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Relationship between self-efficacy, learning strategies, and learning styles of teacher candidates (Anadolu University example)

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The purpose of this study is to analyse the relationship between the perceptions of self-efficacy, as well as learning styles and strategies of teacher candidates at Anadolu University, in terms of various variables. We used correlational analysis to define the relationship between efficacy, learning styles, and strategies. The research population of the study comprised teacher candidates who were selected by "convenience sampling" among teacher candidates from various teacher education programs and levels at Anadolu University Faculty of Education. Three different assessment tools were used for data collection: the "Teacher Self-Efficacy Scale" was used to assess the self-efficacy perceptions of teacher candidates; the "Kolb Learning Styles Inventory III" was used to determine the learning styles of teacher candidates; and the "Learning Strategies Scale" was used to define the learning strategies of the teacher candidates. The study revealed a low level of relationship between the self-efficacy perceptions of teacher candidates, their learning styles, and the learning strategies they employ.

Keywords: learning strategies; learning styles; self-efficacy

Introduction

Today, students are required to take an active stance throughout the learning process, which is crucial for and one of the important requirements for generating an informed society. Research on the learner's active participation in the learning-teaching process has shown a certain degree of association between the effectiveness of teaching and the characteristics of the learner (Lunenberg & Volman, 1999; Stern & Huber, 1997). Specifically, the concept of the learner's characteristics mainly involves the concepts of learning style and learning strategy. Another concept that can be associated with these concepts is self-efficacy.

Self-Efficacy

The concept of self-efficacy was defined by Bandura (1997) within the scope of the Social Cognitive Theory, and later, several studies were conducted on this concept. Bandura defined self-efficacy as the judgment of individuals as to how well they are able to take part in actions that are necessary to cope with potential situations. In other words, self-efficacy is not related to how capable in their talents an individual actually is, but is instead related to their belief in their talents (Woolfolk, 1998).

According to Woolfolk (2001), if a person has high levels of self-efficacy, they set higher goals for themselves, and is determined to reach these goals, as they will have lower levels of fear of failure. They are more insistent against the difficulties they face. In case of a failure, they have a tendency to continue their efforts without feeling much shock in their self-efficacy feelings. The person will be motivated, as they see that they are advancing, and as their skills improve, so will their feelings of self-efficacy. According to Bandura (1997), feelings of self-efficacy are affected by people's own sense of achievement. While achievement increases self-efficacy, it reduces failure. Only a strong sense of self-efficacy prevents a person from being easily affected by failure (Açıkgöz, 1998). This is because the person explains this failure by the method they used or lack of strategy, rather than as their personal shortcoming. If a person has low perception of self-efficacy, they tend to set easier goals for themselves, and avoid difficult tasks. When they encounter a problem, they easily give up, by not being able to use their skills.

In the learning-teaching process, high self-efficacy of both the learners and teachers is a desired quality. In particular, the self-efficacy of the teacher is important, in the sense that it has an effective role in the development and improvement of the self-efficacy of the students. Teacher self-efficacy is the belief of the teacher that they can reach even those that have difficulty in learning and help them learn (Hoy & Woolfolk, 1993).

High self-efficacy perceptions of teachers may lead them to trust themselves as teachers, and reflect this trust in their behaviours. It is stated that teachers with high self-efficacy levels overcome the learning problems of students with learning difficulties, and they are more eager, willing and time-sparing people, who believe in themselves and their students, watch their students more, provide more guidance during the class, use more effective strategies, include group and collaborative tasks, and achieve student participation. Moreover, it may be argued that students will be affected positively from this process by the positive feedback provided by such teachers, the new methods and techniques they use, and their approach towards the students with their classroom management skills (Açıkgöz, 1998; Santrock, 2004; Tekkaya, Çakıroğlu & Özkan, 2002; Tschannen-Moran & Woolfolk Hoy, 2001; Woolfolk, 1998).

