

INVESTIGATING PROSPECTIVE MIDDLE SCHOOL MATHEMATICS
TEACHERS' SELF-EFFICACY PERCEPTIONS OF ONLINE TEACHING
DURING PRACTICE TEACHING COURSE

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ABSTRACT

INVESTIGATING PROSPECTIVE MIDDLE SCHOOL MATHEMATICS TEACHERS' SELF-EFFICACY PERCEPTIONS OF ONLINE TEACHING DURING PRACTICE TEACHING COURSE

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This study aimed to investigate prospective middle school mathematics teachers' self- efficacy perceptions towards online teaching during the COVID-19 process in their Practice Teaching course. The multiple case study method was used to investigate and understand the cases in-depth. Three prospective teachers studying at a state university in Ankara participated by the purposive sampling method. In line with the purpose of the study, the semi-structured interview questions were developed according to the "Teacher Self-Efficacy Scale" developed by Tschannen-Moran and Hoy (2001) and adapted into Turkish by Çapa et al. (2005). Data were collected through pre-and post-lesson semi-structured interviews in the Spring semester of the 2020-2021 academic year.

The findings of this study showed that the self-efficacy perceptions of all prospective teachers about online teaching changed in terms of classroom management, instructional strategies, and student engagement. In the classroom management dimension, while most of the prospective teachers stated that they had low self-efficacy perceptions, there were cases where they showed improvement throughout

the process. Prospective teachers, who mostly had the lowest self-efficacy in providing time management and behavior control, attributed this low self-efficacy perception to their lack of management skills and insufficient knowledge about their students. Regarding teaching strategies, it was revealed that prospective teachers mostly had the lowest self-efficacy perceptions in terms of measurement and evaluation. They attributed this low self-efficacy to their pedagogical skills as they could not ensure sufficient student participation. In the dimension of providing alternative explanations, it was revealed that they mostly felt competent due to their technological skills. They mostly felt inadequate in ensuring student participation.

Keywords: Emergent Online Education, Online Education, Self-efficacy Perceptions, Prospective Middle School Mathematics Teachers, Online Teaching Skills

ÖZ

ORTAOKUL MATEMATİK ÖĞRETMEN ADAYLARININ ÇEVİRİM İÇİ ÖĞRETİME YÖNELİK ÖZ-YETERLİLİK ALGILARININ ÖĞRETMENLİK UYGULAMALARI DERSİ SÜRESİNCE İNCELENMESİ

Koldaş, Şerife Yazar
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Bu çalışmanın amacı, ortaokul matematik öğretmen adaylarının, COVID-19 sürecinde Öğretmenlik Uygulamaları dersinde çevrim içi öğretime yönelik öz-yeterlilik algılarının araştırılmasıdır. Konunun derinlemesine araştırılması ve anlaşılması için çoklu durum çalışması yöntemine başvurulmuştur. Araştırmaya amaçlı örneklem yöntemiyle, Ankara'daki bir devlet üniversitesinde okuyan 3 öğretmen adayı katılmıştır. Çalışmanın amacı doğrultusunda, yarı-yapılandırılmış görüşme soruları Tschannen-Moran ve Hoy (2001) tarafından geliştirilen, Çapa vd. (2005) tarafından Türkçeye uyarlanan "Öğretmen Öz-yeterlik Ölçeği"ne göre geliştirilmiştir. Veriler, 2020-2021 eğitim-öğretim yılı Bahar döneminde ders öncesi ve sonrası yarı yapılandırılmış görüşmeler yoluyla toplanmıştır.

Bu çalışmanın bulguları, tüm öğretmen adaylarının çevrim içi öğretim ile ilgili öz-yeterlilik algılarının sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı boyutlarında değiştiğini göstermiştir. Sınıf yönetimi boyutunda adayların çoğu düşük öz-yeterlilik algısı olduğunu belirtirken, süreç boyunca gelişim gösterdikleri

durumlar olmuştur. En çok zaman yönetimi ve davranış kontrolünü sağlama konusunda düşük öz-yeterliliğe sahip olan öğretmen adayları, bu düşük öz-yeterlilik algısının sebebini yönetim becerilerine ve öğrencileri hakkında yeterli bilgiye sahip olmamalarına bağlamışlardır. Öğretim stratejileri açısından ise öğretmen adaylarının en çok ölçme ve değerlendirme açısından düşük öz-yeterlilik algısına sahip oldukları ortaya çıkmıştır. Bu düşük öz-yeterlilik algısını ise yeterli öğrenci katılımını sağlayamadıkları için pedagojik becerilerine bağlamışlardır. Alternatif açıklama sunma boyutunda ise çoğunlukla kendilerini yeterli hissettiklerini ve bunu da teknolojik becerilerine dayandırdıkları ortaya çıkmıştır. Öğrenci katılımını sağlama konusunda çoğunlukla yetersiz hissetmişlerdir.

Anahtar Kelimeler: Acil çevrim içi eğitim, Çevrim içi eğitim, Öz-yeterlilik algısı, Ortaokul matematik öğretmen adayları, Çevrim içi öğretim becerileri

To My Family,

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LIST OF ABBREVIATIONS

ABBREVIATIONS

METU: Middle East Technical University

MoNE : Ministry of National Education

TSES : Teachers' Sense of Efficacy Scale

ISTE : International Society for Technology in Education

CHAPTER 1

INTRODUCTION

The outbreak of the COVID-19 Pandemic across the world had profound effects on all aspects of life. World Health Organization (WHO) declared COVID-19 a global pandemic on March 11, 2020. To prevent the virus spread, many countries have set strict rules like lock-down, social distancing rules, and the necessity to wear a mask. In a very short time, the multi-dimensional effects of the pandemic appeared. People started working from home. Cafes and restaurants were closed. One of the institutions considered to remain closed was educational institutions. This situation forced schools and universities to apply online education.

School functions were deeply affected, with 186 countries closing their schools across the country, according to data from the United Nations Educational Scientific and Cultural Organization (UNESCO) on April 29, 2019. This closing has caused a worldwide crisis in the field of education. This crisis affected approximately 1.3 billion students, 74% of the students enrolled in schools (UNESCO 2020). In Turkey, the Ministry of National Education (MoNE) reported that schools would switch to distance education on March 12, 2020. It was announced that asynchronous (EBA TV, which is a distance education platform prepared by the Ministry of National Education) and synchronous teaching (lessons over online teaching platforms like Zoom) would be provided during online education.

Online education is defined as bringing students and teachers together independent of time and place with technology (Moore & Kearsley, 2011). Until the COVID-19 process, some of the reasons for the spread of online education were listed as follows: the increase in students in the education system, individual needs, and the increase

in education-teaching costs (Simonson et al., 2009). However, with the closure of schools during the COVID-19 process, online education has become compulsory and entered our lives with the definition of emergent online education (Bozkurt, 2020). In this study, emergent online education carried out during the COVID-19 process was examined in terms of prospective teachers during the Practice Teaching course. Online education will be used as an umbrella term throughout the rest of this study.

Unlike scheduled online courses, emergent online education takes place to ensure continuity of education in situations where there is a temporary barrier to education due to a crisis (Hodges et al., 2020). While providing this continuity, the transition from face-to-face education to emergency online education was very difficult for education stakeholders: teachers, students, parents, and teachers of the future (prospective teachers).

Let's examine the process from the teachers' perspective, the pioneers of online education. Teachers have duties and responsibilities that are not easily transferred when moving from a face-to-face learning system to an online system such as maintaining in-class interaction, measuring student outcomes, preparing lesson content appropriate for student level. In addition, this new system combined with never-before implemented online education. A teacher must sensitively overcome all the problems that arise in online education to continue to meet the set goals. To overcome these problems, teachers must have some qualifications in online education as well as in face-to-face education (Baran & Sadık, 2021).

From the perspective of prospective teachers, this process was not much different from that of teachers. Teaching practice is seen as an effective practice that allows prospective teachers to organize teaching activities and experience many complex tasks by making daily and weekly observations in their classroom environments (Beck & Kosnik, 2002). Moreover, prospective senior teachers gained online teaching experience without experiencing teaching practice face-to-face. Within the

scope of the online Practice Teaching course, the theoretical contents were given through online training. Universities decided on their own how the prospective teachers would do their field experience. Most of the education faculties have approved the continuation of the Practice Teaching course in online teaching environments, with the schools serving at all levels affiliated to the Ministry of National Education (MoNE) taking a break from face-to-face education. Thus, prospective teachers who attended online classes during the practice teaching course carried out their teaching activities online and then graduated.

The teaching-learning environments that have changed under the pandemic and the online education experiences during the teacher training process have brought questions about current professional competencies and practices. Prospective teachers, who had experience in online education as both a student and a teacher, are seen as important stakeholders of a new adventure within the scope of the Practice Teaching course they were responsible for during the pandemic period.

Teacher self-efficacy belief, which is defined as "a judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Tschannen- Moran & Woolfolk Hoy, 2001, p. 783), has become a more important concept for teachers in this difficult pandemic process. According to Ross (1995), teachers with high self-efficacy beliefs do not give up immediately when encountering an obstacle. For this reason, teachers with high self-efficacy were expected to be stronger in the face of the unknowns of online education. In addition, Cousins and Walker (2000) emphasized that teachers with high self-efficacy beliefs are more open to new ideas and more willing to try new methods.

Since teacher self-efficacy is related to student success and qualified teacher characteristics, it seems necessary to develop self-efficacy during teacher education programs. Since self-efficacy is more flexible in the initial stages of learning, the

most substantial influences on the development of teacher self-efficacy would be in teacher education and the first teaching year (Mulholland & Wallace, 2001; Woolfolk-Hoy & Burke-Spero, 2005). For this reason, it is essential to examine prospective teachers' self-efficacy perceptions during teacher education programs and increase the efficiency of online education.

In short, to contribute to the limited literature, this study focused on the self-efficacy perceptions of prospective middle school mathematics teachers during the online practice teaching course.

1.1 Purpose of the Study and Research Questions

The purpose of the study was to investigate prospective middle school mathematics teachers' self-efficacy perception of online teaching during the online practice teaching course. This study also aimed to determine the reasons from which these self-efficacy perceptions originated.

In parallel with this aim, the research questions of this study were:

1. How do the prospective middle school mathematics teachers' self-efficacy perceptions change regarding online teaching during the Practice Teaching course?
 - 1.1. How do prospective middle school mathematics teachers' self-efficacy perceptions change regarding instructional strategies during the Practice Teaching course?
 - 1.2. How do prospective middle school mathematics teachers' self-efficacy perceptions change regarding student engagement during the Practice Teaching course?
 - 1.3. How do prospective middle school mathematics teachers' self-efficacy perceptions change regarding classroom management during the Practice Teaching course?

2. What are the reasons of changes in prospective teachers' self-efficacy perceptions regarding online teaching during the Practice Teaching course?

2.1. What are the reasons of changes in prospective teachers' self-efficacy perceptions regarding instructional strategies during the Practice Teaching course?

2.2. What are the reasons of changes in prospective teachers' self-efficacy perceptions regarding student engagement during the Practice Teaching course?

2.3. What are the reasons of changes in prospective teachers' self-efficacy perceptions regarding classroom management during the Practice Teaching course?

1.2 Significance of the Study

Perceived self-efficacy regarding teaching ability is undeniably associated with successful teaching (Bandura, 1997). For this reason, teachers' high self-efficacy perceptions are an essential factor for successful teaching. As teachers gain experience, their self-confidence increases, and they see themselves as more competent. This situation also applies to prospective teachers. The sooner they gain a sense of self-confidence and competence, later when they become a teacher, this feeling continues, increasing their success. Therefore, teacher self-efficacy remains an important field in the educational research literature (Woolfolk-Hoy & Hoy, 1990). When the literature is examined, most teacher self-efficacy studies have used quantitative methods, including Likert scales in the last 20 years (Klassen et al., 2011). There is a need for qualitative studies in this area to obtain in-depth information about teacher self-efficacy perception. The study of Cansoy et al. (2018) also supports this idea. Between 2000 and 2017, 48 studies on self-efficacy perceptions were conducted in Turkey, and only one of them was qualitative (Cansoy et al., 2018). In this respect, the current study is considered valuable because

prospective teachers' self-efficacy perceptions were investigated using qualitative research methods.

The pandemic has had a profound impact on all aspects of life in our country and all over the world. The transition from face-to-face education to the emergent online education process in the field of education was a very difficult process for teachers, students, and parents. In addition, many faculties of education had to allow prospective teachers to complete their field experience online. Therefore, in the last semester, prospective teachers who did not know much about online teaching had to teach mathematics online. This study investigated the changes in prospective teachers' self-efficacy perceptions in-depth during these challenging processes since the Practice Teaching course was not experienced online before. In addition to examining the changes in prospective teachers' self-efficacy perceptions in the online education process, this study also investigated the reasons from which these self-efficacy perceptions originated. Determining these reasons would help determine the content of online teaching courses that can be given in prospective teacher education.

1.3 Definition of Important Terms

Self-Efficacy Perception: According to Bandura (1994), self-efficacy perception is defined as individuals' perception of their ability to perform significantly regarding events that will affect their lives. Self-efficacy perception depends on individuals' motivations, their influence from events and actions, what they believe rather than what is real.

Sources of Self-Efficacy: Four sources shape self-efficacy perception. The first one is successful experiences that have occurred due to an incident in the past, which is the primary determinant of the perception of self-efficacy known as mastery experiences. The second source is vicarious experience. It can be defined as the indirect experience obtained from observation and comparison of an experience

based on observation. The third one is verbal persuasion. Behaviors such as feedback and appreciation are examined within the scope of verbal persuasion. The last one is Emotional and physiological states which express individuals' belief in their abilities about what they can do (Bandura, 1994).

Teachers' Self-efficacy Perception: According to Tschannen-Moran and Hoy (2001), teacher self-efficacy perception is defined as a teacher's perception about his or her students' capacity or ability to produce desired learning outcomes.

Online Education: Moore and Kearsly (2011) defined online education as a flexible education and teaching model that students and teachers carry out independently of time and place.

Emergent Online Education: Although emergency online education is not systematic like planned distance education, it is an education method that provides reliable access to teaching and teaching materials for a while (Hodges et al., 2020).

Online Teaching Skills: According to Albrahim (2020), educators need determined online teaching skills and competencies to help design professional development programs for online instructors. Online teaching skills and competencies were defined in six categories. (i) pedagogical skills, (ii) design skills, (iii) content skills, (iv) social and communication skills, (v) technological skills, (vi) management and institutional skills.

Prospective middle school mathematics teachers: In this study, prospective middle school mathematics teachers were the seniors studying in the Elementary Mathematics Education program in the Faculty of Education. These prospective teachers are expected to teach mathematics to middle school students from grade 5 to grade 8.

Practice Teaching: It is a course aiming to provide prospective teachers with field experience (minimum 12 weeks) and guided teaching practice in the teacher education programs. They include a focus on classroom observation, planning, and preparation for teaching.

1.4 Motivation for the Study

In 2018, I had the chance to be in the online education process for the first time, thanks to the online course namely STEM Lead Teacher Professional Development Program. I received that course from BAUSTEM Center at Bahçeşehir University to apply STEM activities in my class. At that time, I was working as a teacher in a middle school. The course was asynchronous and allowed me to receive education whenever I wanted. After completing this one-year online course, I concluded that online education was an excellent opportunity to gain new experiences, especially in a limited time. When I started my graduate life, I decided to study this topic based on this experience.

With the COVID-19 pandemic process, online education, which was a choice until then, became mandatory with the pandemic conditions. In this way, all education stakeholders met with online education and gained new experiences. As a teacher, I learned to teach online through experience. Along with the difficulties of working with a young age group (middle school students), I discovered new methods by trial and error. And in prospective teacher education, I realized that I never improved myself in online education.

Online education has entered our lives quickly and intends to be permanent. The transfer of experiences is important so that future teachers do not experience the difficulties we experienced with online teaching. I believe that prospective teachers should improve themselves in this regard during their prospective education lives. For this reason, I wanted to research how prospective teachers can improve themselves in these areas by determining the areas they have the most difficulty with. Since I have experienced how important self-efficacy is in professional life, I aimed to investigate prospective mathematics teachers' self-efficacy perceptions about online teaching. In addition to online teaching self-efficacy, I also questioned the reasons for these self-efficacy perceptions.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study was to examine the changes in self-efficacy perceptions of prospective middle school mathematics teachers during their online practice teaching experience. The literature was examined in four main headings: self-efficacy, teachers' self-efficacy beliefs or perceptions, online teaching, and a summary will be presented at the end of the chapter.

2.1 Self-Efficacy

2.1.1 Definition of Self-Efficacy

Self-efficacy, put forward by Bandura, defines the confidence that individuals have to use their knowledge and skills most effectively and benefit from it. Self-efficacy belief is based on social cognition theory, which states that individuals should believe and trust their competence in the field they are primarily interested in or want to prove themselves (Gist & Mitchell, 1992).

According to Bandura (1997), self-efficacy; refers to individuals' beliefs about themselves that they can organize and assemble the behaviors they need to perform the tasks given to them by others. It develops the skills required to manage the situations expected from the individual. Self-efficacy defines the individual's self-belief in planning and organizing the individual's internal motivation cognitive abilities (Bandura, 1997).

After defining self-efficacy, Bandura (1997) stated that self-efficacy refers to individuals' beliefs about the abilities they have discovered in themselves, based on the experiences they have gained throughout their lives. As this belief increases over time, changes occur in the behavior of individuals (Bandura, 1997).

As previously defined, self-efficacy is confidence in one's own cognitive and affective potential rather than ability. A few studies have also emphasized the importance of using this potential when necessary. A person with low self-efficacy can have problems activating these skills even if he/she has sufficient skills when faced with any situation or problem (Aktan, 2012). In other words, self-efficacy is a person's belief about what he or she can do in different situations with the skills available. This existing knowledge, skills, and learned strategies will not be functional unless there is a belief that they can be used in appropriate situations (Sakız, 2013).

The difference between self-efficacy and self-efficacy perceptions has been included in many studies. Perception of self-efficacy is related to the belief about efficacy rather than the actual level of efficacy (Tschannen-Moran et al., 1998). People often believe that their proficiency level is either lower or higher. In other words, it is common for people to misjudge, underestimate, or overestimate their capabilities. Underperceiving their capacities prevents people from using their skills in the best way. On the other hand, overestimating one's actual capacity has a positive effect on performance in most cases (Tschannen-Moran et al., 1998).

In line with the ideas of Tschannen-Moran et al. (1998), perception of self-efficacy shows one's judgments of one's competencies rather than their actual level of competency. While individuals sometimes exaggerate and see their competencies as more than what they have, they may sometimes see them as less than they have (Çakir et al., 2006). The psychological processes present in the individual influence forming and developing the perception of efficacy. A person with a high sense of self-efficacy can solve complex events and problems, be patient, trust himself to succeed, and become more successful. A person with a low sense of efficacy cannot

cope with the negative situations he/she encounters, is hopeless and insecure, impatient, and avoids trying again when he/she fails (Akar, 2008). If people with a strong sense of self-efficacy face failure due to their job or task, their self-efficacy perceptions are not adversely affected by this situation.

2.1.2 Sources of Self-Efficacy

Four important sources shape self-efficacy perception. The first one is successful experiences that have occurred due to an incident in the past, which is the primary determinant of the perception of self-efficacy known as mastery experiences. The second source is vicarious experience. It can be defined as the indirect experience obtained from observation and comparison of an experience based on observation. The third one is verbal persuasion. Behaviors such as feedback and appreciation are examined within the scope of verbal persuasion.

The last one is social and communication states which express individuals' belief in their abilities about what they can do (Bandura, 1994).

- **Mastery experiences**

Mastery experience is the most critical factor in an excellent self-efficacy belief. Success enables one to become aware of one's abilities and build a firm belief in individual efficacy. Once this belief is established, failures can damage belief in personal efficacy. Success comes after some difficulties and failures. This success is the result of a long effort and different experiences. After the individual finds out the path to success, he/she will count every event he/she has encountered as experience. The individual produces appropriate solutions by taking into account the difficulties and negative situations and finding permanent solutions (Bandura, 2004).

- **Vicarious experiences**

Another resource needed to create and develop self-efficacy belief is the indirect experiences that include comparing and observing the behaviors, experiences, skills,

and achievements of others (Bandura, 1994; McCabe, 2003). In other words, it is the element that helps the success of people who identify with others' experiences or find close to their characteristics, to form their own self-efficacy belief (Ordun, 2005). What people think they have in common with them, observing people's successes enables them to develop their beliefs about achieving similar successes (Bandura, 1994). The observing individual realizes a similarity between the person he/she observes and himself/herself. In that case, this situation contributes to the knowledge of the individual about the subject he/she is interested in. The fact that the information obtained through observation is vital contributes to the self-efficacy belief of the individual. The degree of similarity between the individual and the other party is adequate for the success and failure of the modeled individual. Bandura (1994) states that models whose behaviors are consistent and whose thoughts are sufficient can pass on their knowledge, respond to the environment, teach the individual to be effective, and act strategically. Accurate and helpful information strengthens the individual's self-efficacy belief (Bandura, 1994).

- Verbal persuasion

One of the elements that Bandura defined as the source of self-efficacy belief is verbal persuasion. Verbal persuasion can be defined as suggesting that people have the ability they need to achieve their intended goals, giving them the courage to strengthen their beliefs or persuading them (Bandura, 1997). In other words, it can be defined as the positive approach, suggestions, and reactions that the individual will receive from the outside world or his environment regarding the work he needs to perform and vocal support from his immediate environment. With verbal persuasion, an individual's self-efficacy can increase. An individual with increased self-efficacy can achieve higher performance by making more effort (Ordun, 2005).

- Emotional and physiological states

The other factor that is effective in forming self-efficacy belief and is shown among its sources is physiological and emotional states. Anxiety level, the stress, the difficulties the individual feels while doing a job, or at the end of the job or the

exhaustion, the mood he is in is the effect of the individual's physiological and emotional states on the self-efficacy belief (Pajares, 2002).

When people are nervous, delusional, and depressed, they view these situations as signs of individual inadequacy. The individual thinks that he/she has low physical competence in situations that require physical strength, such as being tired and feeling pain. In order to cope with this situation, it is necessary to change the mind of the individual about himself, make the individual feel better physically, improve his mood, and change the wrong beliefs he has acquired psychologically (Bandura, 1986). Self-efficacy beliefs encourage the individual and provide the individual with self-confidence. If the individual has an unquestioning belief in success, both the individual's desire and effort will increase. On the other hand, if the individual's self-efficacy belief is too high, this may prevent the individual from making enough effort, leading to a failure (Bandura & Cervone, 1986).

In this study, four sources of self-efficacy were used as existing codes to determine the reasons for the changes in prospective teachers' self-efficacy perceptions.

2.2 Teachers' Self-Efficacy Beliefs/Perceptions

Bandura's self-efficacy belief theory can be used to explain human behaviors. This theory reveals the level of belief of teachers, who are behavior change engineers, that they can fulfill the competencies required by the teaching profession. It can be used to predict behavior related teaching duties and responsibilities. It is thought that this prediction can provide important information in the understanding and development of teacher behaviors that can affect the development of the individual (Bicen et al., 2014).

Teachers' efforts in the teaching process are significantly affected by their beliefs about what they can do (Bandura, 1997). Creating a classroom environment where effective learning can occur largely depends on teachers' abilities and self-efficacy beliefs (Bandura, 1993). This situation makes self-efficacy belief a critical concept

for the teaching profession. Thanks to their self-efficacy beliefs, teachers can use their knowledge and abilities to achieve important things under challenging conditions. Bandura (1993) states that teachers' abilities and self-efficacy beliefs are influential in forming learning environments that will enable the development of students' cognitive and academic competencies. For example, teachers' beliefs in their instructional competencies play a decisive role in shaping the activities in their classrooms. For this reason, one of the issues that have attracted attention in recent years and on which necessary research has been carried out is the professional self-perception of teachers and prospective teachers; "self-efficacy belief or self-efficacy perception" are concepts used for this (Yeşilyurt, 2013).

There are different definitions of teacher self-efficacy. MoNE (2017, p. 4) defined 13 teacher competence as "the knowledge, skills, and attitudes that must be found in order to be able to do the teaching profession efficiently and effectively." Tschannen-Moran and Hoy (2001) defined teacher efficacy as a teacher's belief in his ability to create desired learning outcomes; Guskey and Passaro (1994, p. 628) defined it as "teachers' belief or conviction that they can influence how well students learn, even those who may be considered difficult or unmotivated".

Teacher self-efficacy belief is an important concept associated with student outcomes such as student achievement, student motivation, and student self-efficacy beliefs. This concept is also related to the behavior of teachers in the classroom. Teachers' self-efficacy beliefs affect their efforts to teach, the goals they set, and their willingness to teach (Tschannen-Moran et al., 1998). As teacher competence increases, a more humane approach is adopted in student control, educational reforms are approached positively, teacher satisfaction and parent participation in school increase (Goddard & Goddard, 2001). According to Woolfolk et al. (1990), teachers with this characteristic are more humane and progressive in their teaching approaches. According to Webb and Ashton (1986), the teachers, who find themselves competent, believe that their work is essential, expect that they can increase the students' performance, set goals in front of them, and determine methods to achieve these goals.

Unlike high proficiency teachers, low proficiency teachers use more traditional education methods. They use harsh management strategies to create a controlled teaching environment (Witcher et al., 2002). Many studies on teacher efficacy have shown that it is problematic for teachers to have less confidence in their competence. For example, Tschannen-Moran et al. (1998, p. 234) stated, “Lower efficacy leads to less effort and giving up easily, which leads to poor teaching outcomes, which then produce decreased efficacy.” Low proficiency affected teachers’ activities, efforts, and resilience. Teachers with low proficiency may avoid planning activities that they believe exceed their abilities, do not deal with students who have difficulty learning, spend little effort finding materials, and do not seek ways to make students understand better (Schunk, 1991).

2.2.1 Teacher Self-Efficacy Scales

When the literature is examined, it is seen that the studies conducted to measure the competencies of teachers started with Gibson and Dembo (1984). Researchers developed a 30-item scale consisting of two dimensions: personal teaching efficacy and general teaching efficacy. Emmer and Hickman (1991) developed a three-factor teacher efficacy scale called classroom management, external influences, and personal teaching efficacy. The “Teacher Sense of Efficacy Scale” developed by Tschannen- Moran and Hoy (2001) consisted of three factors: competence in instructional strategies, competence in classroom management, and competence in ensuring student participation. Teachers’ Sense of Efficacy Scale- TSES is a Likert-type scale consisting of nine points. The scale has both a 24-item long-form and a 12-item short form.

There are measurement tools recently adapted to measure teachers’ self-efficacy beliefs in Turkey. Diken (2004) adapted the “Teacher Efficacy Scale” developed by Gibson and Dembo (1984) and revised by Guskey and Passaro (1994).

The teachers' sense of efficacy scale, developed by Tschannen- Moran, Hoy, and Hoy, was adapted into Turkish by Çapa et al. (2005). The researchers translated the original scale into Turkish by a team that has worked on teacher self-efficacy for many years and experts fluent in both languages. After the first translation, the items were revised by the same team. In the next step, the scale was examined by four high school teachers in terms of the intelligibility of the items, and minor changes were made based on their feedback. Then, a pilot study was conducted with 97 prospective teachers studying in Turkey's six prominent universities. As a result of this, the reliability estimate for the whole scale in terms of internal consistency was found to be .95, and those of the subscales were found to vary between .85 and .88. The scale was described as a reliable measurement tool. In addition, based on the self-efficacy data obtained from the prospective teachers, a three-factor model analysis was applied, and the three-factor structure of the scale, namely efficacy in instructional strategies, efficacy in classroom management, and efficacy in ensuring student participation, was confirmed.

In this study, the Turkish version of the teachers' sense of efficacy scale (Çapa et al. 2005) was used to select participants and develop the interview questions.

