descriptive statistics were used and mean and standard deviation values were calculated for these variables. As a way of inferential statistics, the simple correlation was used by calculating Pearson Correlation Coefficient to examine the relationship between pre-service teachers' level of self-efficacy beliefs and their level of determining suitable taxonomy, strategy, teaching methods, and techniques. In addition to this, using independent samples t-test, it was tested whether the variables of this study differ according to grade level.

Qualitative data in this study were obtained from the answers given to open-ended questions. Content analysis was conducted using open-coding. To ensure the reliability of the analysis, the two field experts created codes from different data. To calculate the consistency between these codes, agreement percentage formula (Reliability = Agreement/[Agreement + Disagreement] × 100) of Patton (2002) was used. The first agreement was calculated as 0.90. The second agreement percentage of the codes who disagreed was calculated again after the researchers examined the data. The final agreement percentage has been found to be 0.96. After that, different themes were created from the consensus codes using inductive analysis for each question to explain the obtained data on a global level. The created codes are represented in the results section in tables with their frequencies and percentages. In addition, there were direct quotations to illustrate the codes in the table to increase reliability.

FINDINGS

In this section, the findings obtained from qualitative and quantitative data are presented in line with the research questions.

Findings for the 1st Research Question

This section includes the findings regarding pre-service teachers' self-efficacy beliefs toward science teaching and determination levels of appropriate taxonomy, strategy, teaching methods-techniques for objectives.

Table 1 shows the results of descriptive statistics of STEBI, and form of determining objective-oriented TSMTDF.

As Table 1 demonstrates, the level of self-efficacy beliefs of pre-service teachers toward science (X=70.50) and the level of determining appropriate taxonomy, method, technique, and strategy (X=3.70) was relatively high. When the TSMTDF scores of pre-service teachers were compared, it was seen that their level of determining the appropriate taxonomy was low (X=0.51) while determining strategy (X=1.58) and method-technique (X=1.60) were similar and high.

In addition, an independent sample t-test was performed to see the difference between the different grade levels in determining appropriate taxonomy, method, technique, strategy, and self-efficacy beliefs of pre-service teachers. The results of the analysis are given below in Table 2.

Table 2 demonstrates that efficacy belief (t = −0.10, ρ > 0.05), outcome expectancy (t = 0.93, ρ > 0.05), and self-efficacy belief

(t = 0.44, ρ > 0.05) did not have a significant difference based on the grade levels. In addition, it was seen that both the level of total objective-oriented taxonomy, instructional method, technique, and strategy determining (t = 0.27, ρ > 0.05), and the level of strategy determining (t = 1.61, ρ > 0.05) did not differ according to grade level. Moreover, seniors had higher scores than the juniors in determining taxonomy (t = −2.58, ρ < 0.05) and determining method-technique (t = 2.13, ρ < 0.05).

Findings for the 2nd Research Question

This section includes the findings regarding the difference between the levels of pre-service teachers' self-efficacy beliefs toward science teaching and determining appropriate objective-oriented taxonomy, strategy, and teaching methods-techniques.

Pearson product-moment correlation analysis was used to investigate the correlation between pre-service teachers' self-efficacy beliefs toward science teaching and determining appropriate objective-oriented taxonomy, strategy, teaching methods-techniques, and Pearson correlation coefficient was calculated. Table 3 presents the related results.

Table 3 reveals the results of Pearson product-moment correlation analysis indicating that there was a statistically significant and a positive correlation between pre-service teachers' self-efficacy beliefs toward science teaching and determining appropriate objective-oriented taxonomy, strategy, and teaching methods-techniques (r = 0.206; ρ < 0.05). Although the correlation between the two variables was significant, it was low according to Cohen (1988).

Findings for the 3th Research Question

The findings regarding the reasons why pre-service teachers chose those objectives that they determined for science teaching and whether these choices were different depending on the class levels are demonstrated in this section. By asking the question: "Why did you choose that objective?" To pre-service teachers, it was aimed to determine which criteria that they prioritized. The answers that pre-service teachers gave to that question were examined using codes and themes related to these codes (Table 4). Because of the fact that pre-service teachers gave opinions regarding different codes, the number of codes was more than those of pre-service teachers.