Teachers with low sense of self-efficacy: do not have confidence in themselves regarding their classroom management skills; get angry at the mistakes of their students; do not believe that their students can improve their skills; frequently resort to restrictive and retributory disciplinary models; believe that students with limited talents cannot learn; and state that they would not chose the profession of teaching if they were born again (Santrock, 2004). In the light of all this, it would not be right to argue that teachers with low self-efficacy would have a positive effect on the development and improvement of students' self-efficacy (Bümen & Özaydın, 2013; Corkett, Hatt & Benevides, 2011; Elstad & Christophersen, 2017; Kavrayıcı & Bayrak, 2016; Kurt, Güngör & Ekici, 2014; Mosoge, Challens & Xaba, 2018; Savasci-Acikalin, 2014; Senemoğlu, Demirel, Yağcı & Üstündağ, 2009; Ugras, Ay, Altunbas & Cil, 2012).

In the light of the information provided above, namely, that high self-efficacy levels of teachers affect the learning-teaching environment positively, the need for training teachers with advanced self-efficacy arises. Considering that the self-efficacy perceptions of teachers start to emerge and develop during their teacher training, it would be accurate to state that this process is highly important. It is crucial that firstly, the prospective teachers themselves should know about their self-efficacy levels and develop an awareness to self-improve; and that teacher training curricula ought to include relevant theoretical and applied courses, and if necessary, activities within hidden curricula. It is observed that, for these reasons, the number of studies on the self-efficacy levels of prospective teachers is constantly increasing (Baltaoğlu, Sucuoğlu & Yurdabakan, 2015; Çakiroğlu, J, Çakiroğlu & Boone, 2005; Cakiroglu, E 2008; Güven & Gökdağ, 2017; Güvenç, 2011; Kose & Uzun, 2018; Ozdemir & Dikkartin Ovez, 2012; Sirmaci & Taş, 2016; Ünlü & Ertekin, 2018; Yaşar-Ekici, 2018).

Learning Styles

The concept of learning styles, which emerged as a result of researchers' studies to investigate individual differences, has a highly significant place in terms of learning. A learning style, which is a concept that does not change throughout life but changes the individual's life (Güven, 2004), may be respectively defined as: the preferences of the individual in learning activities or their personal approach towards learning (Honey & Mumford, 1995); the ways the individual prefers in the process of obtaining and processing information (Kolb, 1984); usage of separate and unique way by each student while preparing to learn; learning and recalling a new and difficult piece of information (Dunn, Dunn & Price, 1986); individual differences regarding learning or studying (Pashler, McDaniel, Rohrer & Bjork, 2008); or as an approach to learning and studying (Woolfolk, 1998). In other words, learning style shapes the perception of the student, his/her interaction with the elements of the environment; and his/her cognitive, affective, and physiological nature affecting his/her behaviour in the learning environment. In a nutshell, learning style can be defined as those characteristics specifying the individual's tendencies or preferences regarding learning (Güven, 2004). There are some concepts in the literature that are confused with learning styles. While the concepts of learning style, learning skill and learning form are sometimes used interchangeably, they have different meanings. While a learning style shows our preferences or how we will do something, learning skills represent our capabilities or how we will do something *better* (Willingham, Hughes & Dobolyi, 2015); and learning forms are explained as the entirety of perceptual preferences that exist among the dimensions of learning styles (Friedrich, 1995).

A number of distinct models on learning styles have been developed since the 1940s. These learning style models emphasise the affective side of an individual's focus on personal characteristics regarding motives, attention, control focus, interest, and willingness to take risks. The learning style models emphasise the physiological side of individuals, which in turn, focus on variables such as sensory perception (regarding visual, aural, kinaesthetic, tactile, and tasting skills); environmental characteristics (level of noise, light, heat, and the layout of the room); need for food during study; and the time frame for optimal learning during the day (Cornet, 1983).