2.2.2 Prospective Teachers Self-Efficacy

Teacher self-efficacy beliefs are constructed mainly in the early stages of their professional development (Bandura, 1997). Because once efficacy beliefs are formed, they later show some resistance to change. Therefore, Bandura encouraged to focus on prospective teacher education because teacher self-efficacy beliefs are formed early in teachers' professional lives (Hoy & Spero, 2005). Thus, prospective teachers' self-efficacy beliefs created a significant research interest. However, there has been no consensus on how teachers' efficacy beliefs change during their teacher education program in the studies conducted so far. In studies conducted in Canada (Housego, 1992), Korea (Jeffrey & Young Suk, 1995), and the United States (Wenner, 2001), it has been determined that teacher self-efficacy belief tends to

become stronger during teacher education programs. On the other hand, studies conducted in Israel (Romi et al., 1999) and Taiwan (Lin & Gorrell, 2001) reported no change or decrease in prospective teachers' feelings of efficacy during their teacher education program. Due to the lack of consensus, it is important to examine the teacher self-efficacy belief during the teacher education program.

Swars (2005) investigated perceptions of mathematics teaching effectiveness among elementary prospective teachers with high and low efficacy using Mathematics Teaching Efficacy Beliefs Instrument (MTEBI). Four prospective teachers participated in the research. Data were collected through Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) and interviews. The efficacy of the degree of mathematics teaching of prospective teachers was determined with the data obtained from MTEBI. Three themes emerged from the data: past experiences with mathematics, influences upon perceptions of mathematics teaching effectiveness, and mathematics instructional strategies. According to the research findings, both those with low and high self-efficacy levels of prospective teachers believed that their "daily life" experiences were significant in motivating students in mathematics lessons. The findings showed that two low proficiency prospective teachers had negative past experiences with mathematics. For example, prospective teachers' experiences of being unsuccessful in their student years contributed to a lower perception of mathematics teacher efficacy. However, two high proficiency prospective teachers had different past experiences. One of those with high self-efficacy studied math diligently and stated that she could empathize with her future students. The other had positive experiences with mathematics and explained that she felt that these experiences would contribute to her effectiveness as a teacher. This finding was parallel to a previous study which found that prior experiences with science and mathematics, anxiety about science and mathematics, and self-efficacy beliefs in science and mathematics influence prospective teachers' efficacy attitudes about teaching science and mathematics (Bates et al., 2011).

In addition to the prospective teachers' past experiences, the effect of teaching experience on the perception of self-efficacy was also investigated. Teaching

experience is one of the most important parts of teachers' initial training. It helps teachers integrate theory and practice. Prospective teachers' gaining teaching experience and the critical observation and analysis of their lessons by experienced instructors contribute to their professional lives (Hoy & Spero, 2005).

During the teaching experience, when prospective teachers realize that they can support students' learning, they can develop teacher self-efficacy beliefs and create the opposite negative feelings and attitudes (Tschannen-Moran et al., 1998). According to Hoy and Spero (2005), researching the development of prospective teachers in challenging areas, especially in mathematics, during their teaching experience can provide information about the factors affecting this development. Thus, the prospective teacher education program can be shaped and developed with the knowledge gained about these factors.

Hill et al. (2008) examined prospective teachers' 12-week supervised teaching process to investigate the effect of teaching experience on their self-efficacy beliefs. The study conducted with 89 prospective elementary teachers examined mathematics efficacy beliefs before, during, and after participating in the course. Researchers measured teacher efficacy beliefs by examining two factors: instructional skills and classroom management. It has been revealed that prospective teachers with different self-efficacy beliefs follow different developmental processes. First of all, it was stated that teacher self-efficacy beliefs increased in all groups. In addition, it was emphasized that the student group with the lowest teacher self-efficacy belief showed the most improvement.

Another study also found that prospective teachers' experiences in university courses and student teaching practice may impact their beliefs regarding teaching efficacy as they progress through their university careers (Brand & Wilkins, 2007). Successful teacher education programs should increase prospective teachers' self-efficacy beliefs (Lin & Gorrell, 1998). According to Podell and Soodak (1993), these programs should provide prospective teachers with a sense of competence and

develop this feeling. Knowing how self-sufficient prospective teachers see themselves might help teacher educators prepare them for the world of education.

When the studies conducted in Turkey regarding the self-efficacy beliefs of prospective teachers are examined; it is seen that some of them examine prospective teachers' self-efficacy beliefs for courses such as Science, Chemistry (e.g., Akbaş, & Çelikkaleli, 2006; Çubukçu & Girmen, 2005; Morgil et al., 2004; Yılmaz & Çavaş, 2008).

Some of the studies aimed to develop scales related to teacher self-efficacy beliefs (e.g., Çapa et al., 2005; Diken, 2004) or to reveal the relationships of these beliefs with various variables (e.g., Altunçekiç et al., 2005; Erdem, 2008; Yaşar et al., 2006). The relations with different variables, including gender, class, and program, were studied. It seems that some research findings are similar, while others differ. Therefore, more research on this subject and examining self-efficacy beliefs in different contexts are needed.

2.3 Online Education

2.3.1 Definitions of online education

In the literature, many definitions of online education have been made. When different researchers' definitions of distance education are examined, it is seen that they define online education by using concepts that are not far from each other. Some of the definitions are given below:

- Online education is a discipline based on self-learning and benefiting from educational technologies to reach every individual who wishes to learn within the framework of equal opportunity and ensure that lifelong education needs and specific social and individual goals are met (Kaya, 2002).
- Online education is a formal education in which the individuals receiving the education are far from each other. The communication between learners, teachers,

and resources is made using interactive communication opportunities (Simonson et al., 2009).

- Online education is a teaching-learning style in which the parties interact in different environments from the place where the teaching is carried out by incorporating various teaching technologies through specially designed teaching materials and some teaching methods, and where teaching activities are carried out in a planned and regular manner (Moore & Kearsley, 2011).
- Online education is an education system model in which learners and instructors actively use communication technologies and postal services in learning activities. In addition, it is an education that enables learners to learn on their own and is more flexible and adaptable to the situations of individuals compared to traditional education (İşman, 2008).
- According to the United States Distance Learning Association (USDLA), online education provides educational opportunities to remote students through satellite, video, graphics, computer, audio, and multimedia technologies. At the same time, it was mentioned that electronic tools, written materials, and materials should be used in the teaching environment due to the distance between students and instructors (USDLA, 2004).

The most popular online education strategies have been blended, synchronous, and asynchronous teaching and learning. In synchronous education, students and teachers meet online at a predetermined time and conduct the lessons live (Fidalgo et al., 2020). In this process, it is tried to create a more active environment for teachers and learners, such as in-class interaction and discussion, instant questioning and expressing incomprehensible parts, and an environment close to face-to-face education is tried to be provided. In asynchronous education, on the other hand, it is the type of education in which teachers and students do not have the opportunity to work simultaneously and students can access the course content (presentation, video, audio recording, etc.) over the internet whenever they want or need it. Communication between participants takes place mainly through e-mail and online

forums and is usually moderated by trainers (Watts, 2016). In blended learning, teachers use online activities to improve students' skill knowledge while also providing appropriate practice in traditional classrooms (Garrison & Kanuka, 2004). To these well-established approaches, the category of emergency remote teaching can be added.

Another word for the current circumstance is "emergency remote teaching (ERT)," which is defined as a temporary shift in instructional delivery to develop a fully remote educational solution in lockdown situations (Hodges et al., 2020). Unlike scheduled online courses, emergency distance learning ensures the continuity of education in cases where there is a temporary obstacle to the delivery of education due to a crisis. Although emergency distance education is not systematic like planned distance education, it is an education method that provides reliable access to teaching and teaching materials for a while (Hodges et al., 2020). Emergency distance education has started with the COVID-19 epidemic, and this concept was confused with distance education. While developing content, finding the right technologies, and all kinds of difficulties experienced by educators in emergency distance education caused a negative attitude towards distance education, it is essential to know the differences between these two concepts (Sezgin, 2021). While "distance" equivalent of distance education emphasizes physical, interactional, and psychological distance, "Remote" equivalent of distance education emphasizes only physical distance (Bozkurt, 2020). The differences between these two concepts were explained explicitly in Bozkurt (2020)'s study. Bozkurt (2020) stated that while distance education is an option, emergent distance education is a necessity. While education continues in a planned and systematic way in distance education, emergency distance education aims to keep education alive only in times of crisis (Bozkurt, 2020).

Even if this stage of online teaching is classified as ERT, the existing experiences of all parties involved (teachers, students, administrative staff, IT specialists, and government officials) can be used to guide future online education legislation and improvements. In this study, emergent online education carried out during the

COVID-19 process was examined. Online education will be used as an umbrella term throughout the rest of this study.

2.3.2 Online Teaching Skills

As in face-to-face education, teachers must also have some qualifications in online teaching. Many studies have been conducted to narrow down online teaching skills and competencies.

In a comprehensive study, Albrahim (2020) categorized the skills and competencies an instructor should have to teach online in higher education by examining many studies. Albrahim has taken a general view of the issues related to online learning and teaching. For this reason, the skills and competencies mentioned in the study can also be used by instructors who provide online education to different student groups.

According to Palloff and Pratt (2011), the successful online trainer must understand the nature of face-to-face and online learning and their differences. In addition, they should use this understanding in the practice of online lessons. The personal characteristics that these trainers should have are listed as follows: highly motivated, active, visible, accessible, honest, organized, respectful, sensitive, analytical, flexible, supportive, open, compassionate, and leadership ability (Savery, 2005).

Online teaching competencies have been classified in different ways in the literature. According to Salmon (2003), these competencies should be listed in five categories: (i) technical skills, (ii) content expertise, (iii) online communication skills, (iv) understanding of the online process, and (v) personal characteristics. On the other hand, The International Society for Technology in Education-ISTE (2001) specified them in more detail and included different perspectives than Salmon (2003) as follows: (i) technology operations and concepts; (ii) planning and designing learning environments; (iii) measurement and evaluation; (iv) productivity and professional practice; (v) teach, learn and develop the curriculum; (vi) leadership and vision; (vii) procedures, policies, planning and budgeting for technology environments; and (viii)

social, ethical, legal and humanitarian issues. Smith (2008) briefly listed online competencies as social, pedagogical, personal, and technological, in addition to a set of competencies related to design, communication, management, and content.

Although the categories mentioned earlier seem feasible in theory, it is challenging for online teachers to have all these competencies in practice. For this reason, the duties and responsibilities of the teacher in the lesson should be determined first and then the competencies suitable for these roles should be determined. In short, the competencies required by the teacher may vary according to the role of the teacher in the classroom (Bawane & Spector, 2009).

Albrahim (2020) found that the majority of the studies focused on communication and social, pedagogy, technology, design, content, management, and institutional skills. This result was compatible with Technological Pedagogical Content Knowledge (TPACK), the teacher knowledge model put forward by Koehler et al. (2013). Particularly in the last ten years, in parallel with today's technological developments, the concept of pedagogical content knowledge (PCK) developed by Shulman (1986; 1987) has begun to be redefined as TPACK. TPACK integrated the PCK with technological knowledge due to the influence of instructional technologies on the learning-teaching process.

Therefore, Albrahim (2020) classified the skills and competencies that educators need to teach effectively in online learning environments into six categories: (i) pedagogical skills, (ii) content skills, (iii) design skills, (iv) technological skills, (v) management and organizational skills; and (vi) social and communication skills. Albrahim (2020) explained an online teacher's skills under the following headings.

i) Pedagogical Skills

Albrahim (2020) indicated that an effective online instructor should be able to do the following:

Learning theories, such as learning styles, the adult learning theory, the learner-centered approach, and collaborative learning; designing and

implementing appropriate instructional strategies, as well as classroom assessment and student engagement techniques; organizing and facilitating students' participation and providing guidance and support as needed; motivating students and showing enthusiasm and interest. (p. 15)

ii) Content Skills

Albrahim (2020) indicated that an effective online instructor should be able to do the following:

Stating learning goals and objectives that coincide with learners' levels and characteristics; drafting and developing learning and assessment activities that align with learning goals and objectives; developing and selecting appropriate and varied learning resources that accommodate different learning styles and preferences. (p. 15)

iii) Design Skills

Albrahim (2020) indicated that an effective online instructor should be able to do these principles and strategies: "organizing and presenting the learning materials in different formats; using students' previous feedback to develop and design new courses, understanding and applying instructional design principles" (p. 15).

iv) Technological Skills

Albrahim (2020) indicated that an effective online instructor should be able to do these principles and strategies: "accessing various technological resources and tools, understanding the learning and teaching capabilities and limitations of these tools (p.16)."

v) Management and Organizational Skills

Albrahim (2020) indicated that an effective online instructor should be able to do these principles and strategies:

Being able to clarify the roles and expectations of the instructor and the learners; managing the course time and applying time-saving techniques; demonstrating leadership, management, mentoring, and coaching skills; establishing and declaring rules and regulations for participation, submission of assignments. (p. 16)

vi) Social and Communication Skills

Albrahim (2020) indicated that an effective online instructor should be able to do these principles and strategies: “Facilitating and maintaining interactive discussion and information exchange; using sufficient and commonly understandable language; personalizing messages and feedback and making them more lively” (p. 16).

In this current study, online teaching skills (Albrahim, 2020) were determined as one of the frameworks for coding the data. While coding, initial themes were formed by using the sub-dimensions of the online teachers’ skills and competencies model (Albrahim, 2020).

2.3.3 Research about Online Teaching

The studies, in the last 20 years, have focused on students, teachers, prospective teachers, administrators, and parents in online education. In this section, focused on the experiences of teachers and prospective teachers regarding online education will be examined.

The study on the online teaching experiences of English teachers was carried out at a private university in Istanbul with 39 participants (Şener et al., 2020). In the study conducted to explore the technical, pedagogical, and institutional problems experienced by English teachers during online education, data was collected through an online questionnaire consisting of questions designed according to the Likert scale. Although the teachers stated that they received support from their colleagues, they stated the negativities they experienced due to the lack of technical equipment, lack of financial support, and increased workload. In addition, among the findings,

creating interaction opportunities in virtual lessons, students' low motivation, lack of autonomy, lack of standardization in the faculty, and general internet connection problems were the most problematic areas. Şener et al. (2020) also found that most of the participants had a positive attitude towards online teaching despite all the problems.

Baran and Sadık (2021), on the other hand, examined the experiences and opinions of classroom teachers regarding emergency distance education during the COVID-19 epidemic process. The research was carried out with 10 classroom teachers. The data were collected in three stages: before, during, and after the lesson. In the results obtained, the difficulties of teaching in younger age groups have also been observed, unlike the study conducted with English teachers (Şener et al., 2020). The participants mentioned the importance of parent support due to the young age of their students. They stated that they overcame many difficulties with parent support. While the classroom teachers indicated that they were generally sufficient in terms of their technological readiness, it was revealed that they did not have any distance education experience before COVID-19. Emphasizing the measurement and evaluation problems, the participants clearly stated that they did not find measurement and evaluation reliable in distance education. Again, suggestions were made to improve student follow-up due to the age group (Baran & Sadık, 2021).

Besides teachers, studies on prospective teachers' online teaching experiences are not many. The work done so far in this area can be summarized as follows. Among the urgent decisions and educational practices during the pandemic, prospective teachers also experienced a new experience within the practice teaching course's scope. Most prospective teachers graduated by completing their teaching experience online within the scope of this relevant course (Aslan Altan, 2021).

Aslan Altan (2021) carried out her study to examine the experiences of prospective teachers who experienced online teaching experience. Data were obtained from the online focus interviews with the participants using semi-structured interview forms. In the findings, the answers of the prospective teachers were presented in two

themes: physical distance and ease of preparing digital material. It was seen as one of the greatest conveniences that the prospective teachers stated that they did not have to wake up early and be present at school. In addition, the use of easier and ready-made content in the digital environment, thanks to technology support, and the absence of financial difficulties in using the digital materials used were considered an advantage.

Mohebi and Meda (2021) also conducted a qualitative study with 12 prospective pre-school teacher and five faculty supervisors to examine the perceptions of prospective teachers and supervisors in early childhood education about online field experiences from the United Arab Emirates. Three themes emerged from data from participants who completed open-ended questionnaires about their virtual field experience: (1) integrating technology into lesson planning, (2) meeting classroom management challenges, and (3) expanding the repertoire of teaching strategies. Although common themes (such as classroom management) also emerged in the study of Aslan Altan (2021), Mohebi and Meda (2021, p. 1197) emphasized the following point:

Although virtual field experiences were unprecedented, they offered internship students the opportunity to be creative and apply critical thinking skills to solve problems and manage young children's online learning experiences. This is an essential skill that is looming in the twenty-first century, a time in which online instructors should be able to think critically, solve problems, and meet the diverse needs of children in online classrooms.

Ak and Gökdaş (2021), in their study, aimed to evaluate and compare prospective teachers' teaching experiences in virtual classrooms and face-to-face teaching environments. For this purpose, quantitative data were collected with an online teaching experience questionnaire in the study conducted with 40 Computer and Instructional Technologies Education students. Semi-structured interviews were conducted in order to obtain more in-depth information. According to the findings obtained, most of the prospective teachers were found to prefer face-to-face education. They explained the reasons for this as teacher-student interaction and eye

contact. It was shown that motivation and performance were higher in face-to-face education, so productivity was also higher.

Lastly, a study was conducted with prospective English teachers to provide them online teaching experience and increase their proficiency and readiness for online teaching (Ersin et al., 2020). In the study, an alternative application was designed and implemented to increase the teaching proficiency of prospective teachers and prepare them for online teaching. A virtual classroom consisting of twenty-five prospective teachers was created. Six prospective teachers gave micro-teaching to their peers using Zoom. The university counselor e-mentored immediately after each session. Then, each prospective teacher gave feedback on their e-practice experience and e-mentoring. The findings revealed that prospective teachers found e-practice helpful as it helped them overcome their fears of teaching online.

The design of online learning-teaching environments has gained importance due to the emergent and compulsory education experience during the COVID-19 pandemic rather than the rapid development of technology (Ak & Gökdaş, 2021). Both prospective and in-service teachers should be offered the opportunity for online teaching and interactions because teachers should be able to use technology and pedagogy in both online and face-to-face teaching and manage the adverse emotional reactions during the application (Anderson et al., 2010).

2.4 Summary of Literature Review

The literature review began with defining self-efficacy theory in general. In the section, the meaning of self-efficacy was explained. The expression of self-efficacy was first introduced in the social learning theory developed by Albert Bandura. For Bandura, (1977), self-efficacy is an individual's self-judgment about arranging and successfully performing the activities necessary to bring about a behavior. The positive effects of high self-efficacy perception on performance have been examined in many studies (e.g., Çakir et al., 2006; Tschannen-Moran et al., 1998;). Considering

this effect, sources of self-efficacy were investigated to increase the perception of self-efficacy. Bandura (1997) stated that self-efficacy develops by feeding on four different sources. These resources are; mastery experiences, vicarious experience, verbal persuasion, emotional states.

When the concept of self-efficacy is evaluated from the teacher's perspective, the knowledge, skills, and attitudes that must be possessed to fulfill the duties and responsibilities required by teaching are emphasized. Several studies (e.g., Ashton & Webb, 1986; Goddard & Goddard, 2001; Tschannen-Moran et al., 1998), have highlighted that high teacher self-efficacy perception also positively affects students' self-efficacy perceptions. Therefore, to increase teacher self-efficacy, it was thought that this perception should be measured first, and different researchers developed different scales (e.g., Gibson & Dembo, 1984; Tschannen-Moran & Hoy, 2001). Tschannen-Moran and Hoy (2001) developed the "Teacher Sense Efficacy Scale," consisting of three factors: instructional strategies, classroom management, and student engagement, which was also used in this study.

Klassen et al. (2011) stated that most of the teacher self-efficacy studies use quantitative tools (surveys based on Likert scales). According to Wyatt (2012), the development of in-depth qualitative self-efficacy methods is very important in making self-efficacy research beneficial for teachers and teacher educators. For this purpose, Glackin and Hohenstein (2017) did one of the pioneering studies. Glackin and Hohenstein (2017) presented an approach to how qualitative data sources can be used in self-efficacy research to enable a more in-depth examination of data. The study aimed to investigate the self-efficacy perceptions of secondary school science teachers. The findings revealed that traditional quantitative scales did not fully capture teacher self-efficacy, and qualitative methods should be used to see the bigger picture.

When the studies were examined, there was no clear consensus on whether the perception of teacher self-efficacy is more open to development in the teacher education period. For instance, Housego (1992), Gorrell and Hwang (1995), and

Wenner (2001) revealed that prospective teachers' perceptions of self-efficacy were more conducive to development during teacher education programs. Contrary to this idea, Romi et al. (1999) and Lin and Gorrell (2001) supported that no change was observed in prospective teachers' self-efficacy perception during teacher education program.

Next, studies related to online teaching were reviewed. Online education was defined as a flexible education and training model carried out by students and teachers independently of time and place (Moore & Kearsly, 2011). At this point, the difference between the concepts of online education and emergent online education was explained. It was emphasized that emergent online education took place to ensure the continuity of education in cases where there was a temporary obstacle to the delivery of education due to a crisis (Hodges et al., 2020). In order to be successful in online education, there was a need to determine what teaching skills teachers need, as in face-to-face education; for this reason, which online teaching skills teachers need has been the subject of research. Salmon (2003), ISTE (2001), and Smith (2008) determined a variety of online teaching skills categories. Albrahim (2020), drawing on previous studies, specified online teaching skills in six categories: (i) pedagogical skills, (ii) content skills, (iii) design skills, (iv) technological skills, (v) management and organizational; and (vi) social and communication skills.

With the need for online education, the researchers conducted studies with teachers, prospective teachers, students, parents, and administrators. Considering the research questions of this study, studies conducted with prospective teachers were highlighted. Especially in the online teaching experience processes, Aslan Altan (2021) worked with prospective pre-school teachers from many branches (English, pre-school, mathematics), and Mohebi and Meda (2021) worked with prospective pre-school teachers and their faculty supervisors. In these two studies, qualitative data were collected. The teaching experiences and perceptions of prospective teachers in this process were investigated. In addition to this perspective, Ak and Gökdaş (2021) evaluated prospective teachers' perceptions towards online education

by asking them to compare face-to-face education with virtual classroom. The findings showed that the majority of prospective teachers preferred a face-to-face teaching environment. The reason for this was explained by reasons such as teacher-student interaction and eye contact.

In short, many studies focusing on the self-efficacy perceptions of prospective teachers and the importance of online teaching experience have been conducted. Despite several studies in the literature that addressed the importance of prospective teachers' self-efficacy, none of the studies have discussed their self-efficacy beliefs in online education. In this context, it was seen that there was a need for examining prospective teachers' self-efficacy perceptions in online education during practice teaching.

CHAPTER 3

METHODOLOGY

The main goal of this chapter is to provide information about the research methodology in detail. The research design, study participant, data collection tool, data collection process, data analysis, trustworthiness, ethical considerations, assumptions, and limitations of the study will be mentioned.

3.1 Research Design

This study, which aimed to examine prospective middle school mathematics teachers' self-efficacy perceptions of online teaching during the online Practice Teaching course and determine the reasons from which these self-efficacy perceptions originated, was structured within the scope of the qualitative research approach.

Case studies are defined as a research design in which a current and limited situation or many situations are examined by collecting long-term and in-depth data (Creswell, 2013; Merriam, 2009). In case studies, there may be events, programs, cases, or individuals (Merriam, 2009). On the other hand, multiple case studies are defined as research designs in which more than one case related to a determined research focus can be examined, and detailed inferences can be made about the research topic (Stake, 1995).

This study focused on examining the possible changes in the prospective teachers' self-efficacy perceptions in their online teaching experiences. In choosing the research design, the suitability for the purpose of the research was taken into consideration. To determine the changes in prospective teachers' self-efficacy

perceptions who went through this process and the problems they experienced, a long-term examination would be effective in answering the research questions.

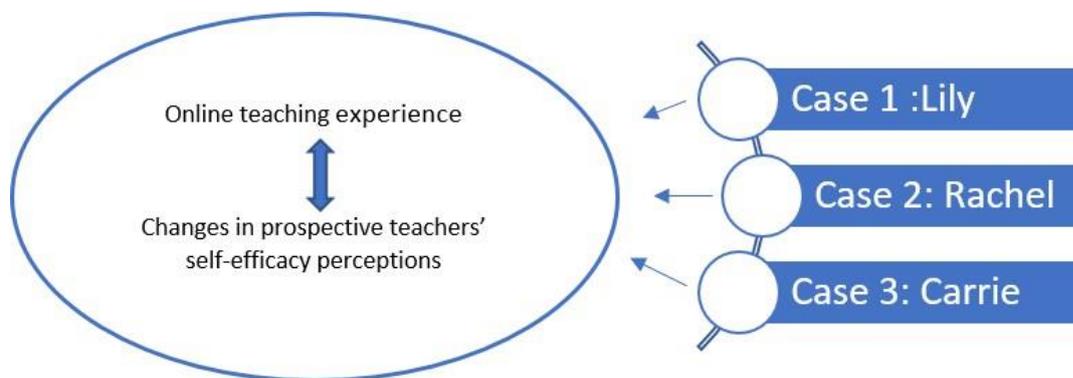


Figure 3.1. Research focus and cases.

In this study, each of the three prospective mathematics teachers was handled as a separate case; therefore, the multiple case study design, one of the case study designs, was used. Multiple case studies are case studies in which more than one case is handled holistically on their own (Merriam, 2009; Yin, 2009). In these studies, more than one case is considered to explain the issue, and the same data collection process is followed for each case (Creswell, 2007). Within the scope of this study, the self-efficacy perceptions of each of the three prospective mathematics teachers were examined with a holistic and in-depth understanding during their practice teaching period.

3.2 Context of the Study

All the prospective attended the same program, Elementary Mathematics Education (EME) program in a public university in Ankara. It is a four-year undergraduate program under the Department of Mathematics and Science Education. The graduate teachers are certified in mathematics in middle schools, Grades 5 to 8.

In the first two years of this program, the content courses such as Calculus, Elementary Geometry, Physics are offered from the respective departments (e.g., Mathematics, Statistics, Physics) in the Faculty of Arts and Sciences. The courses taken in the last two years are mostly from the Faculty of Education. The Educational Sciences courses such as Classroom Management are offered by the Educational Sciences Department. The courses offered by their own program, EME focus on both teaching and content including the Methods of Teaching Mathematics course. In the first semester of their last year, the School Experience course is offered, in which the prospective teachers are asked to observe mathematics lessons in a middle school. In the second semester of their last year, in the Practice Teaching course, besides observation, teaching experience is also gained.

The data for this study was collected during the Practice Teaching course. All the schools the prospective teachers attended were public middle schools. Similar to the School Experience course, the Practice Teaching was also held online. The duration of the lessons held via Zoom was 30 minutes. The prospective teachers were asked to teach at least four lessons. One of the participants made a block lesson by combining each of the two lessons in one session. The other two participants taught four different lessons.

