# Personality Traits, Communication Skills and Science Teaching Self-Efficacy Beliefs of Preservice Primary School Teachers

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| Article Info | ABSTRACT |
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| | An effective curriculum requires teachers, as practitioners, to have field competencies, effective communication skills, positive beliefs, attitudes and personality traits. Accordingly, it was aimed in this study to identify the personality traits, communication skills and science teaching self-efficacy beliefs of preservice primary school teachers and to reveal their relationships with each other. For this purpose, the correlational research model was preferred among the quantitative research methods, and the bivariate spearmen test was used in the data analysis. The study sample consisted of 234 preservice primary school teachers. The research findings have revealed significant and moderate positive correlations between communication skills and the sub-dimensions of personality traits including extraversion, agreeableness, conscientiousness, and openness to experience, and a significant weak negative correlation between communication skills and the neuroticism sub-dimension of personality traits. Moreover, communication skills have positive correlations with science teaching self-efficacy beliefs as well as its sub-dimensions, self-efficacy and outcome expectancy. The significant correlations with science teaching self-efficacy beliefs and self-efficacy are moderate, whereas the one with outcome expectancy is weak. Furthermore, science teaching self-efficacy belief has a significant weak positive relationship with personality traits including extraversion, agreeableness, conscientiousness, and openness to experience, yet an insignificant negative relationship with neuroticism. As a result of the findings, it is recommended that practices to enhance communication skills should be integrated into the primary school teacher training program for teachers with high science self-efficacy perception, and personality traits should be identified while selecting a department. |

# Geleceğin Sınıf Öğretmenlerinin Kişilik Özellikleri, İletişim Becerileri ve Fen Öğretimi Öz Yeterlik İnançları

**ÖZ**

Etkili bir eğitim öğretim programı uygulayıcı olan öğretmenlerin alan yeterliklerini etkili iletişim becerilerini, olumlu inanç, tutum ve kişilik özellikleri taşımaların gerekli kılar. Çalışmada geleceğin sınıf öğretmeni adaylarının kişilik özellikleri iletişim becerileri ve fen öğretimi öz yeterlik inançlarının tespiti ve birbirleriyle olan ilişkilerinin açığa çıkarılması amaçlanmıştır. Bu hedefle nicel araştırma yöntemlerinden korelasyonel araştırma modeli ve verilerin analizinde ikili korelasyon testi kullanılmıştır. Örneklem grubunu farklı sınıf düzeylerinde eğitim gören öğretmen adaylarından ve amaçlı örnekleme yöntemlerinden kolay ulaşılabilir durum örneklemesi yaklaşımıyla seçilmiş olan 234 sınıf öğretmeni adayı oluşturmuştur. Araştırma bulgularına göre, iletişim becerileri ile kişilik özelliklerinin alt boyutlarından dışa dönüklük, yumuşak başlılık ve sorumluk ve deneyime açıklık arasında pozitif yönde ve orta seviyede anlamlı ilişkiler olduğu görülmüştür. İletişim becerileri ile kişilik özelliklerinin duygusal dengesizlik alt boyutu arasında negatif yönde düşük seviyede anlamlı ilişki olduğu bulunmuştur. İletişim becerileri ile fen öğretimine yönelik öz yeterlik algısı ve alt boyutlarından öz yeterlik ve sonuç beklentisi arasında pozitif yönde ilişkiler olduğu görülmüştür. İletişim becerileriyle aralarında bulunan bu anlamlı ilişkilerden öz yeterlik ve fen öğretimine yönelik öz yeterlik algısı orta düzeyde anlamlı iken sonuç beklentisi düşük düzeydedir. Fen öğretimine yönelik öz yeterlik algısı ile kişilik özelliklerinden dışa dönüklük yumuşak başlılık, sorumluluk ve deneyime açıklık arasında pozitif yönde düşük düzeyde anlamlı ilişkiler olduğu görülürken duygusal dengesizlik arasında negatif yönde anlamsız bir ilişki olduğu görülmüştür. Bulgular sonucunda sınıf öğretmen yetiştirme programında fene dair öz yeterlik algısı yüksek öğretmenler için iletişim becerilerini artırmaya yönelik uygulamaların yapılmasının ve kişilik özellikleri belirlenerek bölüm tercihi yapılmasının daha faydalı olabileceği önerileri yapılmıştır.