A model that has become very popular in the local as well as international literature was developed by Kolb. The Kolb model is based on the empirical learning theory, and entails a classification of students with reference to their preferences. The model attempted to investigate how individuals handle incidents, concepts, and ideas, and how they produce solutions for these, based on this theory. In the empirical learning theory, learning is designed as a circle of learning. The circle of learning entails four forms of learning, namely: concrete experience; reflective observation; abstract conceptualisation; and effective experimentation. Each form of learning employs different learning methods. Concrete experience is based on learning by "touching and feeling," while reflective observation utilises "watching and listening." Abstract conceptualisation is based on "thinking," while effective experimentation focuses on learning by "doing" (Kolb, 1984). Kolb (1984) argues that each such a form of learning is most crucial, and should be employed in a complementary manner. In this context, there are four learning styles:

transformative, discerning, internalising, and adaptive (Butler, 1987; Felder & Brent, 2005; Kolb, 1984; Kolb, Boyatzis & Mainemelis, 2001; Özden, 2003).

Learning Strategies

The means that individuals need to understand their learning capabilities through learning strategies. Such strategies allow their capablities to become more operational in nature (Güven, 2004). Weinstein and Mayer (1986:315) emphasise the need for the students to know learning strategies, for them to achieve more efficient learning, to recall knowledge when required, and to be aware of their self-motivation capabilities. Learning strategies are those tools employed by individuals, with a view to achieving learning-related goals. Although the literature is more or less unanimous about the importance and benefits of learning strategies, which are often called cognitive strategies, one cannot say the same for a specific definition and categorisation. This is the reason why numerous definitions have been proposed with respect to learning strategy (Güven, 2004).

Learning strategies can be defined as the behaviours or thoughts expected to shape the processes of acquiring knowledge, coding it in memory, and re-accessing it when necessary, as demonstrated by the students during learning (Weinstein & Mayer, 1986). Again, according to Mayer (1988), learning strategies refer to the behaviour that shapes the way the learner would process knowledge. On the basis of these definitions, the concept of learning strategies usually refers to the techniques students employ to solve their problems, or to the processes that enable learning by themselves (Weinstein, Ridley, Dahl & Weber, 1989).

Students and teachers with a high level of self-efficacy perception are necessary in the learning-teaching process. A high level of self-efficacy perception on the part of the teachers would lead to self-confidence, which would eventually be reflected in their behaviours. Moreover, this positive perception of self-efficacy would have a positive impact on various cases, from classroom management to new methods and techniques to be applied by the teacher, from learning styles and strategies to the attitudes of students (Tekkaya et al., 2002; Tschannen-Moran & Woolfolk Hoy, 2001); these changes will in turn affect the students directly. In order for the learning process to be as effective as mentioned above, the undergraduate education process where the roots of the profession are set, that is, the period of the teacher candidate's status, has a highly significant effect. This is why the literature is rich in terms of studies on the self-efficacy perceptions of prospective teachers (Güven & Gökdağ, 2017; Kose & Uzun, 2018; Yaşar-Ekici, 2018).

However, a review of studies performed abroad, as well as in Turkey, thus far, did not identify many studies that focus on all variables simultaneously, although there are a substantial number of studies focusing on individual variables. Evin Gencel and Köse (2011) tried to analyse the relationship between the prospective science teachers' perception of self-efficacy in science teaching, as well as learning and studying skills, but did not provide an analysis built on the three variables the present study intends to shed light on. The study has suggested that disaggregation is the preferred learning style of the prospective science teachers, that learning styles are associated with the class level and science teaching self-efficacy perceptions; that they are not associated with gender; and that their self-efficacy perceptions were sufficient. Deniz (2013), in turn, investigated the relationship between learning styles and self-efficacy perceptions of prospective teachers and purpose to shed light on the correlation between these and certain variables. The study concluded that the secondary aspects of the learning strategies and preferred Grasha-Reichmann learning styles of prospective teachers are not associated with the secondary aspects of teachers' self-efficacy.