3.3 Participants of the Study

The study's target population was prospective middle school mathematics teachers who experienced online teaching due to the COVID-19 during their practice teaching course in a state university in Ankara, Turkey. Qualitative research aims to obtain a holistic picture by examining the situations rather than generalization (Lichtman, 2013). Purposive sampling methods emerged on this basis within the tradition of qualitative research (Yıldırım & Şimşek, 2011). In this study, the purposive sampling method was used. The stages used in determining the participants were presented in Figure 3.2:

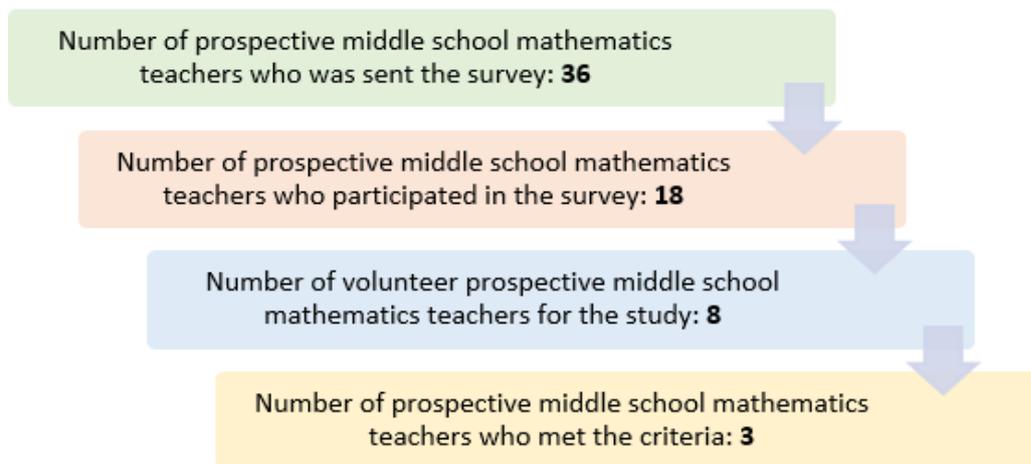


Figure 3.2. The stages followed in the determination of the participants

Thirty-six prospective middle school mathematics teachers taking the practice teaching course in the 2020-2021 spring semester were reached via e-mail. The Turkish version of the Teachers' Sense of Efficacy Scale (Çapa et al., 2005) was sent along with the research information. Responses were received from eighteen prospective middle school mathematics teachers. Eight of them accepted to participate in the study voluntarily. A preliminary interview was held with eight prospective volunteer teachers. In the purposive sampling method, it is critical to include information rich cases where data can be obtained (Patton, 2002). Based on the criteria of good communication between participants and researcher, participants' ability to express themselves comfortably in the interview, the desire to choose from a variety of self-efficacy levels based on the questionnaire implemented, and not having an online teaching experience before, three participants were selected for the study. They were informed about the process of the research. Verbal and written consent was taken. Afterward, planning for the data collection process was made, and a timeline was prepared, which was shared with the participants.

Pseudonyms were used as Lily, Rachel, and Carrie in the reporting process of the research to ensure the confidentiality of the participants.

Detailed characteristics of participants will be described next.

3.3.1 Case 1: Lily

Lily was a senior in the middle school mathematics education program at a state university in Ankara. Her last two courses in that semester were Practice Teaching and Guidance.

Lily said that she chose the teaching profession consciously and entirely willingly. She also stated that this is the most suitable profession for her, and she loves talking and children. Also, she added that this had been her dream since her high school years.

As a teacher, she had no experience teaching online in the classroom. Nevertheless, she explained that she taught one-to-one lessons online. As a student, she had many online courses from March to January. A few of them were synchronous, and the others were asynchronous. She found all of them productive.

She reported that she had no interest and talent for technology. Since she believed learning technology was necessary, she tried to learn and do research.

She believed that a teacher must be technologically proficient at teaching online successfully. Apart from that, since the online lesson periods were concise, teachers should provide the best time management. New methods for homework control should be developed by the teacher in order to monitor the students' progress.

3.3.2 Case 2: Rachel

Rachel was in her last year in the elementary mathematics education program at the same university as Lily. The only course she took different from Lily at that semester was the Turkish Educational System and School Management.

She explained the reason for choosing the teaching profession as follows. She stated that she wanted to be hopeful as a teacher for children in regions with insufficient opportunities in Turkey. She said that she loves mathematics very much, loves to

touch people and add value to them, and chose it because she thinks the place where the two of them fit together is teaching.

Rachel stated that she was related to technology. She emphasized that she had internal motivation; for example, she was currently taking a robotic coding course from the platform provided by her university. She also stated that when she has a problem with technology, she continually searches how to solve it and tries to find a solution.

She said that she had only one-on-one teaching experience about online teaching. She stated that she took a robotic coding course from the platform provided by her university. This course was asynchronous. She thought the assessment and evaluation of the course were done well and found the lectures were informative.

3.3.3 Case 3: Carrie

Carrie was also a student in the elementary mathematics education program at the same state university as the two participants. She had classes from both the 3rd and 4th year. Her last term courses were Practice Teaching, Method of Teaching Mathematics II, and Guidance.

She explained why she chose mathematics teaching as a profession. She stated that she realized that she enjoyed teaching mathematics while learning mathematics or doing something about mathematics. For example, when she was in high school, she asked her friends questions, she liked it very much. She loved teaching or improving something in the name of mathematics. That is why she chose to teach.

She stated that she had little to do with technology; she used basic programs such as Word and PowerPoint. However, she added that she never wanted to learn coding, etc., because she was not interested.

She thought that there were too many disadvantages of online education, such as students' preferring not to open their cameras. Moreover, Carrie complained that she

did not know if the students were there, that there was a great silence when teachers called because teachers could not get an answer.

She explained that she had no online teaching experience. She did not take courses from any online education platform, except for the online undergraduate education during COVID-19.

3.4 Data Collection Tools

Using multiple data collection methods in case studies is essential (Yin, 2009). Thus, the database of the research is enriched, and the results of the research can be interpreted from a broader perspective (Yıldırım & Şimşek, 2011). In this study, which was conducted to examine the changes in prospective middle school mathematics teachers' self-efficacy perceptions of online teaching, data were collected using questionnaires, interviews, and document review methods.

3.4.1 Questionnaire

The Turkish Version of the Teachers' Sense of Efficacy Scale (Çapa et al., 2005) was used for selecting participants (See Appendix A). The scale consisted of 24 items. Items covered three main themes to evaluate teachers' self-efficacy perceptions. These themes are instructional strategies, student engagement, and classroom management. While evaluating their self-efficacy perceptions, prospective teachers could choose a number from 1 to 9 for each item, where 1 was inadequate and 9 was adequate. (e.g. How much can you do to control disruptive behavior in the classroom?) The Teachers' Sense of Efficacy Scale was found to be a valid and reliable instrument for Turkish prospective teachers (Çapa et al., 2005).

3.4.2 Interview Protocol

The interview is one of the most widely used data collection methods in qualitative studies (Patton, 2002). Interviewing is used to learn about individuals' unobservable thoughts, behaviors, and feelings (Merriam, 2009). The purpose of the interview is to understand the individual's point of view (Creswell, 2007).

In this study, a semi-structured individual interview, one of the interview types, was used. In the semi-structured interview, participant's views on the situation to be explored can be examined in depth (Merriam, 2009).

The semi-structured interviews were conducted through an online platform and they were recorded with a voice recorder. Aims and tools of each interview stage are given in Table 3.1.

Table 3.1 Aims and tools of each interview stage

Date	Stage	Aim	Tool
April 2021	Preliminary interview	Getting to know the participants Creating an environment of mutual trust	Semi-structured interview questions
April-June 2021	Pre-lesson interview	To learn prospective teachers' expectations and self-efficacy perceptions before the lesson	Semi-structured interview questions considering the lesson plan
	Post-lesson interview	To learn prospective teachers' self-efficacy perceptions after the lesson	Semi-structured interview questions considering the lesson plan reflection

3.4.2.1 Preliminary Interviews

In preliminary interviews, data were collected to know the participants closely and create an environment of trust between the researcher and the participants. The participants were asked questions such as the reasons for choosing the teaching profession, the courses they took that semester, their perspectives on technology, their experiences teaching online, based on participants' observation, the difficulties met, and the methods of overcoming these difficulties in online education. The interview forms used in these interviews were presented in Appendix B.

3.4.2.2 Pre-lesson Interviews

The questions used in the pre-lesson interviews were taken from the Turkish Version of the Teachers' Sense of Efficacy Scale (Çapa et al., 2005) and prepared by considering online teaching. They aimed to learn prospective teachers' expectations and self-efficacy perceptions in different dimensions about the lessons before they implemented. The interview form used in this interview consisted of three parts (See Appendix B).

- The First Part: Efficacy for Instructional Strategies

The first part of the interview aimed to have information about the prospective teachers' perceptions about teaching strategies in online education. There were 4 questions in this part. Some examples of questions asked in this part were:

“To what extent can you offer an alternative explanation or example when students are confused in your online course? Why do you think so? In what ways do you feel adequate? In what ways is it inadequate?”

“How well can you apply different teaching methods in the classroom in your online course? Why do you think so?”

- The Second Part: Efficacy for Student Engagement

In this part, questions were asked to examine the participants' self-efficacy perceptions about the student engagement dimension of their self-efficacy perceptions in online teaching. In this context, questions about motivating students in online education, ensuring their participation in the course, and making them believe that they can be successful were included in the first part of the interview form. There were two questions in this part. These questions were as follows:

“To what extent can you motivate students who show little interest in the lesson or who are less academically successful in your online course? Why do you think so?”

“How far can you make students believe they can succeed in the online course? Why do you think so?”

- **The Third Part: Efficacy for Classroom Management**

Participants' self-efficacy perceptions about classroom management were examined in the last part. There were 4 questions in this part. Some examples of questions were:

“To what extent you can control the disturbing behavior in the classroom during the online lesson? Why do you think so?”

“How well can you ensure that the activities in the classroom are carried out regularly in the online lesson? Why do you think so?”

“How well can you ensure that the activities in the classroom are carried out regularly in the online lesson? Why do you think so?”

3.4.2.3 Post-lesson Interviews

The same questions were asked in these interviews as in the pre-lesson interviews. However, the participants were asked to explain their self-efficacy perceptions after the lesson (See Appendix B). The purpose of these interviews was to have them explain the changes, if any, in the self-efficacy perceptions by considering their online teaching experiences.

3.4.3 Documents

Documents are essential sources of information that should be used effectively in qualitative research. Document analysis includes the analysis of written materials containing information about the case or cases aimed to be investigated (Yıldırım & Şimşek, 2011).

The document review in this research aims to reach additional data on prospective teachers' self-efficacy perceptions in online education in addition to the interview data. In this study, the expectation papers written by the prospective teachers before the practice teaching period, the mid-term reflection paper they wrote in the middle of the semester, and the end of reflection paper written at the end of the semester were used in the document analysis. In addition to these, lesson plans prepared by prospective teachers were also used. The reflection part in the lesson plans, which they wrote after each lesson was conducted, was especially examined.

The documents used in the document analysis and their contents are given in Table 3.2.

Table 3.2 The documents and their descriptions

Documents	Description of the documents
Self-improvement paper	In this paper, prospective teachers identified an aspect of the teaching behaviors that they wanted to improve. Moreover, they explained their plan to improve.
Mid-Term Practice Teaching Reflection Paper	This reflection paper was about prospective teachers' practice teaching experience and how this practice might have helped improve the teaching behaviors at the mid-term of the practice teaching.

Table 3.2 The documents and their descriptions (Continued)

End of Practice Teaching Reflection Paper	This reflection paper was about prospective teachers' practice teaching experience and how this practice might have helped improve the teaching behaviors at the end of the practice teaching.
Lesson Plans	In the lesson plans, the activities to be implemented in the lesson were explained in detail in three stages as opening, middle, and closing. Apart from the gearing up and gearing down sections, there was a reflection section at the end of the lesson plan where prospective teachers evaluated how the lesson went.
End of Practice Teaching Reflection Paper	This reflection paper was about prospective teachers' practice teaching experience and how this practice might have helped improve the teaching behaviors at the end of the practice teaching.

3.5 Data Collection Process

Research data were collected in the spring semester of the 2020-2021 academic year. After the data collection tools (semi-structured interview forms) were developed, the required permissions were obtained from the Middle East Technical University (METU) Research Center for Applied Ethics to start the data collection process. After the permission, the participants were reached, and a pilot study was applied. The pilot study was conducted to test the data collection tools (interview forms) and create the necessary revisions. Two prospective middle school mathematics teachers participated in the pilot study. After the pilot application, the order of the questions in the interview forms was changed. In addition, some questions that were found to have the same meaning were combined and simplified. In addition, the intensities of the questions asked in three different dimensions (instructional strategies, student engagement, and classroom management) were tried to be equalized. It was thought

that these revisions would make the interviews more efficient. In addition to this, the pilot application helped determine the approximate duration of the interviews. Since each prospective teacher was observed during four lessons, it was anticipated that approximately eight interviews would be conducted when pre-and post-lesson interviews were planned. Considering the duration of the pilot interview, which lasted about 30 minutes, planning was made to hold a total of 4 hours of interviews with each prospective teacher.

The participants were determined by the purposive sampling method, explained in detail above. In the spring semester of the 2020-2021 academic year, pre-and post-lesson interviews were conducted. Since the study was voluntary, the participants were informed about it. Before the interviews, the purpose of the study, data collection process, and analysis were shared with the participants both in writing (consent form) and verbally. The consent forms were sent via Google Forms. It was stated that the interviews would be held via Zoom due to the COVID 19. After the participants signed the consent form, audio recording began. I informed that these recordings will not be listened to by anyone other than the researcher and will only be used for research purposes. In addition, it was reminded that the participants had the right to withdraw from the research at any time.

The dates and stages of the data collection process are presented in Table 3.3.

Table 3.3 The dates and stages of the data collection process

Date	Stages of the data collection process
January-February 2021	Development of data collection tools
March 2021	Ethical permission process
April 2021	Conducting the pilot study and revising the data collection tools
April 2021	Identification of participants
April-June 2021	Conducting interviews with prospective teachers and collecting relevant documents

3.6 Data Analysis

The data analysis process in qualitative research is a process that begins at the data collection stage of the research (Creswell, 2007; Patton, 2002). Ideas to make sense of the data collection process form the beginning of qualitative data analysis. The primary purpose of qualitative data analysis is understanding and interpretation (Patton, 2002). The primary purpose of the analysis of the data collected through interviews and document reviews in this research was to examine, explain and interpret the prospective middle school mathematics teacher regarding their self-efficacy perceptions in their online teaching experiences.

The data analysis process started with the interviews. In this context, the researcher wrote a research diary after each interview. In the diaries, the researcher focused on both the nonverbal behaviors she observed during the interviews and summarizing her views on the visions of the prospective teachers. In addition, the research diaries contributed to the development of the researcher's thoughts on the research throughout the process, allowing the researcher to reflect more systematically and easily access detailed information about the process in the reporting of the thesis (Silverman & Marvasti, 2008).

The researcher then transcribed the interviews and checked the consistency of the transcripts with the audio recordings after the transcriptions were completed. After the audio recordings and transcripts were checked, both data sets were recorded as computer data processing files and made ready for coding. Before the data were coded, initial themes were formed by using the sub-dimensions of the teacher education model (Albrahim, 2020), which was determined as one of the frameworks in the research. These themes were determined as follows: (1) Content Skills, (2) Design Skills, (3) Technological Skills, (4) Management and Institutional Skills, and (5) Social and Communication Skills. While this structure consisting of the initial themes determined the focus of the analysis, the codes that emerged due to the detailed analysis of the data were also added under the relevant themes. Also, Bandura (1977)'s four sources of self-efficacy, which are mastery experiences,

vicarious experiences, social persuasion, emotional states, were used as existing codes in the study. Apart from these codes, emerged codes from collected data were used. For instance, the data analysis revealed that low self-efficacy beliefs originated from lacking student knowledge. One of the participants attributed her feeling of inadequacy in adjusting the lessons to the proper level for individual students to lacking student knowledge. This was coded as lacking student knowledge under the as an emerging code.

The transcripts of the three interviews were coded by the researcher line by line with the code list created. The transcripts containing the coding made after this process were sent to a researcher experienced in qualitative research. This researcher checked the accuracy of the coding and themes. The consistency between the researchers' coding was examined, which will be explained further in the next section.

In multi-case studies, it is envisaged that each situation is first described independently of each other, then comparisons are made between situations, and finally, generalizations and inferences are made regarding the research focus (Creswell, 2013; Yıldırım & Şimşek, 2011; Yin, 2014). After analyzing the data for each prospective teacher, who was seen independently of each other in the study, comparisons will be made between them, and similarities and differences that may arise between the situations will be determined. Since each prospective teacher is in a different environment and has different students in their classes, these comparisons were not intended to generalize theoretically to a broader environment. It was examined whether there were familiar and different inferences regarding the changes in the perceptions of only three prospective teachers from whom data were obtained (Simons, 2009). The purpose of making such a comparison can be expressed as a deeper understanding of the processes and results focused in the research, understanding how they are limited in different conditions, and thus developing more detailed descriptions and more robust explanations (Miles et al., 2014).

3.7 Trustworthiness

Trustworthiness is an essential criterion when evaluating the worth of research. Validity and reliability affect the trustworthiness of the study. Validity and reliability are related to establishing the theoretical framework of a research, collecting, analyzing, and interpreting data, and presenting the findings (Merriam, 2009). In ensuring the validity and reliability of this research (i) credibility (internal validity), (ii) transfer- ability (external validity) and (iii) reliability criteria (Merriam, 2009) were used.

Credibility (internal validity) is related to the compatibility of research findings with reality in the external world. For example, "do the findings really explain the situation?" is related to credibility (Merriam, 2009). The credibility of the findings in this study is related to the fact that the data obtained from the research can realistically reflect the prospective teachers' self-efficacy perceptions in the online teaching process. In this context, the fact that prospective teachers' self-efficacy perceptions were examined based on the course processes in which they were observed provided an advantage for the study's internal validity. There are many ways to increase credibility. These are (i) prolonged engagement, (ii) member checking, and (iii) peer debriefing, and (iv) triangulation (Holloway & Wheeler, 1996). All of them were used in this study.

In collecting the research data, a long-term association was made with the prospective teachers. Half-hour interviews were held with prospective teachers before and after each lesson observation, and communication was maintained throughout the entire practice teaching process. This long-term association might have played an essential role in increasing the credibility of the research data. Spending a long time with the participants also enabled the establishment of a mutually trusting and friendly relationship and getting correct and complete answers (Houser, 2015; Streubert & Carpenter, 2011). In this way, researchers can better understand the participants' experiences (Holloway & Wheeler, 1996).

In order to increase the credibility of the research findings, member checking was used during the data collection and data analysis process. In this context, I double-checked to make sure I have the correct understanding of the prospective teachers' perceptions regarding the lesson observations during the interviews with the prospective teachers.

During this study, related to the peer-debriefing, a researcher who had also studied teachers' self-efficacy beliefs was asked to examine the research from various dimensions. During the data analysis phase, the other researcher also coded the data of the first participant using the code list. Emerged codes were noted. Then, the researcher met with the other researcher, and different views were agreed upon. The other researcher reviewed the other two participants' codes, and the codes were finalized by meeting with the researcher.

Lastly, for triangulation, data collection methods (interviews and document reviews) were diversified to increase credibility. In this way, the data obtained through the interviews regarding prospective teachers' self-efficacy perceptions were detailed with the data obtained from the document reviews. The data that could not be obtained through interviews were collected through document analysis.

Transferability (external validity) in qualitative research is concerned with the extent to which research results can be applied to other situations. A detailed description is made to enable the readers to see the extent to which their situation and the researched environment overlap, thus seeing the degree of transferability of research findings to different situations (Merriam, 2009). A detailed and dense description ensured the external validity of this research. This study focused on prospective teachers' self-efficacy perceptions. The research findings will be described in detail, supported by evidence.

Reliability in qualitative research is how consistent the results are with the collected data. Reliability also means that other people who examine the research find the research findings consistent with the research data (Merriam, 2009). For this purpose, the data obtained through interviews and document analysis in the research

were analyzed comparatively. In the first stage of the data analysis process, the data of a prospective teacher was first coded. The analysis process of the data of the other prospective teachers was compared with the first teacher, and the consistency in the coding was tested. When necessary, revisions were made to the coding.

3.8 The Role of the Researcher

In case studies, Yin (2014) explained the dimensions that researchers should pay attention to in their research roles: asking good questions, being good listeners, being prepared for new situations, sticking to the research focus, and being impartial. From this perspective, the following measures were taken in the study:

- Considering the nature of qualitative research, it is essential to build trust with participants in the research process. Prospective teachers may hold a negative perception by thinking that an evaluation is made during the data collection process. This perception will negatively affect the data collection process by preventing prospective teachers from expressing themselves comfortably. To avoid this situation, as a researcher, I tried to create an atmosphere of trust by explaining the research process in detail and answering the prospective teachers' questions about the research process sincerely in the preliminary interviews. In this process, my teaching experience helped me communicate with prospective teachers, allowing me to empathize. I also observed that prospective teachers expressed themselves comfortably.
- During the interviews, the meeting time was set so that the participants felt comfortable, while the times when the participants were not busy were determined. In this way, it was ensured that the negotiations were efficient. In addition, questions that would guide the participants during the interviews were avoided.
- During the data collection process, directing the participants while asking the interview questions was avoided. Thus, an effort was made not to influence the participants' expressions of their views.

3.9 Ethical Considerations of the Study

In the planning and designing qualitative research processes, researchers should consider ethical issues related to the research process and plan precautions for these issues (Creswell, 2013). Care was taken to adhere to ethical principles throughout the research process, and I took the following measures within this scope:

- After the research design was determined and data collection tools were developed, approval was obtained from the Research Center for Applied Ethics of Middle East Technical University regarding the compliance of the research with ethical principles (See Appendix C).
- The purpose of the research was explained to the prospective teachers who participated in the research, and their volunteering was taken as the basis for their participation in this process. In this context, before the data collection process, verbal and written consent of each participant was obtained through the consent form.
- All information and data obtained about the participants during the research process were stored in different data storage tools. The data were not shared with people other than the researcher and the supervisor.
- In the research reporting, pseudonym names were used instead of real names to ensure the confidentiality of the participants' identities.
- It was planned to share the final version of the research report with the participants.

3.10 Assumptions of the Study

The current study was conducted based on some assumptions. Firstly, it was assumed that interview questions were sufficient to achieve the purpose of the research and were understandable for participants.

Secondly, prospective teachers were assumed to reflect their perceptions of self-efficacy about online teaching honestly. In addition, it was assumed that they gave correct answers to the questions asked in the interviews. Finally, it was assumed that

the researcher collected the data from prospective teachers without prejudice about their knowledge and experiences.

3.11 Limitations of the Study

The current study's limitations can be identified as generalizability and researcher bias. The first limitation is generalizability. The results of this qualitative research cannot be generalized to all prospective teachers in the profession, as the number of cases is limited to 3 in a multi-case study framework to gather in-depth information from a participant by nature. As with almost all other qualitative research designs, another limitation of this study is researcher bias. It is essential to eliminate the researcher's bias, especially when collecting and analyzing data. The researcher's position on eliminating bias has been reported in detail before.

CHAPTER 4

FINDINGS

In this part, the findings obtained in the research will be presented. In describing the results in qualitative studies, it is stated that the researcher should first share the data with the readers without comments. This criterion was considered in the presentation of the findings, and attention was paid to describing the results in detail. First of all, the findings of the three participants will be explained independently of each other. The comparison of the findings obtained from the three participants will be presented in the discussion section.

4.1 Case 1: Lily

The findings obtained from Lily, one of the three participants of the study, will be presented under three main headings in this section. During Lily's online practice teaching experience, the findings regarding the changes in self-efficacy perceptions in the dimensions of instructional strategies, student engagement, and classroom management will be presented, respectively. In addition, the online teaching skills originating from low or high self-efficacy perceptions about three dimensions will be examined in detail for each of them.

4.1.1 Interview Analysis

During her practice teaching course, Lily was observed during two online lessons. For this study, the interviews were held before and after each lesson.

4.1.1.1 Instructional Strategies

Lily's answers to the questions posed under the instructional strategies dimension were presented in Table 4.1. Lily determined the perception of self-efficacy as adequate or inadequate based on each question. The situation was coded as not applicable in cases where she could not evaluate herself (such as cases where she did not have enough experience). Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement such as providing an alternative explanation. The rows refer to interviews held with the prospective teacher, Lily.

Table 4.1 Summary of data on instructional strategies for Lily

Time	Questions Providing an alternative explanation	Implementing different teaching methods	Gauging students' comprehension	Adjusting the lessons to the proper level for individual students
1st Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	+	—	—	—
	<i>Technological Skills</i> <i>Pedagogical Skills</i>	<i>Management Skills</i>	<i>Pedagogical Skills</i>	<i>Management Skills</i>
1st Lesson Post-Interview <i>Reason of self-efficacy perception</i>	+	—	—	+
	<i>Technological Skills</i>	<i>Content Skills</i>	<i>Management Skills</i>	<i>Pedagogical Skills</i>
2nd Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	+	+	—	—
	<i>Technological Skills</i>	<i>Management Skills</i>	<i>Pedagogical Skills</i> <i>Technological Skills</i>	<i>Design Skills</i>

Table 4.1 Summary of data on instructional strategies for Lily (Continued)

<i>2nd Lesson</i>	—	—	—	+
Post-Interview	<i>Design Skills Management Skills</i>	<i>Technological Skills</i>	<i>Pedagogical Skills</i>	<i>Content Skills</i>
<i>Reason of self-efficacy perception</i>				

Note. + adequate self-efficacy perception; – inadequate self-efficacy perception

- **Providing an alternative explanation**

In this section, Lily's answers to the question, "*To what extent can you provide an alternative explanation or example when students are confused? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Lily stated that she perceived herself as sufficient, except for the last interview related to providing an alternative explanation to students when they were confused. She attributed this to be technologically competent. In her first pre- lesson interview, she stated that online education has some advantages and explained the effect of these advantages on her high self-efficacy perceptions as follows: "There are a lot of manipulatives and models. I believe that I can help with students' questions and misconceptions in this way."

In line with her pre-lesson idea, she thought online teaching was better. Because when students do not understand or need alternative explanations, she says that she can easily overcome this situation by using her technological competence. She supported this idea as "If the student continued not to understand, I would have shown it from GeoGebra in any manner; I was thinking of showing them with protractor tools and measuring right triangles." during the post-interview of the first lesson.

In the pre-interview of the second lesson, as in the previous two interviews, she mentioned that her competence in this matter was related to her technological competence. Accessing various technological resources and tools made her feel competent. She explained the reason for this perception as "Yes, we can use more images. We can use more digital materials."

Apart from technological skills, she also attributed the other reason she feels competent to offer alternative explanations to students to her pedagogical skills. She thought she could explain how they could learn. Lily said:

Because I think like a student, I often think about how students can think, how can they understand or how can they not understand, how they get confused. If I were a student, I would think about how I would understand how to explain it most clearly. That is why I try to explain so that the student can understand.

Contrary to the previous three interviews, in the post-interview of the second lesson, her perception of providing an alternative explanation to students when they were confused changed to inadequate. She attributed the reason for this to design and management skills. She explained that she had to take many actions and that she had difficulty managing this process, "It was the last 2-3 minutes of the lesson, and I got a little excited when I picked up my pen. I looked at the participation. There was a little thing about the cameras; everything got mixed up."

In the last interview, she stated that feeling inadequate was related to design skills. She had problems choosing and presenting appropriate learning materials for different learning styles. She explained:

Because a student calculated the perimeter instead of the area, she said, 'We will add two sides, we will add the other two,' she said. Then she said, we add these, and I said, what is the area? You know, we were dividing it into unit squares. We were covering it with something. I said this was the field, but it was not sufficient.

As a result, when Lily's self-efficacy perception in terms of providing alternative explanations to students was examined, it can be said that there was a decrease in her self-efficacy perception. She considered herself sufficient in this regard at the beginning, as she saw her technological and pedagogical skills enough during her practice teaching experience. However, she realized that her management and design skills were not enough, considering what she had experienced during her practice teaching. For this reason, she stated that there was a decrease in the perception of self-efficacy to offer alternative explanations to the students.

- **Implementing different teaching methods**

The results obtained from Lily's answers to the question, *"How well can you implement different teaching methods? Please explain why you think like that."* will be presented relating those with the online teaching skills framework.

While Lily explained that she felt inadequate in three interviews, she stated that she felt sufficient in the pre-interview of the second lesson. She attributed the main reason for her inadequacy to her management skills. Lily thought that if she implemented different teaching techniques in online lectures, the students would not follow this lecture. She assumed that she was doing group work in the online class and stated that she was not sure whether she could demonstrate leadership to the students and manage the class. She added that doing group work in the online class was even more difficult for younger age groups. She emphasized this thought in the pre-interview of the first lesson as:

If we are talking about online, I do not think I can apply it to grouping, especially in the fifth and sixth grades. It is challenging. If we open a room on Zoom, I do not know how to call them back, and I do not know how to make sure they discuss the lesson. I do not think I can use it.