# INTRODUCTION

The countries considered as economically developed pay particular attention to their education policies. An education system needs teachers to serve as practitioners, as well as a well-designed curriculum and appropriate physical conditions. An effective education system is in the hands of teachers who administer the curriculum. In Article 43 of the National Education Basic Law No. 1739, the profession of teaching is defined as "a specialty occupation that takes care of the education and education-related administrative duties of the state". The quality and competency of this occupational group is the most important factor for educational activities to be successful (Büyükkaragöz, 1998).

In order for the system to function as foreseen, teachers require certain characteristics, which must be taken into account when selecting and training students in the faculties of education. Many countries such as the USA and Finland, which are economically powerful, demand reference letters from students regarding their attitudes, personality traits and communication skills if they demand to choose the profession of teaching (Ekinci & Öter, 2010; UMICH, 2014). In the study in which Ekinci and Öter (2010) investigated the education and teacher training systems in Finland, general competency areas of teachers are identified as; awareness of and respect for individual differences of students, cooperation and communication with other teachers, collaboration with parents and various branches of society, design and development of effective and appropriate learning environments and materials, continuation of professional development. Similarly, in Türkiye, teacher qualifications are specified within the scope of the support program for basic education, which took effect with the Financing Agreement signed by the European Commission on 8 February 2000. The general purpose of the program is "to reduce poverty, to improve the quality of and access to education by increasing the education level, to enhance the living conditions of the population in the most disadvantaged rural, urban and slum areas, to support the inclusion of excluded children, young people and adults in basic education, and the improvement of teacher supply". As a result of these workshops held in 2004 as part of the program initiated in 2002, the general competencies of the teaching profession were determined in 6 main competency areas, 31 sub-competencies and 233 performance indicators. Six main competencey areas are:

    A. "Personal and Professional Values – Professional Development,

    B. Recognition of Student,

    C. Learning and Teaching Process,

    D. Monitoring and Evaluation of Learning and Development,

    E. School-Parent and Society Relationships,

    F. Program and Content Knowledge."

In the primary education period covering the first four years, the practitioners are primary school teachers, for whom the Ministry of National Education identified competencies in 2008, and they were effectuated with the Ministerial Approval No. 2391 dated 25 July 2008. Specialized Competencies for Primary school Teachers are as follows (MoNE, 2008):

***Learning-teaching environment and development***

    • Adopt concepts and principles related to development and learning,

    • Provide guidance in accordance with students' periods of development,

• Design appropriate learning environments considering students' individual differences such as superior ability, learning difficulty and learning styles,

• Utilize tools and equipment to enrich learning and teaching processes,

• Adopt thinking skills such as critical and creative thinking in their practices,

• Improve problem solving skills of students,

• Improve reasoning skills of students,

• Carry out practices considering students with special needs and special education needs in the learning and teaching process, includes qualifications.

*Monitoring and evaluation:*

• Monitor students' level of development in the learning process,

• Evaluate the data obtained from the assessment tool applied in the teaching process, includes qualifications.

*Personal and Professional Development – Social Relationships:*

• Ensure professional development,

• Develop professional ethical values,

• Collaborate with education stakeholders and other members of the society in the education process,

• Utilize information technologies for professional development and communication, includes qualifications.

*Art and aesthetics:*

• Have general knowledge of fine arts,

• Use artistic activities in the learning process,

• Consider aesthetical perspective in the design of learning and teaching environments,

• Ensure internalization of the importance attached to art by Atatürk, includes qualifications.

*Improvement of language skills:*

• "Improve students' skills for correct, proper and effective use of Turkish language,

• Improve students' reading and writing skills,

• Serve as a model in proper and effective use of Turkish language and communication,

• Reflect Atatürk's opinions and views regarding Turkish language and national values on the practices in the teaching process", includes qualifications.

