational stress in general, pressure from study and despondency had a significant negative moderate relation with openness. These findings are suggestive of a moderate effect of educational stress in general and its subscales pressure from study and despondency. Workload had a significant negative weak correlation with openness. This suggests presence of a mild influence of workload on openness related attitudes to learning.

The relation between educational stress and anxiety related to attitudes to learning was significantly positive. This finding shows presence of a linear relationship between anxiety about learning and educational stress and that as one increases so does the other (Büyüköztürk, 2002: 32). It can be suggested that anxiety is influenced by some aspects of educational stress.

In Izgar (2015: 394) study, the score for Scale for Attitudes to Learning had a significant negative weak relation with the scores for the subscales worry about grades ($r=-0.16$) and self-expectation ($r=-0.23$, $p<0.01$) in Educational Stress Scale for Adolescents. It means that as the scores for worry about grades and self-expectation increased, the scores for attitudes to learning decreased, which conflicts with the results of the present study. The conflict between the findings in Izgar's study and those of the present study might have resulted from the differences between the samples. Especially, inclusion of the students taking pedagogical courses in Izgar's study might have had an impact on the difference. In fact, as emphasized before, significant differences were found between the students in the education faculty and those taking pedagogical courses in terms of attitudes to learning and educational stress. This might have an influence on the correlation analysis of the scores for both scales.

CONCLUSION AND RECOMMENDATIONS

This study, directed towards revealing relations between attitudes to learning and educational stress, show that although the students' attitudes to learning varied with subscales of educational stress, the students either mostly agreed or were indecisive about their attitudes and stress. Their low scores for educational stress indicate that they had low levels of stress. Since high levels of stress can be effective in academic performance, their low scores for educational stress seem to be favorable. The comparisons between genders revealed differences in attitudes to learning and educational stress and their subscales in favor of the female students. Although the year of study did not create a difference in attitudes to learning, the fourth-year students had a higher self-expectation. The sections of the students did not cause a difference. Attitudes to learning were associated with some aspects of educational stress.

In light of the results of this study, the following recommendations can be made:

- 1) The study was performed on a small sample of the students in a single Education Faculty. Therefore, further studies should be conducted in larger samples.
- 2) Data were collected only through quantitative research tools like scales. It can be recommended that qualitative data be gathered with such tools as interviews and focus

group interviews.

3) Detection of relations between attitudes to learning and educational stress can provide guidance for arrangement of the learning environment. Taking account of effects of attitudes on academic success, appropriate interventions directed towards minimization of worries about grades and workload and supporting expectations should be offered to reduce academic stress of students. The units and specialists responsible for reduction of educational stress in students at universities could be appointed to conduct these interventions.

4) Stress and anxiety can affect academic performance. This may prevent students from receiving sufficient scores to pass KPSS in Turkey, required to get a job in state organizations. Therefore, the Turkish Ministry of Health and other policy makers should pay attention to the relation between academic performance and stress and anxiety. The results of the present study can help them be aware of the problems experienced by prospective primary school teachers, take appropriate precautions and provide appropriate support for these prospective teachers.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Appendix A

ÖĞRENMEYE İLİŞKİN TUTUM VE STRES ÖLÇEKLERİ

Açıklama: Aşağıda öğrenmeye ilişkin çeşitli ifadeler verilmiştir. Söz konusu ifadeye hangi oranda katılıyorsanız, lütfen karşısındaki ilgili sütunu "X" ile işaretleyiniz. Bu araştırma tamamen bilimsel amaç taşımaktadır, vereceğiniz samimi ve eksiksiz cevaplardan dolayı teşekkür ederim. Yrd. Doç. Dr. HÜLYA HAMURCU

Cinsiyetiniz: Kadın..... Erkek.....
Sınıf: 3. Sınıf..... 4. Sınıf.....