At this point, she did not think that she could manage the process by showing her leadership qualities. For this reason, she had a low self-efficacy perception.

Another reason why she felt inadequate was that her content skills were found insufficient. Because, in the interview held at the post-interview of the first lesson, Lily stated that she thought the content of the first lesson was not suitable for implementing different teaching techniques. Therefore, she did not develop or select varied learning resources that accommodate different learning styles. In other words, she thought that she could not apply different teaching techniques because she thought that the content was not suitable for developing different learning sources and explained that her perception of self-efficacy was low because she felt her content skills were insufficient. She said, "The content of the course is not appropriate...I did not plan on an activity. The [course content] was not appropriate as I planned to include many examples from different questions."

However, she made a statement that contradicted this idea in the post-interview of the second lesson. Although the subject was appropriate, she still did not implement a different teaching technique. She explained this situation as "I could not do much. So, I do not think it is enough. I think it is a very suitable activity for group work." That is, she attributed the reason why she could not apply different teaching techniques in the previous interview to the fact that the subject was not suitable. In this meeting, she stated that the subject was appropriate, but she still did not apply different teaching techniques. In other words, a contradiction was reported here. She also stated that implementing different teaching techniques did not apply to this age group (middle school). As mentioned in the interviews before, she did not think that these young students could easily follow the lessons in which different learning techniques were applied. However, she applied it to older age groups (high school, university) and observed that it was efficient. This experience has increased her belief that it would be productive in younger age groups. For this reason, in the pre-interview of the second lesson, she explained the reason why she felt competent about implementing different techniques as:

I had group work done at some events, but these were university-wide events. You know, I have never done this with young children, but I witnessed it being done with children, I observed and watched. Again, we did a game

event last term. We had the students do group work there again. There were no problems, and I overcame them and saw them more efficiently. So, I think I can use it.

In short, it is said that even though there were inconsistent explanations, she felt inadequate in implementing different teaching techniques, and this low self-efficacy perception did not increase during the practice teaching process. This common self-efficacy perception was due to the lack of other online teaching skills like technological, content, and management skills.

- **Gauging students' comprehension**

In this section, Lily's answers to the question, "*To what extent can you gauge student comprehension of what you have taught? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Under the Instructional strategies title, the only sub-title that did not change Lily's self-efficacy perception was this section in online education (See Table 4.1). She stated that the questions asked about gauging students' comprehension and using different assessment methods in online education were insufficient in all four interviews. The biggest reason for the low self-efficacy perception was pedagogical skills. Apart from pedagogical skills, Lily had a common self-efficacy perception because she thought she had inadequate management and technological skills. In the pre-interview of the first lesson, Lily thought that she could evaluate what students learned in the lesson even with one question. She stated that she could easily do this evaluation process using different digital materials. However, she still concluded that she could not evaluate fully in the online lesson. She explained that she felt inadequate in this regard as "I guess I cannot tell if they have learned exactly or not. Well, I am not very confident in asking the right questions. I do not know if I can ask exactly what I want." This low perception of self-efficacy was due to inadequate pedagogical skills because designing appropriate classroom assessments was one of the indicators of pedagogical skills in online education (Albrahim, 2020). Therefore,

not asking pertinent questions to students shows that she felt insufficient in terms of pedagogical skills.

Lily explained her perception of self-efficacy resulting from another lack of pedagogical skills in the pre-interview of the second lesson. She stated that she did not feel sufficient about gauging because she could not ensure the participation of the students. She emphasized that students did not participate because she was insufficient in organizing and facilitating student participation. She mentioned that this situation also negatively affected the gauging. The lack of pedagogical skills caused her low self-efficacy. In line with the opinion, she explained her inadequacy about participation in the post-interview of the second lesson as:

I do not think the lesson was grasped very well [by the students]. Because, for the last time, after covering the topic, I asked, "Do you understand? Doesn't anyone understand?" I was only able to get an answer from one person. Nobody else spoke.

Thus, she again emphasized the importance of participation in gauging online education. In brief, she stated that it becomes difficult to gauge students' comprehension unless students participate in the lesson and express their thoughts or indicate whether they understand or not.

When asked if she used different gauging methods, she explained that she did not think about other techniques because the fundamental problems related to gauging were not solved at first.

Another online teaching skill that was the reason for her low self-efficacy perception was technological skills. She gave the example that her feeling of inadequacy in gauging was due to not seeing and observing the solutions provided by the students to the questions. However, she also explained that she did not use technology effectively. This lack of technological skills has also led to low self-efficacy in gauging students' comprehension. She talked about this situation in the pre-interview of the second lesson as:

We cannot observe the students' solution methods very much. Online lessons are minimal, and the [mentor] teacher does not allow asking too many questions to the students... Alternatively, I could do quizzes with open-ended questions, but I cannot use them very well right now.

In the interview held after the first lesson, she attributed the underlying reason for her low self-efficacy perception to the lack of management skills. In the lesson, which started 6 minutes late, she could not complete the gauging section in the last part. She did not use time-saving techniques because she could not manage the lesson time efficiently. After this lesson, she felt inadequate about gauging students' comprehension because of management skills. Here is what Lily thought about this lesson:

Because the lesson was long, it was not quite over. The teacher started the lesson about 6 minutes late. I would do something; I would ask you a question like, can you summarize what you learned today? I could not do it, so I do not think I could observe it much.

- **Adjusting the lessons to the proper level for individual students**

The results obtained from Lily's answers to the question, "*How much can you do to adjust your lesson to the proper level for individual students? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

When Lily was asked about her perception of self-efficacy regarding the question, she said that while she felt inadequate in all the pre-lesson interviews, she was sufficient in all the post-lesson interviews. Before the lesson, she explained in the interviews that although she did not consider herself competent to prepare a lesson suitable for each student's level, she realized that she could do this after applying the lesson.

In the first pre-interview, she associated her inadequacy with the limited lesson time. Nevertheless, she could use time more efficiently by using time-saving techniques.

This required good management skills. In this interview, Lily explained that the lack of management skills caused this low self-efficacy perception. "It seems very difficult for online lessons. . . There is only half an hour in an online lesson. I do not know how to address every student in half an hour of class."

She attributed the self-efficacy perception that rose after the first lesson to her excellent pedagogical skills. In other words, she started the lesson with questions suitable for each student's level to involve all students in the lesson. Thus, using her pedagogical skills, she included students in the lesson and ensured that the lesson was suitable for every student level. This situation also increased the self-efficacy perception in the post-interview of the first lesson, which was low in the pre-interview. Lily expressed this situation as "I made an order from simple questions to complex questions. That is why I started with simple questions and put questions appropriate for all students' levels first. So, I thought of getting everyone involved."

In the interview held before the second lesson, she predicted that the lesson would not be suitable for all students' levels and explained that she was planning to redesign the lesson by using her design skills:

I do not think the activity will suit every student's level for tomorrow's lesson...I think of taking out the final step. . . I am thinking of changing some places, making the numbers smaller, or giving a few hints to the students to move forward.

Lily emphasized that the level was not suitable for every student with this explanation. She had some ideas (making numbers smaller, giving hints, etc.) to suit each student's level. Despite this, she still said that she had a low perception of self-efficacy about her lesson's being suitable for each student's level. She attributed this to the fact that she did not have sufficient information about the level of the students' understanding, as she could not gauge the students' comprehension, as Lily stated in the previous interviews. Therefore, she could not feel sufficient if the lesson was suitable for every student level.

However, after the second lesson experience, low self-efficacy perception turned into high self-efficacy perception because the students answered Lily’s low-level and high-level questions. Lily was able to state learning goals that coincided with learners’ levels, and she could develop learning activities aligned with these learning goals. She achieved this due to her content skills. Thanks to her content skills, she was able to prepare lessons according to the level of all students, and her students were able to answer the questions posed in the lesson. She explained the reason for the high self-efficacy perception regarding adjusting the lessons to the proper level for individual students as "Because almost all of my questions have been answered."

4.1.1.2 Student Engagement

Table 4.2 summarized Lily’s answers to the questions posed under the student engagement dimension. Lily determined the perception of self-efficacy as adequate or inadequate based on each question. The situation was coded as not applicable in cases where she could not evaluate herself. Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement such as motivating students who show low interest. The rows refer to interviews held with the prospective teacher, Lily.

Table 4.2 Summary of data on student engagement for Lily

Questions Time	Motivating students who show low interest	Getting students to believe they can do well in schoolwork
1 st Lesson Pre- Interview <i>Reason of self-efficacy perception</i>	— <i>Pedagogical Skills (external issues)*</i>	— <i>Social and Communication Skills</i>
1 st Lesson Post- Interview <i>Reason of self-efficacy perception</i>	+ <i>Pedagogical Skills</i>	NA

Table 4.2 Summary of data on student engagement for Lily (Continued)

2 nd Lesson Pre- Interview Reason of self-efficacy perception	— <i>Pedagogical Skills</i> (external issues)*	NA
2 nd Lesson Post- Interview Reason of self-efficacy perception	+ <i>Pedagogical Skills</i>	— <i>Management Skills</i>

Note. +adequate self-efficacy perception; – inadequate self-efficacy perception;

NA: not applicable

- **Motivating students who show low interest**

In this section, Lily’s answers, to the question “*How much can you do to motivate students who show low interest in schoolwork? Please explain why you think like that.*” will be presented relating those with the online teaching skills framework.

Although Lily considered herself inadequate in motivating students who showed low interest in schoolwork in the pre-interviews, her self-efficacy perception rose after applying the lessons (See Table 4.2). To give an example, she explained that she applied different plans to motivate students by using her pedagogical skills in involving students as “For example, I played a game [with students]. We made a tangram, and we made a rabbit by using manipulatives. . . For example, each student writes something on the blackboard, use parallelogram . . . it was beautiful.”

Although she felt adequate in her pedagogical skills, her perception of self- efficacy was low. The low perception was not caused by any lack of online teaching skills but by uncontrollable external factors. The mentor teacher affected Lily’s self-efficacy perception during the practice teaching process. She explained that she did not feel free because she felt obliged to do everything the mentor teacher suggested. After all, it was her class, and she followed the mentor teacher’s guidance. She explained her perception of low self-efficacy as:

But the teacher said, you know, take only three minutes, not five minutes for the game. So, there is nothing I can do. However, if it were my class, I would do it [the lesson] using the activity, not with the rote questions. For example, [I would ask] one question but discuss everything.

In the interview held after the first lesson, she said that her self-efficacy perception increased, and she attributed this change to a happening she experienced in the lesson. She stated that the students did not participate at the beginning of the lesson, and when she asked questions, she could not get answers from the students. She made them watch a video to motivate the students, and the participation of the students increased. This experience increased Lily's perception of self-efficacy in this regard.

In the interview before the second lesson, she also stated that she had a low self-efficacy in motivating students. In fact, in this interview, she showed that she knew what ideas she could apply to engage and motivate students. Moreover, she explained these methods as "We can do it by asking simple questions that students can answer. Alternatively, we can ask questions that interest them." Despite this, she said her perception of self-efficacy as low because students did not participate in online classes and did not the questions asked. She added that the students did not even turn on their microphones. In this case, she stated that she did not feel sufficient in motivating the students. Lily stated that while observing the mentor teacher, she noticed the reluctance of the students to participate in the lesson. This observation supported her idea. As a prospective teacher, she could not find a solution to this reluctance.

The situation experienced in the first lesson also happened in the second lesson. At the end of the second lesson, she emphasized that her perception of self- efficacy increased. She explained that she started the lesson with an exciting topic to motivate the students and that the participation of the students increased as:

It was an environmental day. I said, do you know the environment day? What can you do about the environment? I asked a few people who never spoke, a

few people whose voice I never really heard... I asked a few of them and saw that they were talking; even one raised a hand in the next question... I experienced something like this, and I liked it. It was the first time.

- **Getting students to believe they can do well in schoolwork**

The results obtained from Lily's answers to the question, "*How much can you do to get students to believe they can do well in schoolwork? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

When asked about her perception of self-efficacy about getting to believe they can do well in schoolwork in online education in the interview held before the first lesson, she said that she never thought about it at first. Then, she stated that she felt inadequate. She attributed this inadequacy to her lack of social skills. She said that she did not know how to make students believe that they could succeed. Then, when she thought about it, she stated that she would make students believe they could be successful by showing what they can do. She concluded that if she knew more information about students and learned why they feel unsuccessful, she could overcome these obstacles and make them believe that they can succeed. For this reason, she stated that it would help each student to feel competent in this regard by developing social and communication skills and getting to know each student very well. She added that this was quite difficult while doing practice teaching as:

For example, if I know the reasons why the student feels unsuccessful, if I know what she does not understand or what she has difficulty in, maybe I can show that she is more successful by overcoming it. Nevertheless, when you are a prospective teacher, it is challenging.

In the interview held after the first lesson, she stated that she did not experience a situation related to this question, so she could not determine the perception of self-efficacy as low or high. For this reason, the code was considered not applicable in the analysis. In line with this idea, it was recorded as not applicable by advocating the same idea in the second pre-lesson interview.

However, in the interview held after the second lesson, she explained that she had a low self-efficacy perception due to a situation she experienced in the lesson. She described the incident as follows:

The student raised a finger ... She was waiting to solve the problem. The question was challenging. She tried to solve this question with help, but she could not. She could not be involved in the process. Maybe I even made her feel like she was a failure in that way.

In this case, her feeling of inadequacy stemmed from her inability to manage the process; therefore, it was categorized as lacking management skills because she did not demonstrate management skills. Lily knew that the student could not solve that problem. In such a case, she could have directed the student to solve a different question that the student could solve. Or teacher helped her solve the problem with hints. When Lily faced this situation, she did not know how to manage it and felt inadequate.

4.1.1.3 Classroom Management

Table 4.3 illustrated Lily's answers to the questions posed under the classroom management dimension. Lily determined the perception of self-efficacy as adequate or inadequate based on each question. The situation was coded as not applicable in cases where she could not evaluate herself. Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement such as calming a student who is disruptive or noisy an alternative explanation. The rows refer to interviews held with the prospective teacher, Lily.

Table 4.3 Summary of data on classroom management for Lily.

Time	Controlling disruptive behavior in the classroom	Calming a student who is disruptive or noisy	Ensuring that the activities in the classroom run smoothly	Establishing a classroom management system with each group of students
1st Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	+	+	–	–
	<i>Technological Skills</i>	<i>Management Skills</i>	<i>Management Skills</i>	
1st Lesson Post-Interview <i>Reason of self-efficacy perception</i>	–	–	+	+
	<i>Technological Skills</i>	<i>Management Skills</i> <i>Social and Communication Skills</i>	<i>Management Skills</i>	
2nd Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	–	+	+	+
	<i>Technological Skills</i>	<i>Social and Communication Skills</i>	<i>Management Skills</i>	
2nd Lesson Post-Interview <i>Reason of self-efficacy perception</i>	+	NA	+	+
	<i>Management Skills</i>		<i>Management Skills</i> <i>Pedagogical Skills</i>	

Note. + adequate self-efficacy perception; – inadequate self-efficacy perception;

NA: not applicable

- **Controlling disruptive behavior in the classroom**

In this section, Lily’s answers to the question, “How much can you do to control disruptive behavior in the classroom? Please explain why you think like that.” will be presented relating those with the online teaching skills framework.

When Lily was asked about her perception of self-efficacy in controlling disruptive behavior in the classroom, her pre- and post-lesson perceptions were always different. For example, she stated that while she had a high self-efficacy perception before the first lesson, she was affected by a situation she experienced. After the lesson, she had a low self-efficacy perception. The opposite happened in the second lesson. While she felt inadequate in controlling disruptive behavior in the classroom before the lesson, she felt adequate after the lesson.

To explain the changes in her perception of efficacy, she stated before the first lesson, "I consider myself enough. There would be the automatic mute thing if I were in that situation. I would have done that at first." Using their technological skills, she thought she could control it. She believed that she could quickly achieve this because she knew the capabilities of technological tools in online education. However, she explained that this did not happen in the interview after the lesson as:

I think a student whose microphone was on was chatting with his father or mother. We listened to them all the time, so 1 minute passed. For 1 minute, I said something like; "I think your microphone is on. Can you turn it off?"

In the first interview, she saw herself as sufficient attributing it to her technological skills. However, in the post-interview, her perception of self-efficacy decreased. Because she did not the limitations of technological tools and find a solution for these limitations.

In the interview before the second lesson, she continued to the idea that her perception of self-efficacy was low, as she had previously stated. Because, considering the incident in the previous lesson, she emphasized that she was insufficient in this regard with the following sentence. "There is something like this; I was the host, I could have turned off the student's voice, I could not think about it at that moment. . . ." After completing the second lesson, she explained that her self-efficacy perception increased. The bad experience in the first lesson was destroyed by the excellent experience in the second lesson. The smooth passing of the second lesson and the absence of any disturbing behavior increased her perception of self-

efficacy. The fact that Lily successfully carried out the second lesson, that is, her management skills were sufficient, was one of the biggest reasons for her high self-efficacy perception.

- **Calming a student who is disruptive or noisy**

The results obtained from Lily's answers to the question, "*How much can you do to calm a student who is disruptive or noisy? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

In calming a disruptive or noisy student, Lily felt competent in the interviews held before the classes. She attributed this feeling to her management and social skills. She states that she learned many methods in her classroom management lesson at the university. She explained these methods as "For example, if a student is not interested in the lesson, you lightly touch her shoulder, you go to her, and she understands that you expect her to be interested in the lesson..." Although she trusted this information, she expressed the question mark in her mind about online education as "But I do not know in online education." In this statement, she claimed that she was not sure whether the existing methods for classroom management would work in online education. In addition to all these, she stated that she would take concrete steps regarding establishing and declaring rules at the beginning of the year. "At the beginning of the year, I want these from you[students]. These are our rules; let us[class] set the rules. There are also strategies like that. I would do that." She considered herself sufficient because she knew these methods and thought she could apply them. In the pre-lesson interview, she based her high self-efficacy perception on her excellent social and communication skills, stating, "I think I have good communication with students because I think I can get along or understand them." She thought she could soothe the student by showing sensitivity and empathy when communicating online.

The high self-efficacy perception felt before the lesson decreased after the first lesson. This was because she could not manage a student's behavior in the lesson. In terms of management skills, although she thought that she could tell and apply many

methods before the lesson, she could not apply them during the lesson, and she felt inadequate saying:

One student, if you do not promise her, she constantly talks, “I will do it, I will do it, I will do it...” For example, I spent three minutes of the lesson listening to that student; after she talked, I said ok, thank you, but I could not say anything until it was over, so I did not see myself enough.

In addition, another reason why she felt inadequate was that she needed to improve her social and communication skills in online education. She stated that she thought she could communicate with the students more easily and convey what she wanted to say more efficiently by using body language, stating:

Face-to-face education could be easier [for calming a noisy student]. Looking at this situation, if I had been in a face-to-face class with that student [noisy student], I could have shown with my body language that she had given information more than necessary, suggesting that she should stop talking now.

Since body language cannot be used actively enough in online lessons, she needed different techniques in online lessons. For this reason, she wanted to improve her social and communication skills in online education. In addition to this thought, in the interview held after the second lesson, she stated that she could not comment on this issue since no students showed disturbing behavior in the second lesson.

- **Ensuring that the activities in the classroom run smoothly**

In this section, Lily’s answers to the question, “*To what extent can you ensure that the activities in the classroom run smoothly? Please explain why you think like that.*” will be presented relating those with the online teaching skills framework.

Lily said that she did not see herself sufficient before the first lesson in ensuring that activities in the classroom run smoothly, but she felt competent in all subsequent interviews. In other words, it can be said that her perception of self-efficacy increased during the practice teaching process in this regard.

The low self-efficacy perception she mentioned before the first lesson was that her management skills were insufficient to manage a situation in the classroom. She explained this situation as follows:

For example, a student had a misconception, and she could not answer my questions, and I focused entirely on her, and I did not know what the other class [sic] was doing. I was teaching [online] for the first time. I did not know what to do.

She emphasized that she should improve herself in demonstrating management skills in the class. Also, she should teach by thinking about each student in the class.

In the interview held after the first lesson, she mentioned that she felt sufficient about ensuring that activities in the classroom run smoothly because she could complete the parts she planned to do in the lesson. She stated that she was flexible during the lesson and spent more time on the parts that the students did not understand. She completed the other parts by using time-saving techniques. Therefore, her high self-efficacy perception was attributed to good management skills. Similarly, in the interview before the second lesson, it was revealed that she had a high perception of self-efficacy because she felt competent in her management skills. Furthermore, she explained that she thought sufficient about her self-efficacy with the following sentences: "Because some parts will be tough to understand. If it is understood, or rather, if they indicate that they understand, I can make the activities run smoothly."

In the meeting held at the end of the second lesson, she shared that she achieved results in line with her predictions before the lesson. She stated that her lesson was organized in an orderly manner and that she asked all the questions she wanted to ask stating, "I asked all the questions I wanted to ask. I was able to get answers to all of them and even talk about them. So, it runs smoothly." She stated that her pedagogical and management skills were also effective in ensuring that the activities in the classroom run smoothly. It can be said that student participation was a significant factor for the activities running smoothly in the classroom. Since student participation and pedagogical skills are interrelated, Lily explained that pedagogical

skills positively affected the perception of self-efficacy. “The more the students participate, the better it [the lesson] flows.”

- **Establishing a classroom management system with each group of students**

The results obtained from Lily’s answers, “*How well can you establish a classroom management system with each group of students? Please explain why you think like that.*” will be presented relating those with the online teaching skills framework.

Whereas Lily saw herself inadequate before the first lesson in terms of establishing a classroom management system with each group of students, she stated that she considered herself sufficient in all subsequent interviews. It can be said that there was an increase in her perception of self-efficacy during the practice teaching process.

In the interview before the first lesson, she stated that she felt that she could not develop a suitable method for different groups of students because she did not attend the lesson saying, “I do not consider myself sufficient. I have not adapted to different student groups yet. I have not taught [different student groups] yet.” At this point, she did not attribute her feeling lack of competence to any online skills. She just stated that she felt inadequate because of her lack of experience. In the post-interview of the lesson, she noted that she felt herself sufficient. Because she said that she would use sufficient and commonly understandable language by each group of students. At this point, she attributed why she felt adequate to the adequacy of social skills.

In the meeting before the second lesson, she stated that she could implement a different management system and had a high perception of self-efficacy in this regard. It can be said that the reason for this was that she felt competent in her management skills. Lily stated that she could establish different classroom management systems according to each group of students. She explained that she taught fifth and seventh grade students and provided classroom management for

both. In the interview held after the lesson, she said,” For example, seventh graders were more confident than fifth graders. Seventh graders were completely goal oriented. So, classroom management in seventh grade became more manageable."

4.1.2 Document Analysis

In the self-improvement paper she wrote at the beginning of the term, Lily stated that she felt inadequate about content skills and wanted to improve herself in this regard: “For some lessons, the teacher asked me to prepare questions and solve questions for the students. During this period, I realized that I had great inadequacies in understanding and conveying the objectives of the current curriculum correctly." In the post-interview of the first lesson, she also mentioned that her self-efficacy perception was low because she felt inadequate about content skills. This thought, which she wrote in the self-improvement paper at the beginning of the term, supported the thought she stated in the interview. In addition, in the last interview, she stated that she felt adequate about content skills. At this point, it can be said that she had come a long way in her development plan.

Lily stated in the interviews that she felt adequate as long as there were no external issues related to increasing the motivation of her students regarding the dimension of student engagement. In the mid-term reflection paper, she explained, “The visuals, videos, and specialized materials used in the lesson are a source of motivation for students, and their interest in the lesson increases. I noticed that such lessons increase the number of active students."

In the end-of-practice teaching reflection paper, while evaluating her development, she stated “Now, based on my practice teaching experiences, I can say that my curriculum knowledge has increased. Thanks to the lesson contents and lesson plans I prepared; I had the opportunity to review the curriculum many times.”

In the reflection part she wrote after her lesson plans, she stated that she had a low self-efficacy perception in classroom management. This was due to not being able

to manage lesson time and not applying time-saving techniques. In other words, the reason for her low self-efficacy perception was that she felt inadequate in her management skills, stating, "I spent more time than I planned on the first questions. So, I was not able to have the discussion I had planned for the last question."

After applying the lesson plans, she considered herself competent in ensuring the participation of the students in the lesson. She explained that she felt sufficient in the student engagement techniques. She based this high self-efficacy perception on the sufficient level of her pedagogical skills. She supported this thought in the reflection part "I think I was able to get most of the students to participate in the lesson."

4.1.3 Summary

The summary will be in the areas of instructional strategies, student engagement, and classroom management, respectively. If instructional strategies were evaluated in general, she explained that she had a low self-efficacy perception and identified areas to develop. She primarily saw herself as sufficient in providing alternative explanations. The biggest reason why she considered herself sufficient in this regard was that she thought her technological skills were adequate.

Lily's perception of low self-efficacy did not change in gauging students' comprehension. She explained low self-efficacy perception due to her lack of management, pedagogical and technical skills.

She primarily saw herself as inadequate in implementing different teaching methods. She attributed this inadequacy to her management, content, and technological skills. She had a low self-efficacy perception regarding gauging students' comprehension. She thought that this was primarily due to the inadequacy of her pedagogical skills. It can be said that feeling inadequate in management, technological, and pedagogical skills influenced.

Lily had low self-efficacy perceptions in all the pre-lesson interviews; on the contrary, she felt sufficient in all the post-lesson interviews. For example, there was

a low perception of self-efficacy in adjusting the lessons to the proper level for individual students because she felt that management and design skills were inadequate. On the contrary, she explained that she had a high self-efficacy perception because she trusted her pedagogical and content skills.

Lily also felt inadequate in the student engagement dimension. She felt inadequate before each lesson about motivating students who show low interest. She felt sufficient after implementing lessons. She had a low self-efficacy perception about motivating students because she thought her pedagogical skills were inadequate.

She felt insufficient in getting students to believe they could do well in schoolwork. She stated that she felt insufficient because she was prejudiced against online education. She saw this question as irrelevant in other interviews because she could not observe this in her classes (coded as not applicable).

In the last dimension, classroom management, she felt sufficient in general. She had low and high self-efficacy perceptions about controlling disruptive behavior in the classroom during online teaching practice. She attributed the low self-efficacy perception only to the lack of technological skills. In contrast, the high self-efficacy perception was associated with high management and technological skills.

When she evaluated herself about a calming student who is disruptive or noisy, she mostly found herself sufficient. She attributed her feeling of competence to her high management and social skills. In another interview, she said that she had a low self-efficacy perception due to inadequate skills (management and social skills). These statements were contradictory. In addition, in the last interview, she thought that this question (calming a disruptive or noisy student) was not relevant so it was coded as not applicable.

On the other hand, she mostly had a high self-efficacy perception about ensuring that the activities in the classroom run smoothly. One of the biggest reasons for this was her management skills. She felt competent in establishing a classroom management

system with each group of students. While she did not attribute this competence to any skills, she felt sufficient based on her mastery experiences.

4.2 Case 2: Rachel

The change in Rachel's self-efficacy perception in online teaching will be examined similarly under three main headings: instructional strategies, student engagement, and classroom management. By determining the online teaching skills from which these self-efficacy perceptions originate, I will share the changes in the process.

4.2.1 Interview Analysis

During her practice teaching course, Rachel was observed during four online lessons. For this study, the interviews were held before and after each lesson.

4.2.1.1 Instructional Strategies

Rachel's answers to the questions posed under the instructional strategies dimension were presented in Table 4.4. Rachel determined her perception of self-efficacy as adequate or not based on each question. The situation was coded as not applicable in cases where she could not evaluate herself (such as when she did not have enough experience.). Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement such as providing an alternative explanation. The rows refer to interviews held with the prospective teacher, Rachel.

- **Providing an alternative explanation**

In this section, Rachel's responses to the question, *"To what extent can you provide an alternative explanation or example when students are confused? Please explain*

why you think like that.” will be presented relating those with the online teaching skills framework.