*Scientific and technological improvement:*

• Ensure students' proper and effective use of scientific and technological concepts,

• Enable students to acquire general knowledge on the development of science,

• Reflect Atatürk's opinions and views regarding science and technology on the practices in the teaching process, includes qualifications.

*Individual responsibilities and socialization*

- Enable students to recognize themselves and their immediate circle (family, friends, school),

- Enable students to acquire a sense of responsibility and democratic behavior,

- Enable students to establish effective communication,

- Improve students' ability to recognize and observe the natural environment in which they live,

- Develop an understanding of natural disasters in students,

- Develop a sense of love and protection for nature in students,

- Develop a sense of time (past, present and future) and change in students,

- "Reflect Atatürk's views about children's, human, democracy and citizenship rights and responsibilities on the teaching environment", includes qualifications.

*Physical education and safety:*

- Guide students to enhance their gymnastics and dance movements in company with rhythm and music,

- Provide students with basic knowledge and skills about individual and team sports,

- Develop students' motor skills related to individual and team sports,

- Enable students to gain proper and balanced nutrition habits,

- Render first aid in sports injuries,

- Reflect Atatürk's opinions and views regarding sports and national values on the practices in the learning process, includes qualifications.

The qualifications required by a teacher can be observed in these lists of competencies. Teachers, themselves, should have the qualifications to be taught in order to serve as a good model. According to Erişen and Şen (2002), effective teachers are sociable, genial, patient, sensitive, well-mannered, cheerful and friendly to their students. Considering the 32-item characteristics of a good teacher identified by the Ministry of National Education, a teacher should be extroverted, emotionally stable, agreeable, conscientious and open to experience (MoNE, 2013).

In the Programme International Student Assessment (PISA) research conducted in 2012 by Organisation for Economic Cooperation and Development (OECD), the lack of qualifications and number of teachers is indicated as the reason for low student performance (OECD, 2012). Studies have been conducted on teacher qualifications regarding the education level of different countries, and mostly yielded the same conclusions. The increase in the quality of teachers brings in student achievement and an increase in the quality of education (Akyüz, 2003; UNESCO, 2001). Consequently, this study aims to identify the relationships between personality traits, communication skills and science teaching self-efficacy beliefs of preservice primary school teachers.

**Personality Traits**

Personality is a unique, complex and dynamic whole of an individual's physical and kinetic structure, cognitive and affective reactions, and self-formation; it is the character (Bakırcıoğlu, 2006:150). Personality describes the patterns of perception, learning, thinking, coping and behavior that arise from internal sources, dominate the person's manners, and include what is learned through biological structure and experience (Aslan, 2012). For this reason, personality has a specific importance in teaching, as in each profession within the scope of social

sciences. There are different models presented to explain personality and to identify personality traits. These are Psychoanalytic approach, Distinctive feature approach, Biological approach, Humanistic approach, Behavioral/Social learning approach and Cognitive approach. Each approach individually names the sub-dimensions of personality and states causes of behaviors.

One of the models aimed at identifying personality traits is Five Factor Personality Model, which defines personality traits in five different dimensions and 30 related sub-dimensions. The main dimensions of the model were determined considering hundreds of personality traits (Erkuş & Tabak, 2009). Many studies of different cultures have acknowledged these five dimensions, which include extraversion, emotional stability/neuroticism, agreeableness, conscientiousness and openness to experience (Bacanlı et al., 2009).

**Communication Skills**

Even though communication has different definitions due to being the common ground for the whole field of science, it is actually the correct understanding of a message that is meant to be conveyed to the other party (Staton, 1988). The essence of an effective communication is the practice of this definition.

Education comprises the process of interpersonal interaction. Students and teachers, who gather formally under the roof of the school, are in mutual communication. For the smooth functioning of the curriculum, the teacher, as the transmitter, needs to convey the information correctly to the students, who are the receivers. Maintenance of this process without a hitch is possible through effective communication skills.

Allred (1992) specifies communication skills as honesty, sincerity, empathy, respect, speaking, revealing opinions, trying to understand, collaborating, making a commitment, encouraging, teaching, and expressing feelings (As cited in Şahin-Yüksel, 1997). According to Cüceloğlu (1994) and Ersever (1985), for an effective communication, an individual should have strong personality traits as well as communication skills.