It is evident that all three concepts are similar in terms of their ability to serve as common grounds to contribute directly to individuals' learning process. In this perspective, it is crucial to investigate whether the concepts are actually interrelated or not. The literature is not lacking in terms of studies focusing on self-efficacy and learning strategies (Baykara, 2011; Evin Gencel & Köse, 2011), or learning styles and learning strategies (Güven, 2004; Oxford, 1990); however, studies focusing on all three are limited, providing at best in numbers (Evin Gencel & Köse, 2011), and justifying the need for further work in this area. On the basis of all these, the present study intends to reveal the extent to which proven individual differences in terms factors such as learning styles and learning strategies of teacher candidates as noted in many studies, affect their self-efficacy perceptions; the foundations of which had been laid during their education. The present study intends to determine the extent to which individual differences in factors such as learning styles and learning strategies, as proven in many studies among teacher candidates enrolled at Anadolu University, Faculty of Education, affect their self-efficacy perceptions; the foundations of which had been laid during their education. The overall purpose of the present study is to analyse the relationship between the self-efficacy perceptions of prospective teachers enrolled at Anadolu University, Faculty of Education; their learning styles; as well as the learning strategies they employ. In line with this purpose, the following question will be investigated in the study: *Is there a*

significant relationship between the self-efficacy perceptions of prospective teachers, their learning styles as well as the learning strategies they employ?

Methodology

Research Model

This study employed relational screening model in order to describe the existing state of affairs (Codd, 1969; Karasar, 1998). The single screening model was employed to ascertain the self-efficacy perceptions, their learning styles, and the learning strategies they employ. The relational screening model, in turn, was utilised to identify the relationship between the self-efficacy perception, learning style, and learning strategies.

Participants

The study universe was composed of a total of 4,100 students, who were enrolled at Anadolu University, Faculty of Education, in academic year 2015–2016. However, given the scale of the study universe, the research was actually based on a sample. The sampling was done with reference to the "proportional set sampling approach" (Karasar, 1998:81). In proportional set sampling, the universe is divided into sub-universes that have more similar characteristics within themselves. From each sub-universe, elements are selected to reflect the proportion of that sub-universe within the whole. Thus, the probability of each sub-universe to be included in the sample would be proportional to its proportion in the whole.

In this context, first of all, the programmes offered at the Faculty of Education in which students were actually enrolled, were identified. The 12 programmes thus identified were considered as sub-universes, and a sample composed of just 20% of the students of each programme was deemed sufficient. These efforts yielded a sample of 855 prospective teachers enrolled at Anadolu University, Faculty of Education; where 68% of the prospective teachers in the sample were female, while 32% were male. Further, 15.7% of the subjects were enrolled in a primary school teacher training programme; 18.1%, in a primary school mathematics teacher training programme; 2.1%, in a preschool teacher training programme; 3.5%, in an art teacher training programme; 4.8%, in a French teacher training program, 2.3% in a training programme for teachers for children with mental disabilities; 12.3% in a social sciences teacher training programme; 7.4% in computer and teaching technologies teacher training programme; 8.5%, in guidance and psychological counselling programme; 17.2% in an English teacher training programme; 3.4% in a German teacher training programme; and 4.7% in a training programme for teachers for children with hearing disabilities. Additionally, 30.1% of the prospective teachers were enrolled in the freshman year; 38.7% in the sophomore year; 29.7% in the junior year; and 11.5% in the senior year.

Data Gathering Tools

Three distinct tools were employed for quantification in data gathering. The "Teacher Self-Efficacy Scale" was employed to assess the self-efficacy perceptions of prospective teachers. The teacher self-efficacy scale developed by Tschannen-Moran and Woolfolk Hoy (2001) was adapted into Turkish by Çapa, Çakıroğlu and Sarıkaya (2005), and is composed of 24 items and nine Likert scale questions. The scale focuses on three sub-factors, namely: "student participation"; "educational strategies"; and "classroom management." The Cronbach's alpha factor for the whole scale was .93, while those of "student participation," "educational strategies," and "classroom management" sub-factors were .82, .86, and .84, respectively. The present study, in turn, had a Cronbach's alpha factor of .89, while those of the "student participation," "educational strategies," and "classroom management" sub-factors were .73, .79, and .79, respectively.