Öğrenmeye ilişkin tutum	Katılıyorum	Kısmen Katılıyorum	Fikrim Yok	Katılmıyorum	Hiç Katılmıyorum
1-Zeki olanlar daha rahat öğrenirler					
2- Öğrendiklerimi çabuk unutmam beni tedirgin ediyor					
3- Yeni konular öğrendikçe düşüncelerim farklılaşmaktadır					
4- Çalışmayı sevmediğimden öğrenmek istemiyorum					
5- Öğrenme ömür boyu devam eder					
6- Öğrenmek zor iştir, yeni şeyler öğrenirken zorlanıyorum					
7- Öğrendiklerim hayata bakış açımı değiştiriyor					
8- Zorunlu değilse, öğrenmek istemem					
9- Öğrenmede zeka önemlidir					
10- Öğrenirken çok zaman kaybetmem beni olumsuz etkilemektedir					
11- Şimdiye kadar çok şey öğrendim ama faydasını hiç görmedim					
12- Zor olan konuları öğrenmek bana zevk veriyor					
13- Ne öğrenirsem 30 yaşına kadar öğrenirim					
14- Yeni konular anlatılırken rahatsızlık duyuyorum					
15- Hayatta karşılaşılan problemlerle ilgili etkili ve doğru karar verebilmek için sürekli öğrenmek gerekir					
16- Yeni bir konuyu öğrenirken zorlanmıyorum					
17- Öğrenme ölüme kadar devam eden bir süreçtir					
18- Yeni konular öğrenirken konsantrasyon sorunu yaşarım					
19- Yeni şeyler öğrenerek insanlarla iletişimi geliştirmek istiyorum					
20- Sürekli yeni şeyler öğrenmekten yoruldu					
21- Her insanın öğrenme kapasitesi farklıdır					
22- Dikkatimi yoğunlaştıramamam beni rahatsız ediyor					
23- Yeni şeyler öğrenmek yaptığım işlerde başarılı olmamı sağlıyor					
24- Öğrenmeye açık bir insan değilim					
25- Zeki olanlar daha iyi öğrenirler					
26- Yeni konular anlatıldığında canım sıkılır					
27- Öğrendikçe yanlış kararlarımın sayısı azalmaktadır					
28- Şu an sahip olduğum bilgiler benim için yeterlidir					
29- Öğrenmek hep ilgimi çekmiştir					
30- Yeni şeyler öğrenmek işimle ilgili motivasyonumu artırıyor					
31- Daha öğreneceğim çok şey var					
32- Yeni bir konuyu öğrenmeye çalışmak keyiflidir					
33- Öğrendikçe hedeflerim büyüyor					
34- Deneyimlerimden ders almayı bilirim					
35- Yeni konulara başlarken tedirgin olurum					
36- Her türlü konuyu rahatça öğrenebilirim					
37- Yeni konular öğrenmek hoşuma gidiyor					
38- Öğrenmeye karşı tedirgin değilim					
39- Yeni konular öğrenirken başım ağrır					
40- Yeni şeyler öğrenmeye sürekli hazırım					

Appendix B

Eđitim stresi ölçeđi						
Her sorunun karřısında bulunan; (1) Hiç Katılmıyorum (2) Katılmıyorum (3) Kararsızım (4) Katılıyorum ve (5) Tamamen Katılıyorum anlamına gelmektedir. Lütfen her ifadeye mutlaka TEK yanıt veriniz ve kesinlikle BOŐ bırakmayınız. En uygun yanıtları vereceđinizi ümit eder katkılarınız için teŐekkür ederim.						
1	Derslerden aldığım notlarımdan hiç memnun deđilim.	1	2	3	4	5
2	Okulda çok fazla yapılacak iŐim olduđunu hissediyorum.	1	2	3	4	5
3	Çok fazla ev ödevim var.	1	2	3	4	5
4	Gelecekteki eğitim ve çalışma yaşantımı düşünüşümde akademik açıdan yoğun baskı hissediyorum.	1	2	3	4	5
5	Ebeveynim ders notlarımla çok fazla ilgileniyor ve bu benim baskı hissetmeme yol açıyor.	1	2	3	4	5
6	Günlük derslerimden ve akademik çalışmalarımın dolaylı yoğun baskı altına giriyorum.	1	2	3	4	5
7	Okulda çok fazla sınav olduđunu düşünüyorum.	1	2	3	4	5
8	Derslerden aldığım notlar geleceğim için çok önemlidir hatta bütün yaşamımı etkileyebilir.	1	2	3	4	5
9	Sınavlardan düşük not aldığımında ebeveynimi hayal kırıklığına uğrattığımı düşünürüm.	1	2	3	4	5
10	Sınavlardan düşük not aldığımında öğretmenimi hayal kırıklığına uğrattığımı düşünürüm.	1	2	3	4	5
11	Sınıf arkadaşlarım arasında yoğun bir rekabet var ve bu akademik açıdan baskı hissetmeme yol açıyor.	1	2	3	4	5
12	Çođunlukla derslerden alacağım notlar konusunda kendime güvenemem.	1	2	3	4	5
13	Derslerde dikkatimi toplamakta çok güçlük yaşıyorum.	1	2	3	4	5
14	Kendim için belirlediğim akademik standartlara ulaşamadığımda kendimi gergin hissederim.	1	2	3	4	5
15	Beklentilerimi karşılayamadığım durumlarda yeteri kadar iyi olamadığımı hissederim.	1	2	3	4	5
16	Amaçlarıma ulaşamayacağımı düşünüşümde yoğun biçimde endişelenirim ve çođunlukla uyuyamam.	1	2	3	4	5

Not: Sevgili öğrencilerim bu bölüme, Sınıf öğretmenliği bölümünü/ mesleđini seçmenizle ilgili görüşlerinizi yazabilirsiniz... Ayrıca derslerle, gelecekteki akademik beklentilerle ilgili de düşüncelerinizi öğrenmek isterim.

Buraya yazacaklarınız sadece akademik/ bilimsel ve etik kurallara uygun olarak kullanılacaktır.

Görüşlerim;

A stack of several books with various colored spines (brown, red, blue, green) is the central focus. In the foreground, a pair of glasses with thin frames lies on a dark surface. The background is dark and out of focus.

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