Rachel’s self-efficacy perception about providing an alternative example changed after the lessons. While she stated that she had low self-efficacy perception in her first pre-lesson interview, she explained that her self-efficacy increased in the post-lesson interview. The opposite was experienced in the fourth lesson. In the pre-lesson interview, she said she felt herself sufficient in this regard. However, in the first post-lesson interview, she felt inadequate. Her self-efficacy perception changed according to her mastery experiences. Nevertheless, she generally saw herself as sufficient in the online teaching practice. Moreover, she stated that the biggest reason for this adequacy was her design skills.

Table 4.4 Summary of data on instructional strategies for Rachel

Questions Time	Providing an alternative explanation	Implementing different teaching methods	Gauging students’ comprehension	Adjusting the lessons to the proper level for individual students
1st Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	— <i>Content Skills</i> <i>Pedagogical Skills</i>	— <i>Lack of student background knowledge*</i>	+	+
1st Lesson Post-Interview <i>Reason of self-efficacy perception</i>	+	NA	— <i>Management Skills</i>	+
2nd Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	+	—	+	+

Table 4.4 Summary of data on instructional strategies for Rachel (Continued)

2nd Lesson Post-Interview Reason of self-efficacy perception	— <i>Pedagogical and Management Skills</i>	— <i>Emotional state</i>	— <i>Content Skills</i>	— <i>Content Skills</i>
3rd Lesson Pre-Interview Reason of self-efficacy perception	+ <i>Design Skills</i>	+ <i>Design Skills</i>	— <i>Content Skills</i>	+ <i>Design Skills</i>
3rd Lesson Post-Interview Reason of self-efficacy perception	+ <i>Design and Technological Skills</i>	+ <i>Technological Skills</i>	+ <i>Pedagogical Skills</i>	— <i>External Issues*</i>
4th Lesson Pre-Interview Reason of self-efficacy perception	+ <i>Design Skills</i>	+ <i>Technological Skills</i>	+ <i>Content Skills</i>	+ <i>Content Skills</i>
4th Lesson Post-Interview Reason of self-efficacy perception	— <i>Design Skills</i>	— <i>External Issues*</i>	— <i>Technological and Management Skills</i>	+ <i>External Issues*</i>

Note. +adequate self-efficacy perception; – inadequate self-efficacy perception

In the interview before the first lesson, she explained that she felt inadequate in this regard. She did micro-teaching in the practice teaching lesson before the implementation. Here, the case where a student stated that the shape in the example could be a polygon by making it concave was discussed. Since the curriculum clearly states that concave polygons will not be included, Rachel could not manage this situation and had difficulty explaining. This situation lowered her perception of self-efficacy. This low self-efficacy perception was related to not only content skills but also pedagogical skills. In other words, she was aware that she should not mention the concave shapes in the lesson, but she had difficulty explaining them to the

student. This situation she experienced in micro-teaching caused her to worry about the questions coming from the students. In short, she explained her inadequacy as follows. "I studied the content well, but I do not know what kind of questions will come from the students."

However, in the interview held after the first lesson, she perceived herself as sufficient. She stated that the students were not confused because she gave detailed explanations via the GeoGebra files. She attributed her high self-efficacy perception to be technologically competent. Because Rachel observed the positive effect of the GeoGebra on the student and trusted the GeoGebra, she was aware of the technical potential of GeoGebra in math lessons. She said, "To be honest, the students were not confused at all because when I showed using the GeoGebra in detail, there was not a student who was confused."

She again stated that she had a high perception of self-efficacy in the interview before the second lesson. Because she developed different solutions according to the answers expected from the students, for example, for this lesson plan, she determined the points where the students would be confused and planned which clues to give. In short, she attributed the reason for this to design skills. However, she explained that she felt inadequate in the second post-lesson interview. She described her situation during the lesson as:

When I started the lesson, I reminded the previous information... and I asked the student about the area of the square, and the student said that he did not know. Moreover, at that moment, I did not know what to do. I am stuck because we have already repeated it.

Rachel could not manage this situation in class. She did not know how to respond to the student. When she lost time, she switched to direct teaching instead of making students discover the rule. She said "I do not think I was able to make an alternative explanation either. I gave the formula directly rather than explaining it." So, Rachel's management skills were insufficient which affected her self-efficacy negatively. This feeling caused her to switch to direct teaching when she felt inadequate.

She stated that she had a high self-efficacy perception in the pre-and post- interview of the third lesson. Before the third lesson, she explained that she felt adequate because her design skills were sufficient. After the lesson, she presented parallel ideas with this thought. She attributed her confidence to her design and technological skills to feel competent after the lesson. Like the second lesson, students' expected questions were determined, and she prepared GeoGebra to explain these questions. She felt competent to provide an alternative explanation because she had thought about this issue during the planning and developed different materials to handle it. In addition to that, she thought her materials were well-designed, as she was confident in her ability to use GeoGebra. In the post-lesson meeting, she said, "So actually, by using this file [GeoGebra File], I was able to explain it explicitly when she [the student] got confused...I feel sufficient"

Before the fourth lesson, she prepared GeoGebra files considering the points that the students would be confused about. She stated that she felt adequate because of this. The reason for this was again design skills. On the contrary, she stated that she felt inadequate after the lesson. Because she had an unexpected situation in the lesson, she prepared a separate GeoGebra file for each question to provide alternative explanations. When she opened all these files during the lesson, the computer gave an error and became very slow. For this reason, she could not use any file to provide alternative explanations. Furthermore, when the children were confused, she could not explain, which reduced her perception of self-efficacy. She concluded that she should have considered these possible technical problems during the design part of the lesson, and she should have made a plan B. She even found an alternative solution during the interview. She said, "It [the lesson] was awful. Afterward, I said that I could improve myself in this regard. I could have prepared all the examples on a single GeoGebra file... I could have prepared something like this."

- **Implementing different teaching methods**

The results obtained from Rachel's responses to the question, "*How well can you implement different teaching methods? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Rachel stated that she mostly had low self-efficacy perceptions about implementing different teaching methods in online lessons. In the interview before the first lesson, she explained that she felt inadequate in this regard, and she attributed this to her lack of knowledge about students. She said she could find appropriate teaching strategies if she knew the students' interests or way of learning. She emphasized that she avoided implementing different teaching strategies because she did not have enough information about the students. After the first lesson, she stated that she did not implement different teaching methods in the first lesson. For this reason, she emphasized that she would not say whether she felt sufficient or insufficient.

She repeated that she had a low self-efficacy perception in the pre- and post-interview of the second lesson. In the pre-lesson interview, she said that she felt inadequate because she did not include different teaching strategies in the lesson plan and emphasized that her planning could have been different even if it was face-to-face. She said, "Because the lesson plan included only questions and answers. There was no collaboration... If we were face-to-face, it could be applied well, but online, I do not feel competent about it yet." In the interview held after the lesson, she explained that she was doing direct teaching in the lesson and stated that her emotional state affected her perception of self-efficacy negatively: "I could not apply it, it was the same, just direct teaching... It will always remain the same, and I guess I will never be able to apply it [a different teaching method]." She had a state of despair about applying different techniques in online classes. This mood reduced her perception of self-efficacy.

She stated that her perception of self-efficacy in this subject was high for the first time in the interviews held before and after the lesson of the third lesson. She stated that she felt sufficient in this regard, but she could not apply these techniques in

online classes for reasons beyond her control. She explained this situation as follows: "If it was not online, I could have experienced implementing different teaching methods. I could have benefited from group teaching techniques." Moreover, she stated why she did not do this as follows: "Because I do not have such an opportunity. How can I tell students to form a group and do it together?" After the third lesson, her third lesson experience increased her self-efficacy perception. Technological skills also influenced this high self-efficacy perception. This time, she explained that she used Zoom's feature (using annotation tools for collaboration) and felt adequate about it because she implemented a new method except for direct teaching.

Before the fourth lesson, she stated that while she felt sufficient in this regard due to her technological skills, this high perception of self-efficacy decreased after the lesson. She would ask the students to work together on the GeoGebra file before the lesson in this process. Students also used annotating and would explore together through GeoGebra. Of course, for this, students had to know how to use GeoGebra at a basic level. For this reason, she introduced GeoGebra briefly to students before the lesson. She stated that students were ready for the lesson. She thought that she could implement different teaching methods.

So, she felt sufficient. However, the mentor teacher asked her to teach in a different class before the lesson. Since she did not prepare for GeoGebra for this new class, she had difficulty applying the different teaching methods and could not manage this process. Experiencing this external situation reduced Rachel's perception of self-efficacy in this regard. She explained: "I thought I would be adequate before the lesson, but after the lesson, I changed my mind to insufficient due to technical problems."

- **Gauging students' comprehension**

In this section, Rachel's responses to the question, "*To what extent can you gauge student comprehension of what you have taught? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

She stated her perception of self-efficacy in gauging students' comprehension as sufficient and insufficient. In the interview held before the first lesson, she said that she could gauge students' understanding in her online lesson and felt sufficient in this regard. However, she thought that students would not participate, and she would not get any answers from the students. At this point, she said, "I consider myself sufficient in this regard. However, in order to assess, students must attend class. So, it is not about me." Although she considered herself sufficient in this regard, Lily thought students' participation was independent of the teacher. That showed that Lily's pedagogical skills were insufficient. Because the teacher with good pedagogical skills ensures that the students participate in the lesson.

In the interview after the first lesson, she explained that her perception of self-efficacy decreased. She explained that this was because she could not manage the course time, so there was not enough time left for gauging. "I also put questions at the end of the lesson [for gauging]. Nevertheless, there was not enough time for these questions." Thus, she explained that she could not make the assessment fully and felt inadequate in this regard. She also explained that she did not use different gauging methods and felt inadequate in this regard.

In the interview held before the second lesson, she felt sufficient. This was because she thought the lesson content was more suitable for gauging. The second lesson was a lesson in which students would practice by solving questions. For this reason, she thought that she could gauge the students' comprehension more easily while solving questions. Here which stage of the content or lesson (i.e., exploration stage, practice stage, so on.) affected Rachel's self-efficacy perception. Because, in general, she interpreted gauging as problem-solving. She explained her high self-efficacy with the following sentences: "I consider myself sufficient. The reason is that the lesson does not contain an exploring stage. I will be able to solve questions. I can make more observations in this way."

In the interview held after the second lesson, she explained that she felt inadequate as the opposite of her feelings before the lesson. She explained:

When a different shape comes, we can find its areas by comparing them to the areas of the shapes we know. I wanted them to make this deduction. However, I do not know if the students made this deduction. Because I could not assess students during that lesson.

In other words, she stated that she could not make an appropriate assessment for the learning goal. Since developing assessment activities in line with this was related to the content skills, she felt inadequate due to the lack of her content skills.

In the interview before the third lesson, she stated that her self-efficacy perception was low. The reason for this was the same as the previous perception of low self-efficacy: low content skills. She stated that she had problems with developing assessment activities suitable for the learning outcome and that she did not know how to use an assessment tool as follows: "I cannot give all the students the time to speak one by one... That is why it would be great if I use the Google Form, padlet, but how do I use it?" The third lesson was a vital lesson for Rachel about gauging students' comprehension; it was a lesson that changed her perception of self-efficacy. She stated that her self-efficacy perception increased in the post-lesson interview. "...Before solving the questions [to do practice], I randomly selected students and asked what we did... and I could get answers from every student I asked... I think I am sufficient." When the pre-and post-lesson interviews were examined, it was clearly understood in Rachel's statements that there was an increase in the perception of self-efficacy. The biggest reason was that she felt sufficient in her pedagogical skills. She felt that she could design and apply classroom assessments appropriate for the students.

She explained that she had a high perception of self-efficacy regarding this before the fourth lesson. She stated that she prepared the assessment material from easy to difficult. She explained, "I had prepared the questions by increasing questions' difficulty level. I was thinking, especially I could understand whether they understood or not in the last question [according to student answers]. That is why I felt adequate about it." It can be said that she attributed the reason for high self-

efficacy to content skills. She stated that she thought that the assessment activity she prepared was suitable for the content of the lesson and suitable for the levels of the student.

On the contrary to this high self-efficacy perception, she stated that the perception of self-efficacy decreased in the post-interview of the fourth lesson. Since she had a technical problem during the lesson, she could not implement the entire assessment activity. So, she could only ask the most routine questions at different levels. Therefore, she did not think that she did the gauging well. This perception of low self-efficacy was firstly due to the lack of technological skills because she could not cope with the technical glitch. Then, due to this disruption, she could not manage the lesson; she could not use time-saving techniques.

Rachel clearly stated that it was challenging to gauge online education in general. She stated that the basis of this challenge was the low participation of students in online education. She emphasized that gauging will not be efficient in online education, as students do not react whether they understand or not.

- **Adjusting the lessons to the proper level for individual students**

The results obtained from Rachel's responses to the question, "*How much can you do to adjust your lesson to the proper level for individual students? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Rachel stated in the interviews that she considered herself sufficient in general about adjusting the lesson to the proper level for individual students. In the interview held before the first lesson, she explained, "I prepared the lesson by keeping it at the easily understandable level. "It can be said that she attributed the reason for high self-efficacy to content skills because she stated learning goals that coincide with learner's level and prepared learning activities that align with this goal. However, despite this high perception of self-efficacy, she stated that she was worried in some situations. She expressed her concern about this issue, saying that high-level students

might get bored. She noted that she had difficulty preparing lesson content suitable for high-level students because she did not know the students' levels.

In the interview held after the first lesson, she explained that she also had a high perception of self-efficacy. She said that because she kept the lesson's level at an easily understandable level, it was suitable for each student's level, and she felt adequate. In the interview held before the second lesson, she stated that she had a high perception of self-efficacy as in the previous interviews owing to her content skills.

In the interview after the second lesson, she explained that her perception of self-efficacy decreased. Her reason was that the content skills were insufficient because the lesson content could not be prepared according to the level of the student. Learning goals and objectives did not coincide with learners' levels. She stated that the lesson level was far above the level of the students, so they had difficulty understanding. She attributed this to her high expectations from the students as follows: "I guess I set my expectations too high and prepared the lesson accordingly, so I had a hard time."

In the interview held before the third lesson, she said she felt sufficient in this regard. She prepared lesson material suitable for each student's level (low and high level). Also, she prepared GeoGebra files that were suitable for each student's level. So, she thought that the lesson would be suitable for every student's level. It can be said that organizing and presenting the learning materials in different formats increased her perception of self-efficacy. In other words, feeling competent in design skills caused a high self-efficacy perception.

In the interview after the third lesson, she stated that she felt inadequate in this regard. She explained that the reason for this inadequacy was due to her lack of student background knowledge: "I do not think I am sufficient. For this, it is necessary to prepare a very detailed lesson plan. I should get enough information about students' levels. After that, I could prepare a lesson for every students' level..."

In the pre-and post-interview of the fourth lesson, she stated that she considered herself sufficient. However, she did not specify the reason for high self-efficacy perception. The pre-lesson interview explained this competence as follows: “The questions at the beginning of the activity might have been boring for high- level children, but the other questions were intriguing. It would be interesting and appropriate for their level. I saw myself as sufficient.” In the interview after the lesson, she stated that the questions were suitable for the level of all students. For this reason, she said that she considered herself sufficient again.

4.2.1.2 Student Engagement

Table 4.5 showed Rachel’s answers to the questions posed under the student engagement dimension. Rachel determined her perception of self-efficacy as adequate or not adequate based on each question. The situation was coded as not applicable in cases where she could not evaluate herself (such as when she did not have enough experience). Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement such as motivating students who show low interest. The rows refer to interviews held with the prospective teacher, Rachel.

- **Motivating students who show low interest**

In this section, Rachel’s responses to the question, “*How much can you do to motivate students who show low interest in schoolwork? Please explain why you think like that.*” will be presented relating those with the online teaching skills framework.

Table 4.5 Summary of data on student engagement for Rachel

Time	Questions	Motivating students who show low interest	Getting students to believe they can do well in schoolwork
1 st Lesson Pre- Interview		—	—
<i>Reason of self-efficacy perception</i>		<i>Emotional State</i>	<i>Personal Beliefs</i>
1 st Lesson Post- Interview		+	—
<i>Reason of self-efficacy perception</i>		<i>Pedagogical Skills</i>	<i>Personal Beliefs</i>
2 nd Lesson Pre- Interview		+	—
<i>Reason of self-efficacy perception</i>		<i>Emotional State</i>	<i>Personal Beliefs</i>
2 nd Lesson Post- Interview		—	—
<i>Reason of self-efficacy perception</i>		<i>Pedagogical Skills</i>	<i>Mastery Experiences</i>
3 rd Lesson Pre- Interview		+	—
<i>Reason of self-efficacy perception</i>		<i>Pedagogical Skills</i>	<i>Personal Beliefs</i>
3 rd Lesson Post- Interview		+	—
<i>Reason of self-efficacy perception</i>		<i>Pedagogical Skills</i>	<i>Personal Beliefs</i>
4 th Lesson Pre- Interview		+	—
<i>Reason of self-efficacy perception</i>		<i>Pedagogical Skills</i>	<i>Personal Beliefs</i>
4 th Lesson Post- Interview		—	—
<i>Reason of self-efficacy perception</i>		<i>Management Skills</i>	

Note. + adequate self-efficacy perception; – inadequate self-efficacy perception;

NA: not applicable

She mostly found herself sufficient in terms of motivating students. She attributed the reason for high-level perceptions to her pedagogical skills. She stated that while there was a low self-efficacy perception in the first pre-lesson interview, this perception increased after the first lesson. In the first pre-lesson interview, she explained that she felt inadequate in this regard. She attributed this to her emotional state:

I am an extremely panicky person. I wonder if since that child did not understand [and ask many questions], the other students were also confused [because of these questions]. Will I be able to continue the lesson? Do students see me as a teacher? You know, after all, I could not overcome that issue... I felt terrible. That is why I do not think I tried to motivate much.

In short, her anxious nature negatively influenced her perception of self-efficacy. She attributed her inadequacy to her characteristics.

In the first post-lesson interview, she explained that she felt sufficient to motivate the students by commenting on the activities experienced in the lesson: “. . . students participated well. I did not receive an answer such as ‘I do not want to talk’ or ‘I do not want to participate’. I was able to motivate [students]. I feel sufficient at this.”

While she felt sufficient in the interview held before the second lesson, she felt inadequate in the interview held after the lesson. In the interview held before the second lesson, she tried to establish a personal bond with the students to motivate the students and stated that she felt competent: “By communicating with them at the beginning of the lesson, saying, “How are you guys, are you okay?” She thought that she motivated students who showed low interest due to personal bonding. In the interview held after the second lesson, Rachel emphasized that she did not make any effort to increase the participation of the low-interest student in the lesson. She stated that she did not want these students to affect the course negatively; also, she was aware that it was not right to ignore them. However, since she would be evaluated as a prospective teacher, it was more critical for her to run the lesson smoothly. She attributed the reason for this to pedagogical skills. She said:

...However, I may have increased the motivation of the already motivated students. You know, I do not think I put much effort into those who showed little interest in the lesson; I think I am quite inadequate in this regard.

In the pre-and post-third lesson interviews, she felt sufficient. She stated that she would use a different teaching material. She believed this would increase the motivation of the students. She said: "Because my previous lessons were always based on a presentation [PowerPoint], maybe they did not attract their attention. . . they might not have been motivated, but this time I will use something different [GeoGebra files]"

In the interview after the third Lesson, Rachel broke her prejudice against online education because of her experiences in the third lesson. Her self-efficacy perception increased when she felt that she increased students' motivation with the help of GeoGebra. She stated: ". . . I think that using GeoGebra and having those visual things attracted the student's attention... I say I feel sufficient. Yes, online education is a good thing."

For the fourth lesson, she explained that while she felt sufficient in the pre-lesson interview, she felt inadequate in the post-lesson interview. When she saw the positive effect of GeoGebra on the students in the third lesson, she wanted to use it in this lesson as well. Considering her experience in the previous lesson, she stated that she had a high perception of self-efficacy: "I planned it [the lesson] using GeoGebra, as I thought it would attract the students' attention... That is why I consider myself sufficient." However, she stated that due to the technical glitch she experienced in the fourth Lesson (Rachel's computer slowed down due to many GeoGebra files and gave an error), the students' motivation decreased, and therefore her self-efficacy decreased. "After the lesson, I thought GeoGebra caused students to decrease their interest in the lesson. So, I am sure most of them left it [the lesson] and did not listen. That is why I feel inadequate."

It can be said that the main reason for her feeling of inadequacy here was her inability to manage this disruption. She attributed the reason for low self-efficacy perception to management skills.

- **Getting students to believe they can do well in schoolwork**

The results obtained from Rachel's answers to the question, "*How much can you do to get students to believe they can do well in schoolwork? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Rachel stated that she felt inadequate regarding this question. Because she had a prejudice about online education, this negative attitude towards online education negatively affected her self-efficacy. For example, in the interview held before the first lesson, she stated that she did not believe that students could be successful by taking the online course. She stated:

Because I think that students just stand in front of the computer screen and watch, most of the time they do not watch, they deal with different things. So, can I make students believe? I do not know. First of all, I have to convince myself about it.

In the post-interview of the first lesson, she said: ". . . I did not try to convince them of this since I did not think they would be successful from the beginning."

In the interview held before the second lesson, she stated that she felt insufficient in this regard because of her attitude (prejudice about online education). She explained that the reason for this attitude was the inefficiency of online education. In the interview held after the lesson, she said, ". . . I think that most of the students are leaving from the online lesson early. What will I make this student believe that? This student does not want to attend the class anyway..."

Rachel still had a hopeless perspective on this situation, and she thought that the students' reluctance and unwillingness to attend the class were independent of herself (the teacher). In the interview before the third lesson, she felt inadequate. She said:

I do not know whether I can make students believe or not. If I become a teacher in the future, I must get students to believe they can do well in schoolwork ...Then, I did not think about what I would do different things.

The success of the third lesson did not help Rachel break down her prejudice about online education. She said that she could not believe they could do well in schoolwork with a single lesson. She stated that she thought that the content covered in the lesson affected the efficiency of the online lesson. For example, she thought she could make geometry more efficient owing to dynamic software like GeoGebra. However, she thought that the same situation would not be valid when learning different topics such as exponential numbers. She also stated that she felt inadequate in the interview before and after the fourth lesson. The main reason for this inadequacy was her prejudice about online education.

4.2.1.3 Classroom management

Table 4.6 illustrated Rachel's answers to the questions posed under the classroom management dimension. Rachel determined the perception of self-efficacy as adequate or inadequate based on each question. The situation was coded as not applicable in cases where she could not evaluate herself (such as when she did not have enough experience). Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement such as controlling disruptive behavior in the classroom. The rows refer to interviews held with the prospective teacher, Rachel.

- **Controlling disruptive behavior in the classroom**

In this section, Rachel’s answers to the question, “How much can you do to control disruptive behavior in the classroom? Please explain why you think like that.” will be presented relating those with the online teaching skills framework. Rachel stated that she mostly had a high self-efficacy perception regarding controlling disruptive behavior in the classroom. She attributed this perception of high self-efficacy to her high technological skills.

Table 4.6 Summary of data on classroom management for Rachel

Time	Questions	Controlling disruptive behavior in the classroom	Calming a student who is disruptive or noisy	Ensuring that the activities in the classroom run smoothly	Establishing a classroom management system with each group of students
1 st Lesson Pre-Interview	Reason of self-efficacy perception	+	+	—	+
		<i>Technological Skills</i>	<i>Technological Skills</i>	<i>Pedagogical Skills</i>	
1 st Lesson Post-Interview	Reason of self-efficacy perception	+	+	—	NA
		<i>Technological Skills</i>	<i>Mastery Experience</i>	<i>Management and Design Skills</i>	
2 nd Lesson Pre-Interview	Reason of self-efficacy perception	+	+	+	NA
		<i>Technological Skills</i>	<i>Technological Skills</i>	<i>Design Skills</i>	
2 nd Lesson Post-Interview	Reason of self-efficacy perception	—	—	—	NA
		<i>Management Skills</i>	<i>Management Skills</i>	<i>Content Skills</i>	

Table 4.6 Summary of data on classroom management for Rachel (Continued)

3rd Lesson Pre-Interview Reason of self-efficacy perception	+	—	+	NA
	<i>Management Skills</i>	<i>Management Skills</i>	<i>Design Skills</i>	
3rd Lesson Post-Interview Reason of self-efficacy perception	+	+	+	NA
	<i>Technological Skills</i>	<i>Technological Skills</i>	<i>Content and Design Skills</i>	
4th Lesson Pre-Interview Reason of self-efficacy perception	+	+	+	NA
		<i>Technological Skills</i>	<i>Design Skills</i>	
4th Lesson Post-Interview Reason of self-efficacy perception	—	—	—	NA
	<i>Social Skills</i>	<i>Management Skills</i>	<i>Management Skills</i>	

Note. + adequate self-efficacy perception; — inadequate self-efficacy perception; NA: not applicable

In the interview held before and after the first lesson, she stated that her perception of self-efficacy was high. She noted that technology was her most considerable help in controlling disruptive behavior in class. She emphasized that the feature of the Zoom platform to mute all the participants relaxed Rachel: "So the only disruptive behavior would be fifth graders constantly wanting to talk, turning on the microphone without permission. There is a very nice solution for this. We can mute all of them..." She believed that she could easily manage the classroom thanks to technology. The biggest reason for the high self-efficacy perception was technological skills. She stated that the first lesson passed as she had foreseen, she could quickly provide classroom management: "... It is effortless to provide classroom management here, and we can mute them directly. I did not have any difficulties in that respect." After explaining this, she compared it with face-to-face lessons and said, "(If it was face-to-face) I would have a hard time; I mean, I probably

could not quite a class because students shout a lot. But I feel sufficient online." . She stated that although she did not feel adequate at classroom management, she felt competent online.

In the pre-interview of the second lesson, she stated that her self-efficacy was high. She emphasized the reason for the high self-efficacy perception, as she said in the previous interviews, about the feature of Zoom:

... I would turn off all of their sounds in case there is a problem. However, I think students love me and would not do disruptive behavior. . . If they do, I will use the same method again, and I will mute all of them.

She also mentioned that if she connected with the students, she would not need to mute the class. In short, she felt sufficient in online education, as she felt inadequate in management skills.

In the interview held after the second lesson, she explained the reason for her low self-efficacy perception by explaining her experience. She could not manage the situation. She realized that not only technological skills were sufficient, but also management skills were needed in online education. She said:

The student made fun of me. We were talking about the area of the square. Students saw this [the area of the square] years ago... and this student was successful in the class. He said officially, her [prospective teacher's] teacher is coming from the university anyway... Let's push this a little bit. I could not do anything. I did not say anything. I thought I could manage, but it was not like that.

In the interview held before the third lesson, she stated that she considered herself more competent in this regard. She said: "I consider myself more competent in this regard. So at least I know what to do. " Here, she thought that one student could be controlled easily. However, she explained that if a student group exhibit disruptive behavior, she may be insufficient in this regard.

In the post-interview of the third lesson, she attributed her high self-efficacy perception to technological skills and stated that she could use the ability to mute students. Nevertheless, she explained that she knew it was a pedagogically wrong behavior. She said:

If a student disturbs me when I mute that child, he/she feels worthless; it is like saying shut up. This is a bad thing. But I could go near to her/him in face-to-face education. I could look into the student's eyes; I could tell that the situation was bothering me with body language. In the online lesson, I seem to be too harsh [by using the mute button]. It is like saying shut up, do not speak in my class, and disturb me. It is not a very good thing.

At this point, she stated that she knew what she could do in face-to-face education in such a situation. Moreover, she felt more inadequate in terms of management skills in online education. Because she thought that a management method, such as using body language, which was very important to Rachel, was taken away from her in online education, she felt the lack of body language in online education. Instead, she stated that there is a need for new methods in online education.

While she stated that her perception of self-efficacy was high in the pre-lesson interview, she mentioned that self-efficacy decreased after the lesson.