As shown in Table 4, the junior pre-service teachers mostly answered the research question with the themes such as the

Table 1: Descriptive statistics of STEBI and TSMTDF

Variables	n	Min	Max	X	SS
Self-efficacy belief in science teaching	101	46	88	70.50	6.97
Efficacy belief	101	34	56	45.45	4.93
Outcome expectancy	101	12	35	25.05	3.83
Total TSMTDF score	101	0	6	3.70	1.53
Determining taxonomy	101	0	2	0.51	0.78
Determining strategy	101	0	2	1.58	0.68
Determining method-technique	101	0	2	1.60	0.63

STEBI: Science teaching efficacy belief ınstrument, TSMTDF: Taxonomy, strategy, and method-techniques determination form

Table 2: Independent sample t-test result according to the grade levels

Dependent variable	Independent variable groups	n	X	SS	t	ρ
Self-efficacy belief in Science teaching	Junior	69	70.71	6.83	0.44	0.66
	Senior	32	70.05	7.38		
Efficacy belief	Junior	69	45.42	4.93	−0.10	0.92
	Senior	32	45.52	5.01		
Outcome expectancy	Senior	69	25.30	3.82	0.93	0.35
	Senior	32	24.53	3.88		
Total TSMTDF score	Junior	69	3.72	1.52	0.27	0.79
	Senior	32	3.63	1.59		
Determining taxonomy	Junior	69	0.38	0.78	−2.58	0.01*
	Senior	32	0.80	0.71		
Determining strategy	Junior	69	1.65	0.68	1.61	0.11
	Senior	32	1.42	0.65		
Determining method-technique	Junior	69	1.41	0.62	2.13	0.04*
	Senior	32	1.70	0.60		

*$\rho<0.05$. TSMTDF: Taxonomy, strategy, and method-techniques determination form

Table 3: Results of Pearson product-moment correlation analysis of the scores of STEBI and TSMTDF

Variable	n	r	ρ
Science teaching self-efficacy belief * total TSMTDF score	101	0.206	0.038*

*$\rho<0.05$. STEBI: Science teaching efficacy belief ınstrument, TSMTDF: Taxonomy, strategy, and method-techniques determination form

teaching process, professional knowledge, professional quality, and learning process. The senior pre-service teachers mostly answered with the themes such as learning process, teaching process, professional knowledge, and professional quality.

Table 4 shows that the most chosen reason in choosing objectives regarding the teaching process was the fact that "teaching is easy." Therefore, pre-service teachers prioritized the objectives that they think they can teach easily. It can also be seen that senior year pre-service teachers included this code the most as a reason for choosing objectives. Below, there is a direct quotation from one of the participants. The first written number in quotations shows the grade level and the other shows the number given to the participant "…*Teaching is easy and it is a subject that I prepared fondly*." (4.2)

Again, within the scope of the teaching process theme, it was also seen that pre-service teachers preferred those objectives that they could support with materials while teaching. Junior year students expressed their opinions more when it came to supporting the teaching process with materials. Junior year pre-service teachers considered themselves efficient when it came to the concretization of the subjects and developing materials that were suitable for the objective. The following are quotations to illustrate this situation.

"*I chose this objective because I thought that I could prepare an easier and more beneficial material for this objective.*" (3.10)

"*…I think I can teach better with sufficient material and presentation.*" (3.14)

In addition to this, the pre-service teacher prioritized the objectives that the students would be more active about and that they think can associate it with daily life. Pre-service teachers also choose the objectives with the aim of raising conscious individuals.

"*By emphasizing the differences between natural and artificial environments, they will get an idea of how the living creatures around them were formed. They will learn how to act around the living creatures that they encounter or see, learn how they harm or benefit the environment and us and, know what they do then they will act accordingly.*" (3.8)

"*I chose this objective because I wanted the students to be more conscious.*" (4.21)

Besides, while senior year pre-service teachers included codes aimed at exemplifying, using their scientific process skills, easily using methods and techniques that they would use while teaching the objective that they chose; juniors did not express their opinions on these subjects.