The Kolb Learning Styles Inventory was employed to identify the learning styles of prospective teachers. This inventory was developed by Kolb (1985) and adapted into Turkish by Gencel (2007); it was composed of 12 items covering four aspects: reliability factors for the tangible experience aspect, reflective observation aspect, abstract conceptualisation aspect, and active experience aspect were found to be .76, .71, .80, and .75, respectively. In the present study, the reliability factor for the whole inventory was found to be .58, which is similar to the reliability factors of its individual aspect. The reliability factors for the tangible experience aspect, reflective observation aspect, abstract conceptualisation aspect, and active experience aspect were found to be .70, .71, .77, and .73, respectively. The Kolb Learning Style Inventory covers 12 situations that have four choices each. It has a four-point Likert-type scoring scheme where, for each situation, the most suitable choice is scored at 4, the second most suitable one is scored at 3, the third most suitable one is scored at 2 and the least suitable one is scored at 1. Accordingly, regarding the responses of the prospective teachers who participated in the study for the 12 items in the inventory, the numbers of choices they made in the first, second, third, and fourth suitability responses were derived within these response groups. Then, for the four scores that were obtained, two different values were obtained, by subtracting the first score from the third score and subtracting the second score from the fourth score. These values were placed on a plot based on the experiential learning theory, and the

learning styles of the students were determined (Kolb, 1985).

Finally, the Learning Strategies Scale was employed to identify the learning strategies employed by prospective teachers. It is a scale developed by Güven (2008) on the basis of the categorisation proposed by Weinstein and Mayer, employing 35 items in five factors. The reliability factors for the scale's aspects of explanation, tracking understanding, organisation, affective, and reiteration were found to be .81, .79, .76, .70, and .61 respectively, while the reliability factor for the whole scale was found to be .87. In the present study, the reliability factors for the scale's aspects of explanation, tracking understanding, organisation, affective, and reiteration were found to be .81, .95, .93, .70, and .72, respectively, while the reliability factor for the whole scale was found to be .87.

The data gathered in the study were analysed using Pearson product moment correlation factor. The statistical analyses of the data gathered in the study were carried out using Statistical Package for Social Sciences (SPSS) package software.

Results

The Relationship Between the Self-Efficacy, Learning Strategies, and Learning Styles of Teacher Candidates

Finally, the study investigated whether there exists a relationship between the self-efficacy perceptions, learning styles, and the learning strategies employed by teacher candidates. Correlation factor analysis was utilised for this purpose. The analyses obtained are presented in Table 1.

Table 1 reveals that the correlation between the self-efficacy perceptions, learning styles, and learning strategies of prospective teachers vary in terms of both the overall scores for the scales and the scores for the individual aspects of scales. Significant and positive medium to high levels of relationships were identified between the explanation strategy aspect and all other learning strategies (explanation, .392; organisation, .476; affective, .453; reiteration, .312; and overall strategy score, .781). The relationship with the self-efficacy perception, with reference to specific aspects of self-efficacy perception was positive and a medium-level one (student participation, .287; teaching strategies, .281; class management, .192; and overall efficacy score, .290). Furthermore, the relationship between the explanation strategy and style was a low-level positive one, with a score of .257, while the relationship with the concrete experience–abstract conceptualisation aspect of the learning style scale was highly positive at .777; the relationship with the active experience–reflective observation aspects was a mildly positive one of .138.

Significant and positive medium to high levels of relationships were identified between the tracking understanding aspect and all other learning strategies (explanation, .392; organisation, .435; affective, .447; reiteration, .219; and overall strategy score, .757). The relationship with the self-efficacy perception, with reference to specific aspects of self-efficacy perception, was positive and mild (student participation, .110; teaching strategies, .127; class management, .083; and overall efficacy score, .122). Furthermore, the relationship between the tracking understanding strategy and style was a lower-level negative one with a score of -.019, while the score for the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was .012; the relationship with the active experience-reflective observation aspects was a mildly positive one, at .196.