In the pre-lesson interview of the fourth lesson, she stated that she felt competent by explaining the following thought, "Yes, I saw myself as sufficient. As I always say, I mute the student. The student cannot speak in my lesson..." However, after a situation in the lesson, the perception of self-efficacy decreased. While Rachel was teaching the lesson, the mentor teacher informed that she could not attend the lesson. When a student realized that there was no mentor teacher in the class, this student constantly blew on the microphone and displayed annoying behavior in the lesson. Other students who saw this started to write that they were disturbed by this noise from the chat. She explained how she felt inadequate: ". . . The student persistently turned up her voice, and I turned it off. She opened her voice. I turned it off." In short, she could not control the disruptive behavior by just using the mute button. In

this respect, it can be said that there was a lack of management skills. In addition to this thought, Rachel compared it to face-to-face education:

Physically being there [is important to management]. Now how does the student think? "I can do this [disruptive behavior]. I can say there is a problem with my microphone; the teacher cannot tell me anything." ...Nevertheless, the student cannot do such a thing when face to face. After all, I will know that child did it of her own free will..."

She stated that not being physically in the same place as the students made her feel inadequate in terms of classroom management. She attributed this low self-efficacy to social skills. She also explained the in-class problems caused by not knowing how to warn the student: " I felt inadequate. As I said that I did not know how to warn the student there... So, I thought, if I warn this student, the other students will be distracted, and the lesson will be interrupted..."

- **Calming a student who is disruptive or noisy**

The results obtained from Rachel's answers to the question, "How much can you do to calm a student who is disruptive or noisy? Please explain why you think like that." will be presented relating those with the online teaching skills framework.

Rachel stated that she had a high self-efficacy perception in this regard. In general, the answers she gave to this question were parallel with her responses to whether she felt competent about controlling disruptive behavior.

She stated that she felt adequate about this issue during pre-and post-first lesson interviews. She said, "We will give a warning at the beginning [to be quiet] ... However, their voices can be turned off if they continue. I consider myself sufficient in this regard." After the lesson, she explained her perception of high self-efficacy with mastery experience in the interview. She stated that she saw herself as sufficient because she did not encounter such behavior. "There was no disruptive behavior ... I feel sufficient."

In the pre-interview of the second lesson, she again attributed her feeling of competence to technological skills. She supported that she could manage the class by pressing the mute button, and there was no other method in online education. She said, "Because we [teachers] are not face-to-face [with students], there is only one computer between us, I cannot go [near the student] and do anything to that student."

In the interview after the second lesson, she stated that her perception of self- efficacy decreased. She explained the situation she experienced in the lesson: "The fact that they come to class late affects the lesson negatively. Because explaining [what we did in class] that students again is officially waste of time." She also stated that she tried to overcome this (students' attending class late) but could not find a solution until now. The reason why she felt inadequate in this regard can be considered as her inadequacy in management skills because she failed in terms of establishing and declaring rules and regulations for participation in the class.

In the pre-lesson interview of the third lesson, she explained that she felt inadequate because she still could not solve the disturbing behavior she mentioned. "...students who entered the lesson later and disrupted the lesson of the lesson. Since I have not found a solution for them yet, I feel inadequate in this regard. I do not know what to do."

In the interview held after the third lesson, she defended an opinion that contradicted her previous thought and stated that she felt sufficient in this regard, saying, "I see myself enough. I will mute if there is someone who negatively affects [the lesson]." In this interview, she emphasized that she felt sufficient in terms of technological skills.

As in the interview before the third lesson, it can be said that her perception of self- efficacy was high in the pre-lesson interview of the fourth lesson, while the self- efficacy perception decreased in the post-lesson interview. She stated that she had a high self- efficacy perception because she could use the mute feature of Zoom by relying on her technological skills. She attributed her low self- efficacy perception

to her inability to manage the situation she experienced in the fourth lesson. In this case, low management skills had an impact.

- **Ensuring that the activities in the classroom run smoothly**

In this section, Rachel's responses to the question, "*To what extent can you ensure that the activities in the classroom run smoothly? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

She felt inadequate at the beginning of the online teaching practice, her self-efficacy increased towards the end in this regard. She stated that she had a low perception of self-efficacy in the pre-and post-interview of the first lesson. In the pre-lesson interview, she explained that she saw herself as inadequate, and to her, this was due to the inadequacy of online education:

I do not think I can do activities [online]. From now on, I will make all the lesson plans I will prepare entirely on lecture and question solving. Doing activities means to me students' doing something. You know, it means the teacher stays silent and observes. I will not be able to observe, and the students will not be able to do something as a group. Students should be able to do group work. I find myself inadequate in this regard.

Considering what she said, her prejudice about online education changed Rachel's education philosophy. Her inadequacy in terms of pedagogical skills was that she could not design and implement appropriate instructional strategies. Despite this, she believed that she would feel sufficient if the inadequacies of online education (Zoom grouping features, so on) were eliminated. She stated that she had a low self-efficacy perception in the interview after the first lesson. She could not tolerate the part of the lesson that took longer than she thought, as she did not use time-saving techniques. So, the activity did not run smoothly, and she felt inadequate. She said: "...I did not take into account something like a student can have a misunderstanding, and I would step back for that student. I thought they would all understand, and the lesson would run smoothly..." Therefore, improving management skills can increase the

perception of self-efficacy. In addition, it can be said that her design skills were insufficient because she did not make Plan B considering the possible setbacks in the lesson.

In the pre-interview of the second lesson, she explained that she felt competent in this regard for the first time. Moreover, she explained:

If there is something they do not understand, I will intervene directly. For that, I spared a little time for this intervention. The lesson plan was normally more complicated. . . . but I simplified that plan even more... I feel sufficient. I try to make things organized by revising the things that I think will not be so.

The reason for the high self-efficacy perception here was that she thought her design skills were sufficient. Rachel used previous feedback to develop and design a new lesson. In the post-interview of the second lesson, she stated that the self-efficacy perception decreased. She prepared a lesson plan to find the area of different shapes in the activity. Moreover, the activity was multi-staged; she had difficulty carrying out these activities smoothly and completing them on time. For this reason, she felt inadequate in this regard. She said:

...First, one student will read the problem, explain it, and the other will say what to do. The third student will apply it, and the fourth student will find the money to convert it to meters, so activity has many steps... so I think it was a problem that stemmed entirely from my planning.

Rachel had such a problem due to a lack of content skills. Because Rachel did not develop learning aligned with learning goals because she did not set her goal clearly, low self-efficacy perception may also be caused by inadequacy of design skills since she cannot plan an appropriate time for the activity.

In the pre-third lesson interview, she stated that she felt sufficient in this regard. She determined the insufficient part of the previous lesson; she developed her content skills. Moreover, she stated, "Yes, I consider myself sufficient... This time, I kept it

simple. I said that what I want to teach students is to understand where the formula comes from..."The reason for her high self-efficacy perception was that she felt adequate in terms of design skills. Because she was using previous feedback to develop and design new lessons.

In the interview held after the lesson, she made statements supporting her ideas before the lesson:"... I got to know the students as well. I prepared my plan well. I think the activities run smoothly because of that." Considering what she said, the reason for her high self-efficacy was that her content and design skills were sufficient. She first determined her purpose and prepared a lesson plan suitable for this purpose. In addition to these, high self-efficacy resulted from her experience in practice teaching, getting to know the students, and preparing appropriate courses.

She stated that she felt sufficient in the pre-interview of the fourth lesson. She explained that she prepared a good lesson plan suitable for the students, "I had prepared a separate plan for each point that I thought the students would not understand... They would not have difficulty in anything. I would intervene when they had difficulties. I felt myself sufficient." She stated that her self-efficacy perception was high thanks to her design skills.

After the fourth lesson, she stated that her perception of self-efficacy decreased due to her inability to manage the class after technical problems. She emphasized that the reason for this low self-efficacy perception was that she could not ensure that the activities were carried out smoothly in case of a technical problem, and her management skills were insufficient.

- **Establishing a classroom management system with each group of students**

The results obtained from Rachel's answers to the question, "*How well can you establish a classroom management system with each group of students? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Rachel constantly evaluated her self-efficacy perceptions based on her experiences. She stated that she did not experience applying the classroom management system with each group of students since she did not teach at different grade levels. Therefore, she stated this code was not applicable. Although the researcher emphasized that it was not necessary to teach at different grade levels to create different classroom management systems, she still chose to evaluate it as not applicable. At this point, the researcher commented that she did not understand the question very clearly. Only in the interview held before the first class, she stated that she considered herself sufficient in this regard. Afterward, the code was not applicable in the other interviews.

In the pre-lesson interview, she explained that if she knew the students, she would feel sufficient in this regard: "I can do it if I know the students... I consider myself sufficient in this regard. As long as I know the students, I will."

In the interview held after the first lesson, she wanted to answer this question as not applicable. She said: "I always taught the same class. I did not observe such a thing."

In the pre-interview of the second lesson, she determined the code as not applicable in this regard. She explained the reason for this answer as follows:

The only routine thing I can do is to say that we should participate in the lesson by raising our fingers. I do not think I can observe this. I cannot say I feel adequate or inadequate. Because I follow only one class... I avoid teaching in different classes. The mentor teacher said, for example, to teach a different class for a week, but I did not want to.

Here, the student's perspective on practice teaching also affected the perception of self-efficacy. The practice teaching process was to be graded. She wanted that all activities run smoothly. Instead of struggling and developing, she tried to get through this process without much effort. She also knew that she could not grow without difficulty. However, she mainly attributed the missing parts to either online

education or students' refusal to attend classes. She explained that all other responses regarding this question were not applicable because she had no experience.

4.2.2 Document Analysis

In the self-improvement paper, Rachel has prepared a development plan for herself on pedagogical skills social skills(emotions). She mentioned that she wanted to learn more about pedagogical skills and prepare a lesson plan appropriate for students, and she explained her thoughts as follows:

If I want to be an efficient teacher, I must know the students I teach well because the better you know the student, the better you can teach them. As a teacher, if I understand how my students learn then I can easily direct them and help them improve in their education.

She explained the points she wanted to improve about controlling her personal feelings and the effects of her emotional state on her teaching:

The last problem I noticed is that I don't think I'm emotionally mature. I was very angry with the teacher when the teacher interfered with me in the lesson. It made me feel bad when the teacher took the lesson from me while solving the question with students.

Student participation was an important part of pedagogical skills to her. She explained the points she wanted to develop on this subject as follows:

Actually, I was trying to say the names in the participant row one by one. So, I didn't say the name I said once again and thought I was giving everyone a voice in the class. I thought this was the case until a student said, "Teacher, that person has already solved a question." Perhaps I gave the same students the floor over and over again until the student warned me. I'm sure the students I didn't give a say might have felt bad and even though I was

favoring some students. So, I made a new plan to make up for my deficiency in this matter.

In the midterm reflection paper, she stated that in the first observations in online education, the students could not see students' body language because they did not turn on their cameras. She felt the lack of an essential communication tool. Thinking that she needed to learn more about the students to overcome this obstacle (lack of body language), she wanted to improve herself and explained her experiences as follows:

I mentioned that this was because I could not adequately observe the students and analyze them from their gestures and movements because they did not turn on their cameras. As a solution to this, I would make a checklist that would include the students' names, how much they attended the class, whether they had microphones, how much they were interested in the lesson, and whether they could speak to the lecture that day. This chart was handy for me. Even though I didn't see the students with this chart, I got some information about them.

In the self-improvement paper, she mentioned that she wanted to improve her pedagogical skills and motivate students. She explained the developments in this regard and her experiences so far:

As far as I observed, a student in the 7th grade did not participate in the lesson of her own will, but the teacher in the practice teaching was trying to give him the right to speak. As far as I realized, this student was interested in mathematics, but I guess she was afraid to attend the class. I did the same. I tried to give this student the right to speak in every lesson. And one day, when I was lecturing, this student raised her hand. It was a pleasant situation. Maybe I am the one who encouraged the student.

At the end of the semester paper, she explained that she felt more competent in knowing about students and student participation and described her experience:

Student knowledge and student participation- In my last lesson observation, I attended a class in a class that I had not attended because my hours did not fit during my practice teaching. I did not know the students there. I have never observed before. The teacher asked me to solve questions with the students. I was a little panicked at first, but now that I got used to both taking notes and giving lectures, I took note of the students. I gave the voice and tried to give different students a say. When I compare the beginning of the period and the present moment, I think I have overcome this problem.

4.2.3 Summary

I presented Rachel's self-efficacy perceptions under three main headings in this section. While she found herself sufficient about providing alternative explanations, under the instructional strategies, she also saw herself inadequate. At the same time, she attributed her high self-efficacy perceptions to technological skills and design skills. She attributed her inadequacy to her lack of content, design, pedagogical, and management skills. The inconsistency she experienced was that she saw design skills as her strength before the fourth lesson. At the same time, she identified it as her weakness in the post-interview of the fourth lesson.

She stated that she considered herself inadequate regarding implementing different teaching methods. She stated that she considered herself sufficient. She wanted to be evaluated code as NA in only one of them. She stated that she felt sufficient in technological skills. In contrast, she felt insufficient in terms of external issues and emotions. She emphasized that she had sufficient self-efficacy perception.

In gauging students' comprehension, while she found herself sufficient, she found herself inadequate. While she explained the reason for feeling adequate as pedagogical and content skills, she saw insufficient as technological, management, and content skill. In other words, while content skill is the reason for her inadequacy in one interview, it is the main reason why she feels competent in another interview.

Adjusting the lessons to the proper level for individual students, Rachel stated a high perception of self-efficacy. In contrast, she also stated that she had a low perception of self-efficacy. While she attributed the reasons for high self-efficacy perception to online teaching skills, content skills, and design skills. She attributed her inadequacy to inadequate online education, not her online teaching skills.

In the subject of student engagement, one of its sub-headings, motivating students who show low interest, felt sufficient in five interviews and stated low self-efficacy perception. She explained that she felt sufficient in four interviews because she had some of the features under the pedagogical skills. In one of them, she stated that she felt inadequate because of the lack of the feature under the title of pedagogical skills. In one of her interviews, she explained that she felt competent thanks to the personal bonding she established with the students. In one of her interviews, she attributed her low self-efficacy perception to management skills.

She stated that she felt inadequate in getting students to believe they could do well in school work. Because she has an entrenched prejudice about online education, she repeated that she did not see it suitable for this age group (middle school) and did not believe that they would be successful. She emphasized in every interview, without exception, that she felt inadequate because of these personal attributes.

Rachel evaluated the perception of self-efficacy under four subheadings in the classroom management dimension. In the first, controlling disruptive behavior in the classroom, she felt sufficient. However, she explained that she felt inadequate in two of them. Feeling sufficient in terms of technological skills has increased the perception of self-efficacy in this regard. She stated that Zoom's ability to mute all students with a single button would be sufficient. This feature is their most significant supporter of classroom management. Despite this feature, she attributed her inadequate management skills to her felt inadequate.

Regarding calming disruptive or noisy students, she felt insufficient. While the main reason for her inadequacy was that she did not think her management skills were sufficient, she attributed her high self-efficacy perception to being sufficient in

technological skills. She also stated that mastery experience increases self-efficacy perception.

Considering ensuring that the activities in the classroom run smoothly, Rachel clearly stated that she had high self-efficacy perceptions and low self-efficacy perceptions. She attributed high self-efficacy to design skills. While the low perception was caused by content and pedagogical skills.

She explained that she felt competent about establishing a classroom management system with each group of students only during the first pre-lesson interview, which she had never experienced before. She stated that she wanted to consider that the question as not applicable because she only taught one grade level. It was thought that the question was not understood much, as different student groups were interpreted as different grade levels.

4.3 Case 3: Carrie

The findings obtained from Carrie will be explained under three main headings in this section. During Carrie's online practice teaching experience, the findings regarding the change in self-efficacy perception in the dimension of instructional strategies, student engagement, and classroom management will be presented, respectively. In addition, the online teaching skills originating from low or high self-efficacy perceptions about three dimensions will be examined in detail for each of them.

4.3.1 Interview Analysis

During her practice teaching course, Carrie was observed during four online lessons. For this study, the interviews held before and after each lesson.

4.3.1.1 Instructional Strategies

Carrie's answers to the questions posed under the instructional strategies dimension were presented in Table 4.7. Carrie determined the perception of self-efficacy as high or low based on each question. Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement, such as providing an alternative explanation. The rows refer to interviews held with the prospective teacher, Carrie.

- **Providing an alternative explanation**

In this section, Carrie's answers to the question, "*To what extent can you provide an alternative explanation or example when students are confused? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Carrie stated that she generally felt competent in providing alternative explanations to the students. She emphasized that she made adequate preparations before the lesson, especially during the planning. In the interview held before and after the first lesson, she stated that she considered herself sufficient in this regard. She said that she thought about this aspect while preparing the lesson plan. "We think about this while planning the lesson." She did not attribute the reason for her self-efficacy to any online teaching skills. She explained the cause with her mastery experiences. "I guess I have been working with so many different students until now. I can find it [an alternative explanation]."

Table 4.7 Summary of data on instructional strategies for Carrie

Questions Time	Providing an alternative explanation	Implementing different teaching methods	Gauging students' comprehension	Adjusting the lessons to the proper level for individual students
1st Lesson Pre-Interview <i>Reason of</i>	+	+	-	-
	<i>Mastery Experiences</i>	<i>Technological Skills</i>	<i>External Issues*</i>	<i>Lack of student background knowledge*</i>
1st Lesson Post-Interview <i>Reason of self-efficacy perception</i>	+	+	+	-
	<i>Mastery Experiences</i>	<i>Content Skills</i>	<i>Pedagogical Skills</i>	<i>Content Skills</i>
2nd Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	+	+	-	+
	<i>Technological Skills Design Skills</i>	<i>Content Skills</i>	<i>Mastery Experiences</i>	<i>Content Skills</i>
2nd Lesson Post-Interview <i>Reason of self-efficacy perception</i>	+	+	-	+
	<i>Mastery Experience</i>	<i>Flexibility*</i>	<i>Management Skills</i>	<i>Pedagogical Skills</i>
3rd Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	+	+	+	-
	<i>Content Skills</i>	<i>Design Skills</i>	<i>Pedagogical Skills</i>	<i>External Issues*</i>
3rd Lesson Post-Interview <i>Reason of self-efficacy perception</i>	+	+	+	-
	<i>Mastery Experience</i>	<i>Content Skills</i>	<i>Mastery Experience</i>	
4th Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	-	+	+	+
	<i>Design Skills</i>	<i>Content Skills</i>	<i>Pedagogical Skills</i>	<i>Pedagogical Skills</i>

Table 4.7 Summary of data on instructional strategies for Carrie (Continued)

4th Lesson Post-Interview	+	+	–	+
<i>Reason of self-efficacy perception</i>	<i>Mastery Experience</i>	<i>Pedagogical Skills</i>	<i>Pedagogical Skills</i>	<i>Pedagogical Skills</i>

Note. + adequate self-efficacy perception; – inadequate self-efficacy perception

In the post-interview of the first lesson, Rachel explained that she felt sufficient. She explained that when the students needed an alternative explanation, she discussed the question with students. Students examined the learning materials.

Finally, the question was answered. She said:

That was enough. You know, when the student gave a different answer, we immediately went back to the slide and tried to find it together. I tried to answer a bit myself, but the explanations were sufficient. Then I saw that the student was satisfied.

She attributed high self-efficacy perception to her mastery experiences.

As in the previous lesson, she stated that she felt sufficient in pre-and post- interview of the second lesson. The basis of this perception was that her technological skills were adequate. Because she prepared GeoGebra files by using technological skills, she thought that the GeoGebra files would be explanatory when the students were confused: "Yes, I will use GeoGebra in this. It attracts students' attention when they do not understand because it [GeoGebra file] is animated. I consider myself sufficient." In addition, by identifying the points where the students might be confused, she prepared more detailed materials that would eliminate their confusion. She stated that she could present alternative explanations to students by preparing lesson materials in different formats (GeoGebra file, PowerPoint etc.). In short, she explained that she had high self-efficacy thanks to her design skills.

She stated that the perception of self-efficacy was high in the interview held after the second lesson:

...student asked a question I did not expect. It was about the isosceles triangle. Why are those angles congruent? . . . I drew the triangle differently. I did it in the form of ACB, not ABC. I think I had a good strategy for this.

At this point, she stated that she showed flexibility. During the lesson, she arranged the lesson plan according to the needs of the students and eliminated the confusion with alternative examples.

She stated that she had a high self-efficacy perception in her pre-and post- interview of the third lesson. She said that she determined the lesson's purpose and content accordingly. Since the level of the lesson was suitable for students, students would answer each other's questions using peer-teaching. Thus, she could provide an alternative explanation thanks to her sufficient content skills: "...I am thinking of guiding them by asking questions. Instead of telling the answer, I will ask the students, 'Is there anyone who thinks differently?'. But I think the students would find them [different explanations]..."

In the interview after the third lesson, she stated she felt sufficient. She did not attribute this sufficiency to any online teaching skills. She noted that it was sufficient owing to her experiences in the lesson. She said: "When I explained, she said, "I understand why you said it that way!". So, she actually found my direction to make sense. I think it was enough."

In the interview held before the fourth lesson, she said that she had low self- efficacy regarding this for the first time. Because she believed that the lesson's content was not suitable for providing an alternative explanation, she thought that she should have developed learning materials in a different format; in this way, she could provide an alternative explanation quickly. Developing learning materials in different formats was associated with design skills. Therefore, she attributed her low self-efficacy perceptions to design skills." Time [the lesson's content] is challenging for me ... I think the concept is abstract, and you cannot show it to students. You cannot display it like let me show you an animation..." Considering this thought, it can be said that her self-efficacy changed according to the lesson's content.

In the interview held after the 4th lesson, she stated that her self-efficacy increased. She did not attribute the reason for this to online teaching skills. She explained it was sufficient based on her mastery experiences. "I see myself enough in this regard. Students already had some knowledge. Students only had a misunderstanding with exchanging tens. . . However, we overcame it [the misunderstanding] "

- **Implementing different teaching methods**

The results obtained from Carrie's answers to the question, "How well can you implement different teaching methods? Please explain why you think like that." will be presented relating those with the online teaching skills framework.

Carrie stated in all interviews that she had high self-efficacy regarding this. In the pre-lesson interview of the first lesson, she attributed this perception to technological skills. She stated that she used Zoom's annotate feature for collaborative work, thanks to her technological skills:

I think it is easier when you are online, so the visual is already in the foreground. . . So, there is annotate... They [students] write [on the board] themselves... So, I think I can use different methods. Easier even than previous lessons [face-to-face lessons]... However, here, it is much easier to use different methods.

In addition, she said that she thought online education was an advantage as she could easily apply different teaching methods.

In the interview held after the first lesson, she explained that she felt sufficient because she could choose and apply learning sources suitable for the content thanks to her content skills: "We drew, that is, I explained by drawing. I also explained in a normal way [verbally]. . . I was able to try, especially the lesson's content was appropriate for drawing, and I was lucky" Before, she indicated that the lesson's content reduces the self-efficacy perception. Now, it can be said that lesson's content increased the self-efficacy perception.

As she stated in the pre-interview of the second lesson, she attributed her high self-efficacy perception to choosing the appropriate different learning material thanks to her content skills. She said: "It [the lesson] contained questions...There was also a picture [visual material]. I am also planning to solve questions. I think there was an alternative because it was about such an application. I felt myself enough."

In the interview held after the second lesson, she attributed her high self-efficacy perception to her flexibility as a teacher during the lesson. Although she planned the lesson as a discussion, there were points where students had difficulty. She switched to direct teaching considering the student's needs. Thus, it can be said that there is a high perception of self-efficacy in using different teaching methods. She explained: "I planned it as a discussion. Nevertheless, I changed this method to a direct teaching method when students had difficulty. There were difficulties [for students] in some parts of the lesson, I asked questions [guiding questions]. "

In the pre-interview of the third lesson, she stated that she perceived high self-efficacy in this subject and planned to use more than one teaching method while planning the lesson. It can be said that design skills increased her self-efficacy perception: " I think that is enough because we [prospective teachers] do not prepare a routine lesson. " She added that using more than one teaching method influenced how they were graded as a prospective teacher. So, she tried to implement more than one teaching method.

In the interview after the third lesson, she stated that the high self-efficacy perception originated from her content skills. She chose the appropriate different learning materials to implement different teaching methods:

I always visualize it in my plans... When the teacher asks, students can create their own strategies. This is also a different method, peer learning. Apart from that, I ask routine questions. . . That is why I think I feel sufficient. A monotonous lecture never happens. I never just implement direct teaching.

In the interview before the fourth lesson, she mentioned that she linked the lesson's content with an anecdote by using her content skills. This increased the perception of self-efficacy." I associated it [lesson] with history for them, which will be different again. I try to implement something different in my lesson plan each time. "

In the post-interview of the fourth lesson, she said that she attributed her high self-efficacy perception to her pedagogical skills. Because she used different teaching methods to motivate students thanks to her pedagogical skills, she stated:

As a different method, this time, I began with an interesting question. "Why do we measure time?" Later, I shared a story from history. I used it [the story] to persuade students to do the math. The last lesson contained different teaching methods. I think I felt sufficient.

- **Gauging students' comprehension**

In this section, Carrie's answers to the question, "*To what extent can you gauge student comprehension of what you have taught? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework. Carrie stated that she had a high self-efficacy perception in this regard. In contrast, she also emphasized that she had a low self-efficacy perception in some interviews. In the pre-first lesson interview, she based her low self-efficacy upon external issues. She stated that the duration of the lesson was too short. So, this made it challenging to gauge students' comprehension: " I think we could not gauge this [student's comprehension]... Because the duration is limited". She added that the students did not turn on their cameras. At this point, she focused on not seeing the students and not assessing their body language. This external issue reduced the perception of self-efficacy: "For example, we [teachers] cannot force students to turn on the camera. I cannot even see the students' faces. . . I feel insufficient."

It can be said that the self-efficacy perception increased in the post-interview of the first lesson. She stated that she felt sufficient in this regard because she applied the suitable classroom assessment method. This showed the adequacy of her pedagogical

skills: "Yes, I especially liked the student's last answer. You know, they understood very well... " Despite this high self-efficacy perception, when asked, she thought about the students who did not speak". . . I wondered whether students who did not speak understood or not ... If there are 20 students in the class, it is difficult to assess whether 20 of 20 people have grasped it."

In the interview before the second lesson, she attributed her low self-efficacy to mastery experiences. She thought that she could not gauge all students' comprehension based on her experience. This decreased her self-efficacy perception:

...In conclusion, I will get students' opinions on what they have learned. I plan to assess it there. We can say partially. It may not be an exact gauging. Maybe I cannot assess all students, but I think I will have a general idea.

In the post-interview of the second lesson, she attributed the low self-efficacy perception to her management skills. Because she could not manage the lesson time, she explained that there was not enough time left for the to be made at the end of the lesson: "Because the duration of the lesson was not enough. . . That part [gauging activity] was weak because I got left behind. We can say that I should improve." Carrie stated that she spent too much time on some parts of the lesson considering students' needs, which is why there was not enough time for the gauging part. Although Carrie was a prospective teacher with high flexibility, it can be said that her management skills were insufficient.

In the pre-interview of the third lesson, she felt sufficient in this regard because she thought that she had improved the parts that she felt insufficient in the previous lessons (such as the gauging part) by trying new methods. For example, she planned to gauge students' comprehension with Google forms for the third lesson. Developing an appropriate classroom management system for students is associated with pedagogical skills. So, she attributed her high self-efficacy perception to pedagogical skills. She said:

Yes, I put a Google Form [to gauge students' comprehension] in this lesson. Maybe this could be better... Other than that, I am thinking of doing the "What did we learn?" part again. It is nice for students to talk, and they love that part. I think this time will be better. Last time, the conclusion part was not enough. So, I will spend a little more time here.

Considering what she said, she tried to apply new methods to improve the part she thought was missing in the previous lesson. Using different assessment methods was also an indicator of high self-efficacy perception.

In the post-interview of the third lesson, one of the biggest reasons she felt competent about gauging was that she had concrete results. She stated these results as follows: "I have a finding in this-it is 70% [gauging 70% of all students' comprehension] ... I have lost about 5-6 students. Considering that there are 27 students, I think I gauged it [students' comprehension] to a high degree."