**Self-efficacy Belief**

According to Bandura's (1986-1989) social learning theory, self-efficacy concept belief is related to personal judgments of individuals about how well they perform actions required to cope with possible situations (Gürcan, 2005). Bandura (1997) defines personality as "individual's belief in his/her capacity to execute behaviors necessary to produce specific performance attainments". According to Goddard, Hoy and Woolfolk-Hoy (2000), it is the ability to plan and implement the thoughts and activities required to fulfil a task. As it is able to be understood from the definitions, this belief is an internal source of motivation that leads people towards their goal. The relevant feeling is one of the backbones for the teaching profession, which is difficult to perform. The power that best supports and motivates a primary school teacher in the teaching process is students' attainments. The belief in the capacity to organize and execute the process necessary for these attainments keeps the teacher up against the difficulties of the profession. Teachers' self-efficacy belief is related to whether they can achieve the desired outcomes, such as students' commitment and learning, with the skills they have (Tschannen-Moran & Woolfolk Hoy, 2001).

The sub-problems identified in accordance with the purpose of the research are as follows:

1. Is there a significant relationship between preservice primary school teachers' science self-efficacy beliefs and personality traits?

2. Is there a significant relationship between preservice primary school teachers' science self-efficacy beliefs and communication skills?

3. Is there a significant relationship between preservice primary school teachers' personality traits and communication skills?

## METHOD

### Research Design

The study is based on quantitative correlational research design, wherein correlational analysis is carried out to test the linear relationship between two variables or the relationship of a variable with two or more variables, and if any, to measure the degree of this relationship (Karasar, 2005). In the study, correlational analysis was preferred since it was aimed to determine preservice primary school teachers' the personality traits, communication skills and science teaching self-efficacy beliefs and to reveal their relations with each other.

### Research Sample

The population of the study consists of preservice primary school teachers studying in the Faculty of Education at Bartın University, Ahi Evran University, and Hacettepe University. Using the convenience sampling, one of the purposive sampling methods, the participants were selected among students from different grade levels, and a total of 234 teacher candidates were determined as the participants. 174 of the participants in the study are female and 60 male preservice primary school teachers. The fact that the majority of the trainees in the primary school teaching program are women explains the fact that there are more women in the study group. Convenience sampling is a method performed with individuals who are easily accessible, available and willing to participate in the research (Erkuş, 2005:82). The study sample consists of 1st, 2nd, 3rd and 4th grade people in the 18-24 age range who are educated in the primary school teacher trainning program.

### Research Instruments

Self-Efficacy Scale: "Preservice Primary School Teachers' Science Teaching Self-Efficacy Beliefs Scale" was used in order to identify preservice teachers' levels of science teaching self-efficacy beliefs. The scale developed by Enochs and Riggs in 1990 was adapted into Turkish by Bıkmaz (2002), and a pilot study was conducted. The factor analysis results revealed that the Science Teaching Self-Efficacy Scale comprises two sub-dimensions, namely "Science Teaching Self-Efficacy" and "Science Teaching Outcome Expectancy". Whether the students agreed with the statements regarding self-efficacy beliefs was measured with a five-point scale including the options of "strongly agree", "agree", "neither agree nor disagree", "disagree" and "strongly disagree". In the "Science Teaching Self-Efficacy" dimension of the scale, there are 13 items including 5 positive and 8 negative statements, and the "Science Teaching Outcome Expectancy" dimension contains a total of 8 items as 7 positive and 1 negative statements. The reliability coefficient is .89 for the first factor, .69 for the second factor, and .85 for the whole scale (Bıkmaz, 2002).

Adjective-Based Personality Test (ABPT): Adjective-Based Personality Test was developed by Bacanlı, İlhan and Aslan (2009), and its validity was tested using factor analysis and similar methods for scale validity. In the factor analysis regarding the construct validity of the scale, 40 pairs of adjectives were determined to measure five different personality dimensions, and the dimensions obtained could explain 52.6% of the variance of the five-factor personality. In order to test the external validity of the scale, Sociotropy Scale, Conflict Resolution Styles Scale, Positive and Negative Affect Schedule, State-Trait Anxiety Inventory were utilized, and their comparisons yielded the expected results, which indicated the validity of the scale (Bacanlı, İlhan, & Aslan, 2009). As for the reliability, it was revealed that the internal consistency coefficients calculated ranged from 0.73 to 0.89, and the highest coefficient was for extraversion (0.89), while the lowest one was for neuroticism (0.73).