Significant and positive mild, medium, and high levels of relationships were identified between the organisation aspect and all other learning strategies (explanation, .476; tracking understanding, .435; affective, .301; reiteration, .180; and overall strategy score, .663). The relationship with the self-efficacy perception, with reference to specific aspects of self-efficacy perception, was positive and mild (student participation, .096; teaching strategies, .108; class management, .053; and overall efficacy score, .098). Furthermore, the relationship between the organisation strategy and style was a low-level positive one with a score of .011, while the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was a mildly negative one at -.019; the relationship with the active experience-reflective observation aspects was a mildly positive one of .018.

Significant and positive medium to high levels of relationships were identified between the affective strategy aspect and all other learning strategies (explanation, .453; tracking understanding, .447; organisation, .301; reiteration, .338; and overall strategy score, .710). The relationship with the self-efficacy perception, with reference to specific aspects of self-efficacy perception, was positive and mild (student participation, .130; teaching strategies, .113; class management, .121; and overall efficacy score, .139). Furthermore, the relationship between the affective strategy and style was a low negative one with a score of -.066, while the relationship with the concrete experience-abstract conceptualisation aspect of the Learning Style Scale was a mildly negative one at -.039; the relationship with the active experience-reflective observation aspects was a mildly positive one of .150.

Table 1 Correlation coefficient of teacher candidates self-efficacy, learning strategies, and learning style points

	Explana-tion	Tracking understanding	Organisation	Affective	Reiteration	Student participation	Teaching strategies	Class management	Style	Active experience–reflective observation	Concrete experience–abstract concept-ualisation	Total strategy	Total efficacy
Explanation	1	.392*	.476*	.453*	.312*	.287*	.281*	.192	.257	.777	.13*	.781*	.290*
Tracking under-standing	.392*	1	.435*	.447*	.219*	.110*	.127*	.083	-.019	.002	.194	.757*	.122*
Organisation	.476*	.435*	1	.301*	.180*	.096*	.108*	.053	.011	-.009	.018	.663*	.098*
Affective	.453*	.447*	.301*	1	.328*	.130*	.113*	.121*	-.062	-.039	.150*	.710*	.139*
Reiteration	.312*	.219*	.180*	.328*	1	.018	.028	.065	.053	.046	.015	.551*	.043
Student participation efficacy	.287*	.110*	.096*	.130*	.018	1	.681*	.600*	-.111*	-.077	.074	.197*	.866*
Teaching strategies efficacy	.281*	.127*	.108*	.113*	.028	.681*	1	.644*	-.056	-.023	.048	.202*	.889*
Class management efficacy	.192*	.083	.053	.121*	.065	.600*	.644*	1	-.064	-.051	.052	.154*	.862*
Style	-.257	-.019	.011	-.062	.053	-.111*	-.056	-.064	1	.621*	-.347*	-.020	-.087
Concrete experience - abstract concept-ualisation	-.777	.002	-.009	-.039	.046	-.077	-.023	-.051	.621*	1	-.047	-.003	-.057
Concrete experience - abstract concept-ualisation	.138*	.044	.018	.150*	.015	.074	.048	.052	-.347*	-.047	1	.108*	.066
Total strategy	.781*	.757*	.663*	.710*	.551*	.197*	.202*	.154*	-.020	-.003	.108*	1	.211*
Total efficacy	.290*	.122*	.098*	.139*	.043	.866*	.889*	.862*	-.087	-.057	.066	.211*	1

Note. *$p < .05$.