In the interview held before the fourth lesson, she felt sufficient. Because she thought she could apply appropriate assessment methods for students. She used her pedagogical skills while choosing the appropriate assessment method for the student. She explained: "... Therefore, I can do this part. I think that is enough for online. It is the best of the worst. If I see students, I can understand their outputs very clearly, but I cannot see them..." Considering what she said, she stated that online and face-to-face expectations would be different. She said that would be enough for online; that is, gauging in online education would not be like assessing in face-to-face education.

In the interview held after the fourth lesson, she stated that she felt inadequate. She said that she could gauge the students' comprehension of who participated actively in the lesson. However, she could not do anything for students who did not participate. Carrie could not provide student participation due to a lack of pedagogical skills because student participation was associated with pedagogical skills directly. She explained, "I think it was insufficient whether the student

understood or not. Because only 7-8 students spoke [during the lesson]. I am not sure if the others understood..."

- **Adjusting the lessons to the proper level for individual students**

The results obtained from Carrie's answers to the question, "*How much can you do to adjust your lesson to the proper level for individual students? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Regarding adjusting the lessons to the proper level for individual students, she stated that she had a high self-efficacy perception. Conversely, she stated that she had low self-efficacy perception too. In the pre-interview of the first lesson, she stated that she adjusted this lesson to the proper level for individual students; however, that was not applicable for each topic in math. So, she felt insufficient in this regard. She said: "I could do in my current lesson plan, but it was a simple topic, i.e. but when I think about it for such an advanced level ... I am not sure I think that I am inadequate in this regard." In addition to what she said, as a prospective teacher, she stated that she did not know the level of the students, so she was not sure which level was appropriate for the student's level.

She explained that she had a low self-efficacy perception in the post-interview of the first lesson. Because the lesson's level increased as the students asked high-level questions, in other words, due to the lack of content skills, stating learning goals that coincided with learners' levels was insufficient. She said: "I adjusted the material to the proper level. However, suddenly, it increased to a higher level. Because the students answered the questions and high-level questions were asked... Maybe it was difficult for the students who needed support academically."

In the interview that was held before the second lesson, she attributed her high self-efficacy perception to her content skills because she felt successful in stating learning goals and objectives coincided with learners' levels: "...There are also simple questions. Because the last two questions were already at a very high level... That is

why I think it is appropriate for all students' levels. I designed it so that every student could speak.”

In the interview held after the second lesson, she stated that she felt competent in this regard. Thanks to her content skills, she was able to determine a suitable goal for the level of each student and create suitable materials for it. She explained: “There was a combination of triangle and square... For example, the question is ‘How do we find the angle here?’ This was a question everyone can answer...That is why I think I am good enough in this regard.”

In the interview held before the third lesson, she stated that she considered herself inadequate in this regard. She attributed this to external issues. She stated that the duration of online lessons was shorter than face-to-face lessons; this reduces the perception of self-efficacy. “However, if this was a one-hour lesson plan, I could do better . . . I say I should improve myself. I think this [low self-efficacy perception] was due to the short duration of the lesson.”

She stated that she had a low self-efficacy perception in the post-interview of the third lesson. She did not attribute her low self-efficacy perception to any online teaching skills. She explained that there was only one activity in the lesson plan. So, this activity might not be suitable for every student's level. She said: “I think this is insufficient compared to my previous lesson. Because there was only one activity, those[students] who did not understand at the beginning may not have been following the lesson. ”

She stated that she had a high self-efficacy perception in the pre-and post- interview of the fourth lesson. She thought that she facilitated students' participation. So, she attributed her self-efficacy perception to pedagogical skills. She said: "Every student who wants to participate will find a place to attend my class because it is not all about math or all about operations.” In the meeting that was held after the lesson, she expressed: “Here, I am asking a daily life question so that everyone can answer it... I think I can say that I feel myself enough. I also think that I adjusted the lesson's level to the proper level for every student.”

In this section, Carrie’s answers to the question, “How much can you do to motivate students who show low interest in schoolwork? Please explain why you think like that.” will be presented relating those with the online teaching skills framework.

4.3.1.2 Student Engagement

Table 4.8 shows Carrie’s answers to the questions posed under the student engagement dimension. Carrie determined the perception of self-efficacy as high or low based on each question. The situation was coded as not applicable in cases where she could not evaluate herself. Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement, such as motivating students. The rows refer to interviews held with the prospective teacher, Carrie.

- **Motivating students who show low interest**

In this section, Carrie’s answers to the question, “How much can you do to motivate students who show low interest in schoolwork? Please explain why you think like that.” will be presented relating those with the online teaching skills framework.

Table 4.8 Summary of data on student engagement for Carrie

Time	Questions	Motivating students who show low interest	Getting students to believe they can do well in schoolwork
1st Lesson Pre-Interview		+	+
	<i>Reason of self-efficacy perception</i>	<i>Pedagogical Skills</i>	<i>Pedagogical Skills</i>
1st Lesson Post-Interview		+	—
	<i>Reason of self-efficacy perception</i>	<i>Pedagogical Skills</i>	<i>External Issues*</i>
2nd Lesson Pre-Interview		+	+
	<i>Reason of self-efficacy perception</i>	<i>Mastery Experience</i>	<i>Mastery Experience</i>

Table 4.8 Summary of data on student engagement for Carrie (Continued)

2nd Lesson Post-Interview	+	+
<i>Reason of self-efficacy perception</i>	<i>Management Skills</i>	<i>Management Skills</i>
3rd Lesson Pre-Interview	+	+
<i>Reason of self-efficacy perception</i>	<i>Pedagogical Skills</i>	<i>Social and Communication Skills</i>
3rd Lesson Post-Interview	—	+
<i>Reason of self-efficacy perception</i>	<i>Pedagogical Skills</i>	<i>Mastery Experience</i>
4th Lesson Pre-Interview	+	—
<i>Reason of self-efficacy perception</i>	<i>Pedagogical Skills</i>	<i>External Issues*</i>
4th Lesson Post-Interview	+	—
<i>Reason of self-efficacy perception</i>	<i>Pedagogical Skills</i>	<i>External Issues*</i>

Note. + adequate self-efficacy perception; – inadequate self-efficacy perception;

NA: not applicable

It can be said that Carrie had a high self-efficacy perception about motivating students who show low interest. In the interview held before the first lesson, she attributed her sufficiency to pedagogical skills. Because she tried to facilitate student participation, in this way, she tried to motivate students. She explained: ". . . I will observe in the same classroom. At the beginning of the lesson, I think that I call upon students who may be behind to speak [to increase students' participation] ..."

In the interview held after the first lesson, the high self-efficacy perception might be due to her pedagogical skills because she tried to motivate her students by showing them that they could succeed:

When I picked the student who participated less, the student gave a wrong answer... The student read it [the answer] from above [the lesson material]. For example, she read it. Then when we looked at the lesson materials and asked that question again, she remembered it [the answer] because she was

looking at it from above. After that, I said, “Oh, look, you did it yourself. I did not say anything,” and that is how I motivated her.

In the interview before the second lesson, she considered herself sufficient in online education. She attributed this to mastery experiences. However, she felt insufficient in face-to-face education. She thought that competence criteria in online teaching and face-to-face were different. She stated:

I am always doing the same thing here like you can raise your hands, and so on. I think it has been effective. Participation is also changing [in a good way]. I think I'm as good as I can be in online. . . Not quite enough according to the standards of face-to-face education...

In the post-interview of the second lesson, it can be said that she attributed her high self-efficacy perception to management skills because she established the rules and informed them at the beginning of the lesson. In this way, she motivated students to participate. She explained, “I have already informed about them [the rules of the class] at the beginning...Everyone's ideas were important to me... we solved all the questions together. I felt like they were more motivated like that. Everyone tried to participate.”

In the interview before the third lesson, she felt sufficient in this regard. Because she made a lesson plan according to the student's interests, she attributed her self-efficacy perceptions to pedagogical skills. She said: "It seems like cartoon characters motivated students. Our assistant instructor asked me to share an anecdote [about cartoon characters] there. Maybe they [the cartoon characters] would attract student's attraction more. "

In the interview held after the third lesson, she stated that she felt inadequate in this regard for the first time. Because the students' participation was low. She attributed her low self-efficacy perception to pedagogical skills. She said:

I waited again... I saw five people who raised their hands. Then I said I would wait until it was different. I guess I waited for a minute until three or four more people raised their hands... However, I think I felt insufficient.

It can be said that the perception of self-efficacy increased in the interview held before the fourth lesson. Carrie asked students who did not prefer to participate publicly to send their answers privately to the teacher via Chat to increase student participation. The students with low involvement might not want to answer the question in front of all students. In this respect, she felt sufficient because she found a new way to motivate students:

...She [the student] thinks that maybe [the answer] is wrong, so she does not want to participate. She does not want to answer it in class since everyone will see or hear it. The student will be able to write to me individually via Chat.

The basis of her feeling of sufficient was her pedagogical skills because she facilitated students' participation as a teacher.

After the fourth lesson, she explained that she felt sufficient. She increased students' participation by taking advantage of her pedagogical skills because she motivated students and showed enthusiasm and interest, she stated:

I said, "more people can raise hands, come on." Then a student even said something like there are always so many hands raised. . . so I spent a minute or two there. I looked, there were 12-13 people or something... Nevertheless, I think I was able to motivate them..."

- **Getting students to believe they can do well in schoolwork**

The results obtained from Carrie's answers to the question, "*How much can you do to get students to believe they can do well in schoolwork? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

She had a high self-efficacy perception in this regard. In the pre-interview of the first lesson, she attributed the high self-efficacy perception to her mastery experiences. She explained:

I study with a student who is in the fifth grade. She needs support academically. I was always telling her that online education is more useful. Of course, there are disadvantages of online education, but I do not think that telling these [disadvantages] affects positively. That is why I always say such positive aspects...

In line with this point of view, she stated that she did different activities in the lesson and this motivated activity of students. In this way, students believed that they could do well in schoolwork. She attributed her self-efficacy to pedagogical skills. She said: “When I think that students are distracted during the lesson, we watch a university video and talk about: Which university do you want to study at? What profession do you want to choose? . . . “

In the interview held after the first lesson, she stated that her self-efficacy perception decreased. She stated that this low self-efficacy perception was due to student unresponsiveness. At this point, she attempted to convince the students that they could be successful in online education, but the students did not react. So, she was not sure whether they were listening or not. In short, she felt insufficient in this regard.

In the pre-interview of the second lesson, she stated that she considered herself sufficient. She attributed self-efficacy perception to her mastery experiences. She said: “They can make up an excuse in their minds about online education... Nevertheless, I am trying to overcome it as much as possible.”

In the interview held after the second lesson, the reason for her high self- efficacy perceptions might be due to her management skills. When the student thought she was unsuccessful, Carrie made the student believe that she could be successful by using her management skills. She stated:

The student could not write the text there [on screen in online]. Then she said I am sorry... I said, ah. I know this is caused by a defective pen tool, but if you want, let me do it. . . I see myself enough about this...

In the interview that before the third lesson, she stated that she had a high self-efficacy perception. Because she felt her social skills were sufficient. Carrie tried to facilitate and maintain interactive discussions. She said: “. . . We solve the questions together. I am not assigning the question to one student. . . It was more like we did it together. Someone offers an idea. . . I want to give the impression that everyone is doing it together."

In the interview held after the third lesson, she stated that she had no experience in the classroom but that she had experience with the students she studied with one-on-one. She stated that she felt competent in this regard based on her experiences. She explained: "My students [who I work with one-to-one] are pleased to receive online education. Because it seems like I can joke more... We do not have a procedure. It seems like I am feeling better [in the online environment] ..."

She felt sufficient in this regard, as her emotions positively affected her online education approach. In addition, she added that online education was more suitable for one-to-one lessons than large groups: "Perhaps they [online lessons] are perfect when it is one-to-one... I mean, I can see when he turns around, or I can understand when he is looking at his phone." From this point of view, Carrie needed to establish authority to feel competent. Monitoring and controlling students was an essential factor for high self-efficacy perception.

She felt inadequate before the fourth lesson. She stated that her self-efficacy perception changed according to students' age group. Therefore, she said that while she had high self-efficacy about convincing seventh grade students that they could be successful, her self-efficacy in convincing fifth grade students decreased. She clarified this: "I study with a 7th grade student. Online education did not affect her. However, fifth graders are affected because they cannot manage [their learning process] themselves. . . I consider myself insufficient in this regard..."

In the interview held after the fourth lesson, she stated that her perception of low self-efficacy continued. She attributed the reason to external issues. She explained that there was not enough time to convince the students that they would be successful due to the short duration of the lesson: "I do not think I feel myself enough, and I do not have much time for it. "

4.3.1.3 Classroom Management

Table 4.9 below illustrated Carrie’s answers to the questions posed under the classroom management dimension. Carrie determined the perception of self-efficacy as high or low based on each question. The situation was coded as not applicable in cases where she could not evaluate herself. Moreover, the online skills from which this feeling of sufficient or insufficient was noted in the cells under each self-efficacy statement, such as calming a disruptive or noisy student. The rows refer to interviews held with the prospective teacher, Carrie.

Table 4.9 Summary of data on classroom management for Carrie

Questions	Controlling disruptive behavior in the classroom	Calming a student who is disruptive or noisy	Ensuring that the activities in the classroom run smoothly	Establishing a classroom management system with each group of students
1st Lesson Pre-Interview <i>Reason of self-efficacy perception</i>	— <i>Management Skills</i>	+ <i>Social Skills</i>	+ <i>Content Skills</i>	—
1st Lesson Post-Interview <i>Reason of self-efficacy perception</i>	— <i>Management Skills</i>	— <i>Management Skills</i>	+ <i>Content Skills</i>	NA

Table 4.9 Summary of data on classroom management for Carrie (Continued)

2 nd Lesson Pre-Interview Reason of self-efficacy perception	—	—	+	NA
	<i>Mastery Experiences</i>	<i>External Issues*</i>		
2 nd Lesson Post-Interview Reason of self-efficacy perception	+	—	+	NA
	<i>Management Skills</i>	<i>Mastery Experiences</i>	<i>Management Skills</i>	
3 rd Lesson Pre-Interview Reason of self-efficacy perception	+	+	+	NA
	<i>Management Skills</i>	<i>Social Skills</i>	<i>Design Skills</i>	
3 rd Lesson Post-Interview Reason of self-efficacy perception	+	+	+	NA
	<i>Mastery Experiences</i>	<i>Social Skills</i>	<i>Design Skills</i>	
4 th Lesson Pre-Interview Reason of self-efficacy perception	+	—	+	NA
	<i>Management Skills</i>	<i>Pedagogical Skills</i>	<i>Design Skills</i>	
4 th Lesson Post-Interview Reason of self-efficacy perception	+	+	+	NA
	<i>Management Skills</i>	<i>Management Skills</i>	<i>Content Skills</i>	

Note. + adequate self-efficacy perception; – inadequate self-efficacy perception;

NA: not applicable

- **Controlling disruptive behavior in the classroom**

In this section, Carrie’s answers to the question, “How much can you do to control disruptive behavior in the classroom? Please explain why you think like that.” will be presented relating those with the online teaching skills framework.

Carrie stated that at the beginning of her practice teaching experience, she felt inadequate in controlling disruptive behavior in the classroom. During practice teaching experience, her self-efficacy perception increased. She explained that she felt insufficient in the interview held before the first lesson. She stated that her self-efficacy perception was low due to her management skills:

... As a new teacher, it is so hard. Like, it [the class] can turn into chaos in an instant. For example, we are using annotate for them to attend the lesson. But, everyone can draw something at the moment. So, I do not know whether I can establish the authority.

In addition, the mentor teacher made Carrie feel safe. She stated that there was a mentor teacher when she needed support in the case of chaos. She expressed her lack of experience as the main reason for insufficiency.

She stated that her low self-efficacy perception continued in the first post-lesson interview. She attributed this to management skills, again. She explained that she had difficulty establishing rules because she did not make the necessary explanations at the beginning of the lesson. She said:

They wanted to talk, very much. . . for example, I got permission Ayşe to answer, the next time, Ayşe said that you have never promised me... This is very disturbing. Nevertheless, it happened because of me. As I said, the students were also nervous because I did not tell them the rule.

In the pre-interview of the second lesson, she stated that she still felt inadequate based on her first lesson experiences. She attributed this to management skills. She said, "I find myself insufficient because it was noisy in my first lesson. . . Everyone talked at the same time. Because I did not warn at the beginning of the lesson, like 'raise your hand,' and so on..."

In the interview after the second lesson, she explained that her self-efficacy perception increased for the first time. She stated that there was no disturbing

behavior in the lesson. She explained, “I informed students [about rules] at the beginning of the lesson. This was very effective... ‘I can see that you are raising your hand. That is why you do not need to have an extra talk.’” She created a rule by using her management skills, which prevented disturbing behaviors.

In the interview before the third lesson, she stated that she had a high self- efficacy perception. The reason was that she could establish the class rules. She thought that the class rules worked based on her observations. Sufficient management skills caused high self-efficacy perception. She explained this situation as follows: “They learned about this hand-raising thing. That is why I do not have any problems. . . the one who does not raise a hand does not talk...” She stated that she controlled this disturbing behavior. However, she stated that she could not control some disturbing behaviors due to reasons beyond her control (external issues). One of these behaviors was that students come to class late. This may be due to technical problems (internet connection, Zoom error), or the student prefers to come to the lesson late. However, she mentioned that she could not control this behavior because the teacher did not know the reason for this, and most of the time, students could not control too, most of the time.

In the post-interview of the third lesson, she mentioned that her perception of high self-efficacy continued. Based on her experience, she felt that she improved herself in the classroom. This was an important factor in raising self- efficacy perceptions. She said:

...I also asked my teacher [from the university]. I asked the teacher, ‘Do I sometimes lose classroom management?’ She also said no. ‘You cannot lose classroom management anymore,’ she said. She said that ‘because you give students permission to talk when they raise their hands, and they listen to each other’ I feel sufficient.

As can be understood from these statements, she saw herself as sufficient in terms of management skills, and the instructor’s approval also helped her to increase the self- efficacy perception.

She explained that she had a high self-efficacy perception in the pre-and post-interview of the last lesson. She stated that class rules and routines were set, so she did not face disturbing behaviors. Management skills were influential in having a high self-efficacy perception. In the interviews, she explained this competence as follows: "I think I can provide that. The students are already used to doing it. They use raising the hand button... I think I feel sufficient..."

- **Calming a student who is disruptive or noisy**

The results obtained from Carrie's answers to the question, "*How much can you do to calm a student who is disruptive or noisy? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Carrie stated that she mostly felt inadequate about calming a disruptive or noisy student. She stated that she considered herself sufficient in the pre-interview of the first lesson. She mentioned that thanks to her social skills, she can try to calm a student using personal messages and speaking one-to-one. She stated, "Firstly, I talk with the student one-to-one. If it is still not solved, then I would get parent's support..."

In the interview held after the first lesson, she stated that she felt insufficient. She said that the students were constantly trying to talk in an exciting way to answer the questions during the lesson, which caused noise in the classroom. She then explained as follows:

I think I need to be a little more formal here because I got criticized. The teacher said to me that your energy is perfect, you are very excited, and the students participated because of that. . . but she said, "saying let me not hurt her, let me not do that;" you lost authority." That is why I did not feel sufficiently active.

At this point, the prospective teacher's characteristics affected the behavior management. She mentioned that the loss of authority stemmed from her not feeling adequate about management skills.

She said that she had a low self-efficacy perception in the pre-interview of the second lesson. She stated that she had difficulty finding out who was making the noise. She attributed this to her inability to recognize students' voices. She stated that she needed to find out who did this to calm down the disturbing behavior. Still, she could not identify these students and could not perform the necessary intervention, so she felt inadequate. She explained:

When students speak, the speakers appear [on the screen]. However, the students have learned to turn off their speakers. . . I cannot find who spoke again. Even though I know the name, I cannot find it... I think this problem is due to being online.

In the interview held after the second lesson, she stated that she saw herself as inadequate in parallel with the previous interview. In the second lesson, she mentioned that the students made noise by responding loudly. Because of this, she explained that she felt inadequate.

In the interview before the third lesson, she explained that she felt sufficient. She stated that she thought the method she found would work for disruptive students. She stated that she would try to facilitate and maintain interactive discussion by using her social skills, so she said she felt sufficient: "When someone interrupts, I say, 'now Ayşe is talking, then Ahmet will talk, after that I definitely give permission to Ahmet to speak... "

In the post-interview of the third lesson, she stated that she felt sufficient based on her experiences. She attributed her self-efficacy perception to social skills. Her social skills were sufficient as she could facilitate and maintain interactive discussion and information exchange. She said:

A student could not solve the problem... I waited for a long time. . . A few students said, 'I will tell you, teacher, I will tell you.' I said '. . . let us wait for our friend; then I will get opinions from everyone.'

In the pre-interview of the last lesson, she explained that she had a low self- efficacy perception in this regard. She stated that she could ensure that the student did not interfere with other students but that student who made noise did not concentrate on the lesson and did not follow the lesson. She added that she did not know how to increase students' participation and which method to follow. Student participation was related to pedagogical skills, so her insufficiency caused low self-efficacy perception: "When I warn, noise decreases in the class. You know, I am calming down that student, but I cannot participate her in the class again. I do not know how to do that. We can say that it can be improved."

In the interview after the fourth lesson, she stated that she considered herself sufficient in this regard as she could communicate with the students. She stated that she could control the disturbing situations that occurred in the lesson, thanks to her management skills. For this reason, she explained that she had a high perception of self-efficacy.

- **Ensuring that the activities in the classroom run smoothly**

In this section, Carrie's answers to the question, "*To what extent can you ensure that the activities in the classroom run smoothly? Please explain why you think like that.*" will be presented relating those with the online teaching skills framework.

Carrie stated that she felt sufficient. In the pre-interview of the first lesson, she stated that she attributed her self-efficacy perception to content skills. Because she made planning very well, she developed learning materials that were proper to students' level. So, the activities in the classroom ran smoothly:

.... What questions might come from students?... I arrange the lesson and even the presentation in a certain order accordingly. I think I planned the lesson in such a way that there would be no confusion in the students when it is over. We can say that I feel enough for now.

In the interview that was held after the first lesson, she emphasized that she felt sufficient. She stated that thanks to her content skills, she set a goal suitable for the

level of the students and thought that she made a good plan for this purpose. She said, “. . . Since I already had my answers, if I did not get an answer, of course, I would go back there and repeat the previous knowledge. Maybe it could have been interrupted, but there was not such a problem.”

In the pre-interview of the second lesson, she thought that the activities in the classroom ran smoothly due to the lesson’s content. She stated that students did the exploration part before the class; they just would practice by solving questions in the lesson. Moreover, she explained that she felt sufficient: "I already have two questions—lesson to proceed as a question. The students had explored the subject before. That is why I thought it would happen."

In the interview that was held after the second lesson, she stated that she had a high self-efficacy perception. She also stated that she managed the lesson by showing flexibility regarding the time in her plan and successfully completed her plan:

The flow was beautiful. . . My last question was about procedures. I gave up on that question... The student asks me questions. I cannot pass it. I have to answer those questions. Meanwhile, time passes. I gave up on one of those questions.

In the interview before the third lesson, she stated that she felt sufficient. She said, " Because I rehearse the lesson a few times, for example, I am thinking about which part I will go through quickly if one of the parts takes too long. . . ."She stated that she made the necessary plans by thinking about the expected questions from students before the lesson. At this point, it can be said that she owed this self-efficacy to the design skills.

After the third lesson, she attributed her high self-efficacy to her design skills in the interview." . . . I think I can do this properly. Because as I said... I have plans A, B, C. I know where I’ll make it shorter when it gets longer, so there is no problem.”

She stated that she felt sufficient in the pre-and post-interview of the last lesson. She thought that planning a lesson plan seemed like a puzzle and that it was sufficient

because she put much effort into the design part. Also, her emotional state affected her self-efficacy perception positively. She said, "I like it because I think of the lesson plan like a puzzle... I feel sufficient."

In the post-interview of the last lesson, she explained that the program she planned in the lesson was not completed, but she felt sufficient. At this point, she set the goal properly because her content skills were sufficient. ". . . but there was no problem in running activity smoothly..."

- **Establishing a classroom management system with each group of students**

The results obtained from Carrie's answers to the question, "*How well can you establish a classroom management system with each group of students? Please explain why you think like that,*" will be presented relating those with the online teaching skills framework.

Carrie stated that the question about establishing a classroom management system with each group of students was not relevant. As with the previous participants, it was thought that this question was not understood.

Carrie stated that she had low self-efficacy only in the pre-interview of the first lesson. She explained that she felt inadequate because she did not know according to which criteria she should establish the authority. This indicated that she did not feel sufficient in terms of social skills and that she had difficulties creating and developing respectful relationships and a sense of community among the learners. She said:

It is a bit about authority, that is, how the authority is established. Is it established on respect or pressure? I prefer respect... But it might not be. That means it might not be according to the student. We can say that I feel insufficient. "Moreover, she believed that her self-efficacy would increase as she gains experience.

In the interviews, except for the first interview, she stated the question was not relevant since she did not face such a situation during the lessons. She explained the reason as follows: ". . . Because I just taught in the fifth grade, and I always taught the same class [during practice teaching]"

4.3.2 Document Analysis

In the self-improvement paper, she explained two aspects she wanted to improve herself. The first one was management skills, a sub-category of online teaching skills. Time management was what she wanted to develop. Managing the course time was also a very critical point in online education. She explained what she wanted to do about her development as follows:

First, preparing and planning a lesson plan on time management this semester will help me immensely. I think it is effective to practice for this deficiency. While making my lesson plan, I will do a little rehearsal before forwarding my drafts to my teachers. It will be beneficial for me, especially since we need to fit in a short time in the micro-teaching we will do in the course.

Considering the interviews, it can be said that the perception of her self-efficacy increased during the practice teaching.

Another point, she explained that she felt inadequate about classroom management which was also related to management skills, especially calming a disruptive student:

We learned what to do to calm energetic students who disrupt the classroom order, participate all students in the lesson, and maintain order. In short, we gained theoretical information about what we should do in different situations while taking this course and during the period. However, while this information worked for most of the classes I entered in the project, it did not work in one classroom. When I thought about my professional life, I concluded that I was inadequate in classroom management. Since I will have heterogeneous classes, I will have to work with many students. Therefore, I

must improve myself. I think that the practice teaching course I am currently taking is an opportunity to fill my shortcomings.

Carrie also explained her development in the midterm reflection paper. She explained that she had a teaching practice process related to time management, which was related to management skills, and what she paid attention to:

One of my plans in this regard was to manage the lesson more easily by planning the flow as 10-10-10 [minutes]. Upon receiving my teachers' advice in my second lecture, I reduced the introduction and conclusion parts of the lesson. I gave a little more time to the body part. The final version of my plan was approximately 9-15-6 [minutes].

It can be said that with experience, Carrie made progress in classroom management. Determining the rules with students at the beginning of the lesson was one of the requirements of management skills. She explained her experiences with this as follows:

I felt that my lesson was too loud, and I could not master it enough. When my class finished, I took notes in my self-improvement notebook about the situations I expected to happen during the lecture, the problems and reasons I experienced during the lesson, and finally, what I could do for my following lecture. While researching why there was too much noise in the class, I realized that the students wanted to participate more in the lesson. It made me happy that the reason was that the students wanted to attend the lesson more because it showed that students understood my lesson, and the students also enjoyed the class. In line with the feedback I received from my teachers after the lesson, I learned that I should inform the students about how they will speak in the lesson.

In the end-of practice teaching reflection paper, it can be said that the skills developed were technological, content, and pedagogical skills by evaluating the whole process.

She summarized how her perception of self-efficacy regarding technological skills changed as follows:

When I first started the term, I thought that the online practice teaching process would be challenging because I felt I was inadequate in using technological materials. For this reason, before each lesson plan, I searched for technological materials suitable for my lesson. I adapted and used the materials I researched in some of my lesson plans. For example, in my lesson plans, GeoGebra and Google forms were applications where I got good feedback from students. Online practice teaching allowed me to gain a different perspective on the material. I had the opportunity to experience various applications. I examined the links shared by my teachers during the lesson. The different materials my friends used for other subjects also contributed to my development in this process. However, I think I am still at the development level in this regard. I do not believe that I am sufficient, as there are much more mathematics-related applications and manipulatives on the virtual platform than we expected.