Considering the findings related to the test-retest reliability of the scale calculated based on the applications with two-week intervals, agreeableness (r=0.86) presented the strongest correlation, whereas openness to experience (r=0.68) presented the weakest one.

Communication Skills Assessment Scale (CSAS): It is a 5-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always) developed by Korkut in 1996 in order to understand how individuals evaluate their communication skills. The scale consists of a total of 25 statements, and the maximum score to be obtained is 100, while the minimum is 0. High scores reflect that individuals evaluate their communication skills positively. The validity and reliability studies of the scale were performed by the same person, and the validity coefficient was calculated as .58, and the reliability coefficient as .76 (Korkut, 1996).

**Data Analysis**

In the data analysis, bilateral correlations were identified using the spearmen test based on the research problems. Since no dataset showed a normal distribution independently of the others, the Pearson product-moment correlation was not used, and nonparametric tests were administered.

## FINDINGS

**The Relationship Between Communication Skills and Personality Traits of Preservice Primary School Teachers**

**Table 1.**

*Findings Regarding the Relationships Between Preservice Primary School Teachers' Communication Skills and Personality Traits*

|  | Extraversion | Agreeableness | Neuroticism | Conscientiousness | Openness to Experience |
|---|---|---|---|---|---|
| Communication Skills | .455* | .536* | -.209* | .458* | .546* |

p<.05

When Table 1 is examined, there are significant and moderate positive correlations between communication skills and the sub-dimensions of personality traits including extraversion, agreeableness, conscientiousness and openness to experience, and there is a significant weak negative correlation between communication skills and the neuroticism sub-dimension. Considering the determination coefficients, 21% of the total variance in communication skills is explained with extraversion ($r^2$=.21), 29% with agreeableness ($r^2$=.29), 4% with neuroticism ($r^2$ = .04), 21% with conscientiousness ($r^2$=.21) and 30% with openness to experience ($r^2$=.30).

**The Relationship Between Preservice Primary School Teachers' Communication Skills and Science Teaching Self-Efficacy Beliefs**

**Table 2.**

*Findings Regarding the Relationships Between Preservice Primary School Teachers' Communication Skills and Science Teaching Self-Efficacy Beliefs*

| | Self-Efficacy | Science Teaching Outcome Expectancy | Science Teaching Self-Efficacy Belief |
|---|---|---|---|
| Communication Skills | .387* | .297* | .376* |

p<.05

In Table 2, positive correlations are observed between communication skills, and science teaching self-efficacy belief and its sub-dimensions, self-efficacy and outcome expectancy. Among these significant relationships of communication skills, those with self-efficacy and science teaching self-efficacy belief are moderate, whereas the one with outcome expectancy is weak. Regarding the determination coefficients, 15% of the total variance in communication skills is explained with self-efficacy ($r^2$=.15), 14% with science teaching self-efficacy belief, and 8% with outcome expectancy ($r^2$=.08).

**The Relationships Between Preservice Primary School Teachers' Science Teaching Self-Efficacy Beliefs And Personality Traits**

**Table 3.**

*Findings Regarding the Relationships Between Preservice Primary School Teachers' Science Teaching Self-Efficacy Beliefs and Personality Traits*

| | Extraversion | Agreeableness | Neuroticism | Conscientiousness | Openness to Experience |
|---|---|---|---|---|---|
| Self-Efficacy | .289* | .287* | -.030 | .330* | .366* |
| Science Teaching Outcome Expectancy | .176* | .142 | .010 | .133 | .139 |
| Science Teaching Self-Efficacy Belief | .257* | .238* | -.012 | .259* | .282* |