Significant and positive mild to medium levels of relationships were identified between the reiteration strategy aspect and all other learning strategies (explanation, .312; tracking understanding, .219; organisation, .180; affective, .328; and overall strategy score, .551). The relationship with the self-efficacy perception, with reference to specific aspects of self-efficacy perception was positive and mild (student participation, .018; teaching strategies, .028; class management, .065; and overall efficacy score, .043). Furthermore, the relationship between the reiteration strategy and style was a lower-level positive one, with a score of .053, while the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was a mildly positive one, at .043; the relationship with the active experience-reflective observation aspects was a mild positive one, at .015.

Significant and positive high levels of relationships were identified between the overall score for the learning strategies scale and all aspects of learning strategies (explanation, .781; tracking understanding, .771; organisation, .663; affective, .710; and reiteration, .551). The relationship with the self-efficacy perception, with reference to specific aspects of self-efficacy perception, was positive and mild (student participation, .197; teaching strategies, .202; class management, .154; and overall efficacy score, .211). Furthermore, the relationship between the overall learning strategies and style was a low negative one, with a score of -.020, while the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was a mildly negative one of -.003; the relationship with the active experience-reflective observation aspects was a mildly positive one of .108.

High levels of positive relationships were observed between the student participation aspect and other aspects of the self-efficacy scale (teaching strategies, .681; class management, .600; and overall self-efficacy score, .866). Low positive relationships were observed between student participation and learning strategies (explanation, .287; tracking understanding, .110; organisation, .096; affective, .130; reiteration, .018; and overall strategy, .197). The relationship between student participation and style was a low negative one with a score of -.111, while the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was a mildly negative one of -.077; the relationship with the active experience-reflective observation aspects was a mild positive one of .074.

High levels of positive relationships were observed between the teaching strategies aspect and other aspects of the self-efficacy scale (student participation, .681; class management, .644l; and overall self-efficacy score, .889). Low positive relationships were observed between teaching strategies and learning strategies (explanation, .281; tracking understanding, .127; organisation, .108; affective, .113; reiteration, .028; and overall strategy, .202). The relationship between teaching strategies and style was a low negative one, with a score of -.056, while the relationship with the concrete experience–abstract conceptualisation aspect of the learning style scale was a mild negative one of -.023; the relationship with the active experience-reflective observation aspects was a mildly positive one of .048.

High levels of positive relationships were observed between the class management aspect and other aspects of the self-efficacy scale (student participation, .600; teaching strategies, .644; and overall self-efficacy score, .862). Low positive relationships were observed between class management and learning strategies (explanation, .192; tracking understanding, .083; organisation, .053; affective, .121; reiteration, .065; and overall strategy, .154). The relationship between class management and style was a lower negative one with a score of -.064, while the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was a mildly negative one of -.051; the relationship with the active experience-reflective observation aspects was a mildly positive one at .052.

High levels of positive relationships were observed between the overall score for the self-efficacy scale and its individual aspects (student participation, .866; teaching strategies, .889; and class management, .862). Low positive relationships were observed between the overall score for the self-efficacy scale, and learning strategies (explanation, .290; tracking understanding, .122; organisation, .098; affective, .139; reiteration, .043; and overall strategy, .211). The relationship between the overall score for self-efficacy and style was a lower negative one with a score of -.087, while the relationship with the concrete experience-abstract conceptualisation aspect of the learning style scale was a mildly negative one of -.057; the relationship with the active experience-reflective observation aspects was a mildly positive one of .066.

The relationship between the learning style and the concrete experience-abstract conceptualisation aspect of the learning style scale had a highly positive value of .621; the relationship with the active experience-reflective observation aspects was a medium negative one of -.347. Lower positive or negative relationships were observed between learning style and learning strategies (explanation, -.257; tracking understanding, -.019; organisation, .011; affective, -.062; reiteration, .053; and overall strategy, -.087). The relationships between the learning style and specific aspects of self-efficacy perception were negative and mild

(student participation, -.111, teaching strategies, -.056, class management, -.064 and overall efficacy score, -.087). The relationships between the concrete experience-abstract conceptualisation aspect of the learning style scale and the active experience-reflective observation aspects and all other aspects were found to be negative or positive in the low figures.