She also stated that she had high self-efficacy in contents skills. This was because she tried to state learning goals and objectives that coincided with learners' levels and needs and develop learning and assessment activities that aligned with learning goals and objectives, she explained as follows:

While I was lecturing, I gave up on the second question and preferred to discuss different ways with the students on the first question. I tried to ensure that everyone understood the solutions used by the students by taking the ideas of other friends as well. Thus, instead of solving two routine questions, we have solved one question in depth. During the lesson, I made changes in the lesson plan according to the students' needs and levels. Thanks to this competence, the achievement of the course reaches the students. In this case, the time constraint we experience does not affect the flow and achievement of the lesson.

In terms of pedagogical skills, she stated that her perception of self-efficacy increased compared to the beginning of the process. She explained her method and the influence on student participation as follows:

I forgot to give information about who will take the floor in my first lesson. I had a hard time choosing from among the speakers. This [choosing speaker] disrupted the flow of our lesson. I realized that informing the students at the beginning of the class and making occasional reminders are very effective in maintaining the order of the lesson.

It can be said that with experience, she made progress in classroom management. Determining the rules with students at the beginning of the lesson was one of the requirements of management skills. She explained her experiences with this as follows:

I did not use such a technique in my four lectures, as I felt inadequate to master at least four groups. The fact that I could not fully adapt the group work to the topic was among the reasons why I used this narrative technique. However, technological dominance and the inability to foresee possible situations are significant reasons. Therefore, I did not experience group work management.

4.3.3 Summary

Carrie stated in the interviews that she generally felt competent in terms of instructional strategies.

She stated that she had a high perception of self-efficacy about presenting an alternative explanation. Her high self-efficacy perception was associated with her mastery experiences. In other words, she stated that her self-efficacy increased as she gained experience. She also stated that she had a high self-efficacy perception thanks to technological and design skills.

For the question of "implementing different teaching methods," she stated that she felt sufficient. She attributed her competence in this regard to content, pedagogical, technological, and design skills. Also, she stated that she felt adequate because she was flexible.

On gauging students' comprehension part, she stated perception of high self-efficacy and a perception of low self-efficacy. She explained the reasons for feeling competent generally due to pedagogical skills and feeling inadequate to management skills and social skills.

About adjusting the lessons to the proper level for individual students, she felt inadequate. She felt sufficient in others. She explained one of the main reasons for her high self-efficacy perception as pedagogical skills. In addition, she stated that she had high self-efficacy thanks to content skills in one of her interviews. She attributed her low self-efficacy perception to external reasons such as the duration of online lessons. She also felt adequate about student engagement in general.

Carrie considered herself reasonably sufficient in motivating students who showed low interest. She explained that she saw sufficient because she felt competent in pedagogical, management, and technological skills. She also mentioned that she had a low self-efficacy perception because she had inadequate pedagogical skills.

On getting students to believe they can do well in schoolwork, she felt sufficient, explaining the reasons for this with her social and communications, management, and pedagogical skills. She also stated that she was insufficient and explained that this was unrelated to any online teaching skills but external issues such as insufficiency of online education.

On the other hand, classroom management was where Carrie felt the most inadequate among the three dimensions.

She felt insufficient at the beginning of the practice teaching about controlling disruptive behavior in the classroom. She also felt sufficient. It can be said that her perception of self-efficacy increased in the process. High self-efficacy perception

was due to management and social skills, while low self-efficacy perception was due to management skills.

She felt sufficient regarding calming a disruptive or noisy student. Conversely, she also had low self-efficacy perception. She attributed high self-efficacy to social skills and management skills, while low was due to management and social skills.

On the other hand, she felt sufficient in every interview to ensure that the activities in the classroom run smoothly. She always stated that the in-class practice run smoothly because she does the planning phase well. Therefore, she emphasized her management, design, and content skills.

Related to establishing a classroom management system with each group of students, she stated that she had a low self-efficacy perception in one interview. This question was found not relevant in other interviews.

CHAPTER 5

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

This study's findings, which aimed to examine the changes and the reasons for these changes in the perceptions of prospective middle school mathematics teachers' self-efficacy towards online teaching, will be discussed in this section concerning previous studies in the literature. Then, implications and recommendations for further research will be presented.

5.1 Discussion

Within the scope of the research question, the findings related to the three prospective teachers' self-efficacy perceptions regarding the online teaching experience process were determined within the dimensions of the Tschannen-Moran and Woolfolk-Hoy (2001)'s TSES scale. The findings will be discussed regarding each dimension (instructional strategies, student engagement, and classroom management) by comparing the participants and the related studies in the literature.

5.1.1 Prospective Teachers' Perceptions Regarding Instructional Strategies

Three prospective teachers were mainly found to have a high self-efficacy perception in the dimension of providing an alternative explanation. In terms of implementing different teaching methods, it was determined that Lily and Rachel mostly had a high self-efficacy perception; Carrie had a higher self-efficacy perception. The reasons for their high self-efficacy perceptions were mostly due to technological skills, being common for three participants. When comparing the online skills that underlie their self-efficacy perceptions, Lily always explained the reason with her technological skills. She also stated that she could easily use interactive manipulatives and software

such as GeoGebra in online education. In this way, she can offer alternative explanations to students' questions. The reason why participants thought of offering different alternative explanations might be that there are a lot of manipulatives and interactive software, which can offer many options for students with different learning styles. These findings overlap with the findings of the study conducted by Mohebi and Meda (2021). They stated that prospective teachers believed it would be beneficial to use multimedia resources in online education to help children better understand the lectures. They used different technologies and game-based applications to give explanatory lectures to children.

Lily thought that she was completely inadequate about gauging students' comprehension. She attributed the biggest reason for this to the lack of pedagogical skills. She emphasized that student participation needs to be high for the assessment to be carried out and that participation in online education was not at the desired level. Rachel also stated in an interview that she agreed with Lily on this issue. Similarly, in the findings of Baran and Sadik (2021)'s study, the lack of student interaction during the lesson, the lack of feedback, and the passiveness of the students were associated with measurement and assessment. It has been stated that these factors negatively affect the measurement and assessment process. From this point of view, one of the consequences of prospective teachers' inability to motivate students in the student engagement dimension and students' low- participation in the lesson might be low self-efficacy perceptions about gauging students' comprehension in the instructional strategies dimension. In short, it might be said that feeling inadequate in one dimension might affect the other dimension negatively.

However, when asked about the source of these perceptions, Lily stated that she needed to improve herself to increase student participation. On the other hand, Rachel argued that the teacher would not do anything about student participation and that the students entirely caused this problem. From this point of view, it might be deduced that Lily was more self-critical about her development.

On the other hand, Carrie approached this issue from a different perspective and mentioned that she could only gauge those who actively participated in the lesson and could not evaluate the others adequately. In other words, she did not think that the measurement could not be made because of the low participation, like Lily and Rachel. On the contrary, she stated that she could measure the participants. She even tried to increase participation to make the measurement more efficient during the Practice Teaching course. She used different methods and different applications for this. For example, instead of measuring everyone's comprehension level verbally in the form of questions and answers in the classroom, she prepared an assessment material that the whole class could participate in at the same time via Google Forms. She also stated in interviews that this increased participation.

In some instances, the prospective teachers attributed the reasons for their self-efficacy perceptions neither to Albrahim (2020)'s online teaching skills nor to Bandura (1977)'s sources of self-efficacy. These emerging reasons were noted as emerging codes. For example, students' not turning on their cameras was defined as an emerging code. Carrie attributed that she felt inadequate in gauging student comprehension because the students did not turn on their cameras, which was one of the external issues. Carrie believed that the assessment was also done through observation during the lesson, so she wanted to make inferences about the level of understanding by seeing the faces of the students.

In addition, the second reason Carrie stated as an external issue was that the online class duration was short. For this reason, she said that she felt inadequate about applying different measurement tools in her lessons. While there might have been problems with assessment and measurement in online education, the limited time might have prevented prospective teachers from trying new techniques. Gürer et al. (2016) stated that since eye contact was not made with the students in online education, gauging whether the student understood or to what extent they understood was difficult. This inference supported the findings in the current study.

About adjusting the lesson to the proper level for individual students, Lily attributed her adequacy to pedagogical and content skills. Carrie also attributed her adequacy to pedagogical skills like Lily. Carrie explained her inadequacy with external issues. The prospective students did not have enough information about students' levels. This data was coded as lacking student knowledge, which was in the emerging codes category. She did not have enough information about students because she felt insufficient in gauging students' comprehension. And not being able to gauge student comprehension caused them to feel inadequate in adjusting the lessons to the proper level for individual students. In other words, it might be said that when prospective teachers explained the reasons for their self-efficacy perceptions, they mostly emphasized that the self-efficacy perceptions in one dimension influence self-efficacy perceptions in another dimension.

Regarding instructional strategies, the reasons for high self-efficacy perceptions were coded as technological skills in general. The second most common reason for high self-efficacy perceptions was determined as mastery experiences. The most common reason they felt insufficient in this dimension was based on their management skills.

Prospective teachers sometimes did not base their high or low self-efficacy perceptions on any online teaching skills. For example, Carrie stated that she felt sufficient about providing alternative explanations. She attributed her high self-efficacy to providing alternative explanations to her one-on-one experiences with students from many different grades. In Bandura's (1977)'s four sources of self-efficacy theory, one of the sources of self-efficacy was identified as mastery experiences. In short, the source of Carrie's perceptions of self-efficacy was her mastery experiences.

5.1.2 Prospective Teachers' Perceptions Regarding Student Engagement

From a general point of view, it was concluded that prospective teachers' self-efficacy perceptions could not be determined as high or low regarding student engagement. In terms of motivating students, it was determined that Lily and Rachel mostly had a high self-efficacy perception. However, this could not be determined as high or low for Carrie. Carrie mostly had a high self-efficacy perception in getting students to believe they could do well in schoolwork. On the contrary, Lily mostly had low self-efficacy perceptions regarding that. Moreover, Rachel had a lower self-efficacy perception than Lily.

When the participants' answers were considered in general, the reasons for low self-efficacy perceptions were coded due to pedagogical skills. The second most common reason for the feeling was determined as personal beliefs among emergent codes. The reason they felt competent in this dimension was mostly based on their management skills.

It was concluded that Lily felt inadequate about motivating students who showed low interest. She explained the mentor teachers' influence as one of the external factors. Lily stated that they could not implement the different techniques because the classroom was the mentor teacher's classroom. She stated that they had to follow the general rules of the class, so it might be said that prospective teachers did not feel comfortable using different techniques. Using different instructional techniques could increase students' interests and motivation. She gave an example regarding this problem: the mentor teacher gave a direction when Lily wanted to use tangram. She stated that the teacher suggested using the game as an introduction at the beginning of the lesson and then solving the questions. She stated that while she spared less time for the activity, she told her to spend more time solving questions. Therefore, the fact that prospective teachers did not feel free and comfortable enough might have caused low self-efficacy perceptions.

Regarding getting students to believe they can do well in schoolwork, Rachel stated a low perception of self-efficacy in all interviews because she had a considerable prejudice (coded as personal beliefs) that online education was inefficient. For this reason, she said that she felt inadequate because she did not believe that students could be successful only via online education. Second, she did not think that online education was appropriate for this young age group (middle school students). She stated that the students did not just sit in front of the computer and listen; they dealt with different things. She said she did not believe that middle school students were old enough to take responsibility for their own learning. However, Barış and Çankaya (2016) emphasized in their research that students' being responsible for their own learning in online courses increased their self-control.

On the other hand, Rachel even used the following sentence in one of her interviews: "I have to convince myself about it [believing that students can do well]." Here the reason was coded due to her personal beliefs. In short, it can be said that personal beliefs might affect prospective teachers' self-efficacy and, therefore, the efficiency of their lessons. On the other hand, Carrie stated that even if she thought that online education was not that efficient, she would try to motivate students, noting that students did not need to know about it. This showed how prospective teachers' perspectives might interact with their self-efficacy perceptions differently.

Rachel candidly spoke in an interview about the situation where teachers' perceptions might affect perspectives on teaching. She stated that she felt inadequate in motivating students who showed low interest. She attributed this to the fact that she did not make any effort. She made it clear that she did not want to commit to that student because she assumed that the student who had little interest in the course was academically weak. She thought that the lesson could be negatively affected, which would negatively affect her grade in the Practice Teaching course since she was being observed. Therefore, their perceptions about the outcome (grading) also affected the perception of self-efficacy.

5.1.3 Prospective Teachers' Perceptions Regarding Classroom Management

From a general point of view, three prospective teachers' self-efficacy perceptions could be determined as high regarding classroom management. Although they felt adequate in the general evaluation, when the sub-categories were examined, it was concluded that their self-efficacy in controlling disruptive behavior in the classroom and calming a disruptive or noisy student partly decreased. They attributed these mostly to their management skills and the lack of mastery experience.

The point that prospective teachers needed most about classroom management and emphasized was their inability to use body language effectively in online education. Aslan Altan (2021) also stated in her findings that one of the two themes that prospective teachers had the most difficulty with was classroom management.

In particular, the prospective teachers mentioned regarding calming a disruptive or noisy student; they felt inadequate because they did not use body language in online education. Similarly, Ak and Gökdaş (2021) stated in the findings of their study that prospective teachers preferred a face-to-face teaching environment because the virtual classroom had somehow limited non-verbal communication (such as body language).

For example, prospective students emphasized that staying physically close to the student in an uncomfortable situation in the classroom would be a warning. It can be said that the fact that prospective teachers did not know how to warn the students individually without offending them in the online course caused them to feel inadequate. While Lily stated that she had similar thoughts as Rachel, she learned classroom management methods in her course at the university. However, they had concerns about whether these methods would work in online education. Prospective teachers may need new classroom management methods that can be used in online education. The fact that prospective teachers found out which classroom management techniques work by trial and error and did not have sufficient

theoretical knowledge of online classroom management techniques might have caused low self-efficacy perceptions.

Rachel mostly made a face-to-face and online comparison in classroom management. She first argued that classroom management was easier online. She based her reason on the 'mute all' feature in Zoom. However, after the third lesson experience, she experienced that she could not provide classroom management by the "mute all" feature, and she needed to communicate with the students. At this point, it might be said that Rachel understood that she should not completely rely on technological features and that face-to-face classroom management techniques should also be used in online lessons. Rachel also stated that she had a challenging time in this experience due to the lack of body language.

Rachel stated that she felt inadequate about controlling disruptive behavior in the classroom. While other participants perceived disruptive behavior as speaking without permission, interrupting their friend, Rachel determined that attending classes late in online education was disruptive. She stated that many methods could correct arriving late in face-to-face education. However, she said that the same situation does not occur online. Aslan Altan (2021) explained the reason for Rachel's low self-efficacy perception by saying that interruptions in online education affect teaching activities negatively.

In addition to all this, a situation of uncertainty might have bothered Rachel when she was unsure whether she really had a problem, or the students just used it as an excuse when they said they could not attend due to internet problems. She also stated that the student who participated in the class late disrupted the course, and she tried to find a solution, but she could not find it. Because of this, she felt inadequate.

In ensuring that the activities in the classroom run smoothly, all of the students had a time management problem and had difficulty completing their plans. Only Carrie showed significant improvement on this topic. Flexibility, one of the essential features for teachers, was gained in this process. During the lesson, Carrie showed flexibility according to the students' needs. At the same time, she succeeded in

reaching the main goal by using time-saving techniques. She made good progress in this field since it might be difficult for a prospective teacher to be flexible. According to Glackin and Hohenstein (2017), flexibility is defined as the willingness to experiment with new instructional methods and is categorized as one of the high teacher self-efficacy characteristics. From this perspective, Carrie's development was in line with the findings of Housego (1992) in Canada, Jeffrey and Young Suk (1995) in Korea, and Wenner (2001) in the United States in that teacher self-efficacy belief tended to become stronger during prospective education.

Classroom management was the part with which prospective teachers thought they would have the most difficulty. Carrie stated that what she feared most during the lessons was classroom management. Rachel also said that she was afraid that the classroom environment would suddenly become chaotic. She felt inadequate because she was experiencing the anxiety of management. This may indicate that the pre-service teacher's emotional state affected their perception of self-efficacy. This was one of Bandura's (1977) four sources of self-efficacy, emotional state, that influenced self-efficacy beliefs.

5.2 Implications for Educational Practices

Based on the previously mentioned findings, implications will be presented accordingly. Various education stakeholders need to be informed to increase the online teaching experiences of prospective teachers and increase their self-efficacy perceptions since teacher education related to online education is relatively new in our country. The present study has implications for prospective teachers, MoNE, and teacher educators.

This study determined that many changes occurred in three prospective teachers' self-efficacy perceptions during the prospective experience process. In this direction, it would be beneficial to include practices that would contribute to developing a teacher vision for prospective teachers to learn from their own experiences in online education in teacher education programs. This might involve including applications

for the concept of online education, and the dimensions it covers in teacher education programs might help increase prospective teachers' awareness about this concept.

The study's findings revealed that prospective teachers had the most difficulty in classroom management related to online teaching. They evaluated their self-efficacy perceptions as insufficient because they did not know the situations they would encounter in the classroom. In the teacher education period, conducting more practical courses such as Classroom Management and Methods of Teaching Mathematics courses in online education would contribute to teachers' professional competencies in this area. In this direction, including content (for example, case studies) on classroom management problems that prospective teachers may encounter in online teaching may contribute to a more effective process in dealing with problems that prospective teachers may encounter in the future. In addition, since they need a communication tool that can replace body language in online education, communication techniques that can be used in online education should also be included in the content of these courses.

Another result reached in the research was that the prospective teachers' feelings of inadequacy were sometimes based on external factors. These factors were the fact that Zoom's group work feature was not purchased in the public schools, students did not turn on the camera, the course time was insufficient. These factors also influenced in-service teachers. Examining these problems in detail and the MoNE planning on these external factors for online education and increasing the efficiency in online education might positively affect teachers' and prospective teachers' perspectives on online education.

This study determined that three prospective teachers tried to cope with many problems during their online teaching experience. Literature suggests that these problems were not only experienced by prospective teachers. In this direction, problem-oriented prospective teachers education activities carried out by the MoNE, taking into account the problems in the relevant literature, can contribute to the professional development of prospective teachers.

5.3 Recommendations for Further Research Studies

In line with the research results, suggestions for future research will be presented below.

Multiple case study design was used in this study. The researcher examined three prospective teachers' self-efficacy perceptions regarding the online teaching experience process. Future research could also focus on the online teaching experiences of beginning teachers following them from their teacher's education programs and teachers with different years of experience and use action research as their possible designs.

In the current study, qualitative data analysis techniques were used in data analysis. While conducting semi-structured interviews, prospective teachers were asked whether they felt sufficient in three dimensions of self-efficacy. Nevertheless, no rating has been made. This might not have fully revealed their development in the process. Using a scale in the semi-structured interviews and asking prospective teachers to rate themselves might make it easier to make a general assessment about the changes in self-efficacy perceptions.

The prospective teachers seemed to have misunderstood the question about establishing a classroom management system with each group of students in semi-structured interviews even though it was explained. Sufficient data could not be obtained because they considered different student groups as different grade levels and did not consider the question relevant for the most part. In a future study, asking this question differently or with examples can help collect more meaningful data.

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APPENDICES

A. Turkish Version of The Teachers' Sense of Efficacy Scale (Çapa et al, 2005)

Sevgili öğretmen adayları, soruları çevrim içi eğitimde öğretmen öz yeterliliğinizi göz önünde bulundurarak cevaplayınız.

ÖĞRETMEN ÖZYETERLİK ÖLÇEĞİ	yetersiz	çok az yeterli	biraz yeterli	oldukça yeterli	çok yeterli				
1. Çalışması zor öğrencilere ulaşmayı ne kadar başarabilirsiniz?	1	2	3	4	5	6	7	8	9
2. Öğrencilerin eleştirel düşüncelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
3. Sınıfta dersi olumsuz yönde etkileyen davranışları kontrol etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
4. Derslere az ilgi gösteren öğrencileri motive etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
5. Öğrenci davranışlarıyla ilgili beklentilerinizi ne kadar açık ortaya koyabilirsiniz?	1	2	3	4	5	6	7	8	9
6. Öğrencileri okulda başarılı olabileceklerine inandırmayı ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
7. Öğrencilerin zor sorularına ne kadar iyi cevap verebilirsiniz?	1	2	3	4	5	6	7	8	9
8. Sınıfta yapılan etkinliklerin düzenli yürütmesini ne kadar iyi sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
9. Öğrencilerin öğrenmeye değer vermelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
10. Öğrettiklerinizin öğrenciler tarafından kavranıp kavranmadığını ne kadar iyi değerlendirebilirsiniz?	1	2	3	4	5	6	7	8	9
11. Öğrencilerinizi iyi bir şekilde değerlendirmesine olanak sağlayacak soruları ne ölçüde hazırlayabilirsiniz?	1	2	3	4	5	6	7	8	9
12. Öğrencilerin yaratıcılığının gelişmesine ne kadar yardımcı olabilirsiniz?	1	2	3	4	5	6	7	8	9
13. Öğrencilerin sınıf kurallarına uymalarını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
14. Başarısız bir öğrencinin dersi daha iyi anlamasını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
15. Dersi olumsuz yönde etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabilirsiniz?	1	2	3	4	5	6	7	8	9
16. Farklı öğrenci gruplarına uygun sınıf yönetim sistemi ne kadar iyi oluşturabilirsiniz?	1	2	3	4	5	6	7	8	9
17. Derslerin her bir öğrencinin seviyesine uygun olmasını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
18. Farklı değerlendirme yöntemlerini ne kadar kullanabilirsiniz?	1	2	3	4	5	6	7	8	9
19. Birkaç problemlili öğrencinin derse zarar vermesini ne kadar iyi engelleyebilirsiniz?	1	2	3	4	5	6	7	8	9
20. Öğrencilerin kafası karıştığında ne kadar alternatif açıklama ya da örnek sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
21. Sizi hiçe sayan davranışlar gösteren öğrencilerle ne kadar iyi baş edebilirsiniz?	1	2	3	4	5	6	7	8	9
22. Çocuklarının okulda başarılı olmalarına yardımcı olmaları için ailelere ne kadar destek olabilirsiniz?	1	2	3	4	5	6	7	8	9
23. Sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabilirsiniz?	1	2	3	4	5	6	7	8	9
24. Çok yetenekli öğrencilere uygun öğrenme ortamını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9

B. Interview Protocols

B.1. Preliminary Interviews

- Bu dönem matematik eğitimiyle ilgili aldığınız dersler nelerdir?
- Öğretmenlik mesleğini neden seçtiniz?
- Teknolojiye ilgili misiniz? Açıklayınız.
- Daha önce çevrim içi ders anlattınız mı? Cevabınız evet ise, nasıl geçti?
- Çevrim içi eğitim ile ilgili daha önce ders aldınız mı?
- Daha önce çevrim içi bir platformda eğitim aldınız mı? (Coursera, Udemy vs.)
- Gözlemlerinize göre çevrim içi ders yapan öğretmenler nasıl zorluklar yaşıyorlar ve nasıl aşıyorlar?

B.2. Pre-lesson Interviews

Öğretim Stratejileri

- 1) Çevrim içi gerçekleştireceğiniz derste, öğrencilerin kafası karıştığında ne ölçüde alternatif bir açıklama veya örnek sunabilirsiniz? Neden böyle düşünüyorsunuz?
- 2) Çevrim içi gerçekleştireceğiniz derste, sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabilirsiniz? Neden böyle düşünüyorsunuz?
- 3) Çevrim içi gerçekleştireceğiniz derste, öğrettiklerinizin öğrenciler tarafından kavranıp kavranmadığını ne kadar iyi değerlendirebilirsiniz? Farklı değerlendirme yöntemlerini ne kadar iyi kullanabilirsiniz? Neden böyle düşünüyorsunuz?
- 4) Çevrim içi gerçekleştireceğiniz derste, derslerin her bir öğrencinin seviyesine uygun olmasını ne kadar sağlayabilirsiniz? Neden böyle düşünüyorsunuz?

Öğrenci Katılımını Sağlama

5) Çevrim içi gerçekleştirdiğiniz derste, derse az ilgi gösteren ya da akademik olarak daha az başarılı olan öğrencileri motive etmeyi ne kadar sağlayabilirsiniz? Neden böyle düşünüyorsunuz?

6) Öğrencileri çevrim içi derste başarılı olabileceklerine inandırmayı ne kadar sağlayabilirsiniz? Neden böyle düşünüyorsunuz?

Sınıf Yönetimi

7) Çevrim içi gerçekleştireceğiniz derste sınıftaki rahatsız edici davranışları kontrol etmeyi ne kadar sağlayabilirsiniz? Neden böyle düşünüyorsunuz?

8) Çevrim içi gerçekleştireceğiniz derste, dersi olumsuz etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabilirsiniz? Neden böyle düşünüyorsunuz?

9) Çevrim içi gerçekleştireceğiniz derste sınıfta yapılan etkinliklerin düzenli yürümesini ne kadar iyi sağlayabilirsiniz? Neden böyle düşünüyorsunuz?

10) Çevrim içi gerçekleştireceğiniz derste farklı öğrenci gruplarına uygun sınıf yönetim sistemini ne kadar iyi oluşturabilirsiniz? Neden böyle düşünüyorsunuz?

B.3. Post-lesson Interviews

Öğretim Stratejileri

1) Çevrim içi gerçekleştireceğiniz derste, öğrencilerin kafası karıştığında ne ölçüde alternatif bir açıklama veya örnek sunabildiniz? Neden böyle düşünüyorsunuz?

2) Çevrim içi gerçekleştireceğiniz derste, sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabildiniz? Neden böyle düşünüyorsunuz?

3) Çevrim içi gerçekleştireceğiniz derste, öğrettiklerinizin öğrenciler tarafından kavranıp kavranmadığını ne kadar iyi değerlendirebildiniz? Farklı değerlendirme yöntemlerini ne kadar iyi kullanabildiniz? Neden böyle düşünüyorsunuz?

4) Çevrim içi gerçekleştireceğiniz derste, derslerin her bir öğrencinin seviyesine uygun olmasını ne kadar sağlayabildiniz? Neden böyle düşünüyorsunuz?

Öğrenci Katılımını Sağlama

5) Çevrim içi gerçekleştirdiğiniz derste, derse az ilgi gösteren ya da akademik olarak daha az başarılı olan öğrencileri motive etmeyi ne kadar sağlayabildiniz? Neden böyle düşünüyorsunuz?

6) Öğrencileri çevrim içi derste başarılı olabileceklerine inandırmayı ne kadar sağlayabildiniz? Neden böyle düşünüyorsunuz?

Sınıf Yönetimi

7) Çevrim içi gerçekleştireceğiniz derste sınıftaki rahatsız edici davranışları kontrol etmeyi ne kadar sağlayabildiniz? Neden böyle düşünüyorsunuz?

8) Çevrim içi gerçekleştireceğiniz derste, dersi olumsuz etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabildiniz? Neden böyle düşünüyorsunuz?

9) Çevrim içi gerçekleştireceğiniz derste sınıfta yapılan etkinliklerin düzenli yürümesini ne kadar iyi sağlayabildiniz? Neden böyle düşünüyorsunuz?

10) Çevrim içi gerçekleştireceğiniz derste farklı öğrenci gruplarına uygun sınıf yönetim sistemini ne kadar iyi oluşturabildiniz? Neden böyle düşünüyorsunuz?

C. METU Human Subjects Ethics Committee Approval

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Konu : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Dr. Öğretim Üyesi İşıl İşler BAYKAL

Danışmanlığını yürüttüğünüz Şerife Yazar KOLDAŞ'ın "Ortaokul matematik öğretmen adaylarının uzaktan eğitim sürecinde öğretmen öz-yeterlilik inançlarının incelenmesi" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **139-ODTU-2021** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

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