p<.05

When Table 3 is examined, science teaching self-efficacy belief has significant weak positive correlations with personality traits including extraversion, agreeableness, conscientiousness and openness to experience, while there is a negative insignificant correlation with neuroticism. Considering the determination coefficients, 7% of the total variance in science teaching self-efficacy belief is explained with extraversion ($r^2$=.07), 6% with agreeableness ($r^2$=.06), 7% with conscientiousness ($r^2$=.07) and 8% with openness to experience ($r^2$=.08). The outcome expectancy sub-dimension has a significant weak positive correlation only with extraversion among the sub-dimensions of personality traits. The determination coefficients indicate that 3% of the total variance of outcome expectancy is explained with extraversion ($r^2$=.03). There are significant weak positive correlations between self-efficacy beliefs, and extraversion and agreeableness sub-dimensions of personality traits, and significant moderate positive correlations with conscientiousness and openness to experience sub-dimensions. It is also observed that there is a negative insignificant relationship between self-efficacy belief and neuroticism. The determination coefficients indicate that 8% of the total variance of self-efficacy belief is explained with extraversion ($r^2$=.08), 7% with agreeableness ($r^2$=.08), 11% with conscientiousness ($r^2$=.11) and 13% with openness to experience ($r^2$=.13).

**DISCUSSION, CONCLUSION, RECOMMENDATIONS**

There are a great number of studies conducted on preservice primary school teachers' science teaching self-efficacy beliefs, and they mostly include prediction of these beliefs based on various variables. The results of these studies indicate that science teaching self-efficacy beliefs do not show a significant difference by gender, there is a linear increase in science teaching self-efficacy belief in grade level, and preservice teachers who are mathematics graduates have stronger science teaching self-efficacy beliefs. Moreover, the level of preservice primary school teachers' science teaching self-efficacy beliefs is identified to be lower than that of preservice science teachers' beliefs (Akbaş & Çelikkaleli, 2006; Altunçekiç et al., 2005; Berkant & Ekici, 2007; Ercan, 2007; Yaman et al., 2004). No similar research associating preservice primary school teachers' science teaching self-efficacy beliefs with their personality traits or communication skills has been encountered in the literature. Şenler (2011) has presented the pathways between preservice science teachers' self-efficacy beliefs and personality traits, and identified that only agreeableness is positively related with all sub-dimensions of self-efficacy beliefs. On the other hand, conscientiousness has a positive relationship only with self-efficacy beliefs regarding student participation, and openness has a positive relationship only with self-efficacy beliefs regarding classroom management.

Preservice primary school teachers' communication skills have a negative relationship with neuroticism, and positive relationships with the other personality traits including extraversion, openness to experience, agreeableness and conscientiousness. These five sub-dimensions of personality traits are observed to be important predictors of communication skills. Similarly, in their study on the relationship between teachers' personality traits and effective communication skills, Ünsal and İhtiyaroğlu (2022) have concluded that the strongest correlations are between extraversion and empathy, openness to experience and self-recognition/self-disclosure, and agreeableness and the use of I-language. As identified in other studies in the literature, it is an expected result that the neuroticism sub-dimension of personality traits is inversely related to communication skills (Bursal & Yiğit, 2012;Tamir et al., 2002).

Extraverts are passionate, sociable and lively individuals, and are naturally more energetic than introverts (Somer, 1998). They have better communication skills by their nature, which is also supported by research findingsAgreeable people are kind, respectful, honest, reliable, compassionate, and humble. The opposite of agreeableness is ill temper, and ill-tempered people are rude, pessimistic, angry, ruthless, and utilitarian (Costa & McCrea, 1992). It is natural for the agreeable to empathize more easily and thus have stronger communication skills, which is also indicated by research findings.

Conscientious individuals are observed to have characteristics such as striving for achievement, competence, dutifulness, order, self-discipline and deliberation. Unconscientious people, on the other hand, lack self-discipline, enthusiasm and energy, and are undutiful (McCrae & Costa, 1998 as cited in Atak, 2013). It is inevitable for a teacher to be conscientious because only a dutiful person can fulfil the duties assigned by the Ministry. Undutiful individuals will experience miscommunication in their working environments and have low level of performance. Such a person cannot be expected to teach effectively and have a strong self-efficacy belief. The findings of the study have revealed significant relationships in science teaching self-efficacy beliefs of conscientious individuals. No significant difference is found between the conscientiousness and outcome expectancy, for which the reason can be considered as preservice teachers' high science teaching outcome expectancies with the psychology of being a teacher, regardless of their personality traits.