Against this background, one can note the existence of a relationship between self-efficacy perceptions, learning strategies, and learning styles of prospective teachers.

Discussion

The study revealed a low degree of association between the self-efficacy perceptions of teacher candidates, their learning styles, and the learning strategies they employ. However, the relationship is a positive one, and of a medium degree, in terms of certain aspects of self-efficacy, learning strategies scales, and the learning styles inventory. In this context, the clearest relationship was noted between the learning strategies employed by the students and their learning styles and self-efficacy perceptions. Students who employed explanation strategies are known to achieve more meaningful learning through processes, whereby they established associations between previous knowledge and new knowledge (Weinstein, Acee & Jung, 2011). One can forcefully argue that applying meaningful learning strategies with the awareness of the students' learning styles has a positive influence on their self-efficacy perceptions. On the other hand, the strong positive relationship with concrete experience and the abstract conceptualisation aspect of the learning style scale, which in turn characterises individuals who can be thinkers, can develop an understanding of the knowledge, transforming it in the process (Jonnassen & Grobowski, 1993); explaining their high level of self-efficacy perceptions, and the extensive use of explanation strategies. A number of studies support these findings. Evin Gencel and Köse (2011) also found that self-efficacy perceptions of prospective science teachers was "adequate," while the attitudes and motivation aspects of learning and studying strategies were generally low, coupled with high levels of anxiety. The attitude and anxiety levels were also correlated with gender; the level of motivation was related with the year in the programme; and learning styles were related with attitudes and study skills. On the other hand, Deniz (2013) concluded that the secondary aspects of the learning strategies and preferred Grasha-Reichmann learning styles of teacher candidates were not associated with the secondary aspects of teachers' self-efficacy.

The self-efficacy perception, learning styles, and learning strategies occupy a crucial and central position in ensuring continuity of learning and in the learning processes of individuals. An understanding of the self-efficacy perceptions of the individuals makes it possible to render their learning characteristics and the strategies they would employ more effective. For this purpose, studies investigating the learning process of the individuals are required. The present study was designed to serve this purpose. This matter has only recently begun to draw attention in Turkey, and the ability to make comparisons is rather limited at present.

Conclusion and Recommendations

The present study will lead to the development of a theoretical framework through the combined use of the leading concepts within the process of learning, with a view to training more qualified teachers. This would lead to the emphasis of the concepts of self-efficacy, learning style, and learning strategy in a shared framework, both in Turkey and abroad. The best education can be possible only with the best teachers. The development of the teachers, in turn, is possible through high-quality programmes implemented in the higher-education processes. Focusing on the impact of changes required by the information age, on the programmes thus described, and generating a list of problems teaching staff and teacher candidates is assumed to render this study an even more crucial one, particularly where it draws attention to the shortcomings and problems observed with the curricula presented at the faculties of education at the university level.

The relationship revealed by the present study between self-efficacy perception, learning style, and learning strategy provides a brand new perspective on these concepts. Therefore, all these conclusions emphasise the need to work more on the subject matter. That is why the study should be repeated with students enrolled in various stages of education, as well as in specific stages of education in Turkey. Moreover, future studies may employ the self-efficacy scale, the inventory to identify learning strategies, and the scale to ascertain learning strategies as developed for the present study, alongside other tools that have been or may be developed to serve such purposes. A combination of distinct research methods may be employed to ensure in-depth analyses of the general findings of the study.

Further investigations are also necessary to assess the concepts of self-efficacy perception, learning style, and learning strategy as part of the teacher training programs.

Authors' Contributions

In the introduction, self-efficacy was discussed by MGB; parts of Learning Strategies and Learning Styles were written by MG, and the relationship between that three concepts was generated by both authors. MGB and MG wrote the Methodology,

Results (also table) and Discussion together. Both authors reviewed the final manuscript.

Notes

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