Finally, a junior year pre-service teacher stated that s/he chose the objective because s/he thought that it could be designed into an activity suitable for the class level. S/he was confident about organizing an activity suitable for the aimed age group.

The codes in the professional knowledge theme showed that whether the professional knowledge of pre-service teachers sufficient or not was a factor while deciding on the objective. The participating pre-service teachers stated that they chose the objectives because they thought that they had sufficient professional knowledge. Being sufficient in professional knowledge was an important factor in choosing an objective for almost half of the pre-service teachers while some of the pre-service teachers stated that their professional knowledge was not sufficient enough and that they chose the objectives to eliminate their deficiencies.

"*….The reason why I chose this objective is that I was not able to understand after which movements that night-day and*

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Table 4: Findings regarding the data obtained from the question: "Why did you choose this objective?"

Themes	Codes	Junior		Senior	
		F	%	F	%
Teaching process	Teaching is easy	23	33.3	20	62.5
	Supporting teaching with materials	14	20.2	2	6.2
	Relating teaching to daily life	8	11.6	6	18.7
	Making use of active learning	4	5.8	2	6.2
	Changing behaviors	3	4.3	4	12.4
	Interdisciplinary teaching	2	2.9	2	6.2
	Contemporary topics	1	1.44	1	3.1
	Using scientific process skills	0	0	5	15.6
	Applying methods and techniques easily	0	0	4	12.4
	Multi-sampling	0	0	2	6.2
	Compliance with class level	1	1.44	0	0
Professional knowledge	To have sufficient professional knowledge	30	43.5	15	46.8
	Not having enough professional knowledge	13	18.8	4	12.4
Professional quality	Having self-confidence	12	17.4	2	6.2
	Being experienced	11	15.9	4	12.4
	Eliminating one's own shortcomings	6	8.7	4	12.4
	Improving oneself in methodological and technical application	2	2.9	0	0
Learning process	Pre-service teacher's interest	6	8.7	8	24.8
	Active participation of students	2	2.9	4	12.4
	Providing learning with fun	3	4.3	4	12.4
	Permanent learning	3	4.3	3	9.3
	Making learning easier	2	2.9	2	6.2
	Preventing misconceptions	2	2.9	0	0

Table 5: Findings regarding the data obtained from the question: "Why did you choose this teaching strategy, method, and technique?"

Themes	Codes	Junior		Senior	
		F	%	F	%
Teaching process	Appropriateness of the content of the objectives	51	73.9	17	53.1
	Permanent learning	15	21.7	0	0
	Confidence in being able to practice suitable methods and techniques	8	11.6	3	9.4
	Appropriate for bloom taxonomy	8	11.6	1	3.1
	Providing research skills	6	8.7	3	9.4
	Revision	6	8.7	2	6.2
	Believing that the student can learn easily	5	7.2	2	6.2
	Concretization	4	5.8	0	0
	Practicality	3	4.3	4	12.4
	Guiding for research	3	4.3	1	3.1
	Appropriate for crowded classes	3	4.3	0	0
	Practicality	3	4.3	0	0
	Attractiveness	2	2.9	1	3.1
	Improving oneself in that particular method and technique	2	2.9	0	0
	Appropriateness for extracurricular learning	0	0	1	3.1
Learning process	Active participation of students	13	18.8	18	56.2
	Active learning	10	14.5	11	34.4
	Enjoyable learning	7	10.1	5	15.6
	Connect with daily life	4	5.8	1	3.1
	Providing creative thinking skills	3	4.3	0	0
	Providing critical thinking skills	2	2.9	1	3.1
Measurement and evaluation	Detecting prior knowledge	4	5.8	2	6.2
	Ability to measure	1	1.45	1	3.1
	Ability to evaluate	2	2.9	0	0

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