Gündeşlioğlu (2019) has identified that primary school teachers' personality traits including extraversion, agreeableness, self-control/conscientiousness, and openness to improvement have a positive relationship with

professional satisfaction, and a negative relationship with neuroticism, which supports the findings indicating that teachers who are extravert, agreeable, conscientious and open to improvement have good communication skills because teachers who are better at communicating with students have higher levels of professional satisfaction (Driscoll & Shirey, 1985; Stremmel et al., 1993). Teachers who perform their job with love are likely to raise students with better cognitive, affective and behavioral characteristics. Similarly, in a study investigating the relationship between preservice preschool teachers' personality traits and communication skills, personality traits including self-actualization, social relationships and social norms enabled the prediction of communication skills score at a significant level (Dere, 2018). Self-actualization is that an individual who knows her characteristics has the full capacity for what she wants to achieve (Hoffman, 2001). According to Maslow (1969), individuals who have reached the stage of self-actualization have met their physiological (survival) needs, safety needs, belonging and love needs, and esteem needs. These people are extroverted and agreeable. Therefore, it is expected that communication skills are high.

Neuroticism is characterized by anxiety, worry, aggression, insecurity and constant thinking of oneself. Research shows that people diagnosed with neuroticism score high in the dimension of emotional instability, which is based on negative emotions such as anxiety, depression, anger and distress (Atak, 2013). As observed in the research findings, neurotic people have weak communication skills. Neuroticism is also identified to have negative correlations with science teaching self-efficacy belief and outcome expectancy, albeit not significant and correlation coefficients were too small. Considering that there is a significant positive relationship between communication skills and science teaching self-efficacy skills, it is an expected result that neuroticism with low communication skills will see themselves negatively in science teaching self-efficacy, although no significant results have been obtained in the study.

People who are open to experience are generally courageous, curious, independent, liberal, analytical, and unconventional; they love change and have a wide variety of interests (Atak, 2013). These kinds of people tend to prefer variety, which is one of the key factors in inquiry-based science education. The research findings have revealed significant positive relationships between openness to experience and both science teaching self-efficacy and communication skills.

Inquiry-based learning is a student-centered learning approach in which students want to discover everything in their environment, make strong arguments by explaining the natural and physical world around them with sound reasons, grow up as individuals who are enthusiastic about science and know its value, in brief, create knowledge in their own minds by doing-experiencing-thinking like a scientist (MoNE, 2018). Inquiry-based science education adopts a student-centered, active science approach in which students carry out their research by doing and thinking (Jorgenson et al., 2004).

Skillful teachers gradually expand their teaching techniques and decide on the technique appropriate for the situation. These methodological decisions are based on teachers' personality, age, abilities, interests, children's prior knowledge and the nature of the material worked on as many other factors. There is no single method to meet the needs of all children. Therefore, teaching methods should be arranged considering the teacher and educational background (Martin, 2009). According to the research findings, it can be stated that individuals who are highly skilled in communication, open to experience, extravert, agreeable and conscientious have stronger science teaching self-efficacy. Carrying out various evaluations to determine communication skills and personality traits for students to be selected for teacher training will both increase the quality of teachers to be trained and enable raising conscious, science-literate students through inquiry-based science education. In

addition, course contents can be developed to enhance personality traits and communication skills during the university education.

## BİLGİ NOTU

**Author Contributions:** Yasemin Büyükşahin: 100% Research design, literature review, methods, analysis, findings and conclusions.

### Ethical Statement and Conflict of Interest

Scientific ethical principles and rules were taken as the basis in all stages of this research, including preparation, data collection and analysis, and reporting. The ethical standards and conditions of the Committee on Publication Ethics (COPE) have been accepted and acted accordingly. The study did not receive funding from an institution or organization. There is no conflict of interest in the article.

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