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Research Article

The Formation of Subjectivity in Asian Students in Japanese Higher Education[1]

Tomoka Sato[2]

Abstract

This paper explores how non-Japanese Asians studying at Japanese universities form their subjectivity and negotiate in Japanese society. To this end, a qualitative paradigm, namely a narrative approach to data collection, was employed as a methodological framework, and the data collection methods were face-to-face interviews and social media. The participants were six Asian students from different Asian countries. After collecting their narratives and transcribing them, I categorized them into three phases: Expectations & Gaps, Outcomes, and Vision for the future. The findings reveal that all participants felt admiration and respect for Japanese perseverance and politeness, as well as Japan's advanced technology in their imaginary world before they came to Japan. However, after living in Japan, this view changed to a negative one, leaving them disappointed by Japanese narrow-mindedness and both invisible and visible discrimination against them. These negative experiences gradually created their subjectivity as they have found themselves trying to conform to Japanese social power and norms and acting like the Japanese while in Japan. However, their hearts were no longer in Japan. These findings imply that Japanese students' intercultural understanding is dominated by the cultures of the English-speaking world, while their understanding of other cultures except for those of that world is scant. The paper concludes by suggesting a cosmopolitan pedagogy for intercultural understanding and communication so that Japanese students can become true global citizens.

Keywords: *Asian students in Japanese Higher Education, subjectivity, intercultural understanding.*

[1] The data in this study were gathered before 2020 and within the scope of a doctoral research accepted by the Research Ethics Committee of University College London on 08.01.2016.

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Japon Yükseköğretiminde Asyalı Öğrencilerde Öznelliğin Oluşumu

Öz

Bu çalışmanın amacı, Japon üniversitelerinde okuyan Japon olmayan Asyalıların Japon toplumunda öznelliklerini nasıl oluşturduklarını ve müzakere ettiklerini araştırmaktır. Bu amaçla çalışmada, Çalışma, nitel araştırma desenlerinden biri olan "anlatı araştırması" deseni kullanılmıştır. Çalışmada veriler, yüz yüze görüşmeler ve sosyal medya aracılığıyla toplanmıştır. Çalışmanın katılımcıları, farklı Asya ülkelerinden altı Asyalı öğrenciden oluşmaktadır. Öğrencilerin anlatıları toplandıktan ve yazıya döküldükten sonra üç aşamaya ayrılmıştır: Beklentiler ve Boşluklar, Sonuçlar ve Gelecek için Vizyon. Bulgular, tüm katılımcıların Japonya'ya gelmeden önce hayali dünyalarında Japonya'nın ileri teknolojisinin yanı sıra Japon azmi ve nezaketine hayranlık ve saygı duyduklarını ortaya koymaktadır. Bununla birlikte, Japonya'da yaşadıktan sonra, bu görüş olumsuz bir görüşe dönüşmüştür. Katılımcıaalr Japonların dar görüşlü olduklarını ve yabancılara karşı hem görünmez hem de görünür ayrımcılık yaptıklarını ileri sürerek hayal kırıklığına uğradıklarını ifade etmişlerdir. Kendilerini Japon sosyal gücüne ve normlarına uymaya çalışırken ve Japonya'da Japonlar gibi davranmaya çalışırken bulduklarını ifade eden katılımcılar bu olumsuz deneyimlerin kademeli olarak öznelliklerini yarattığını belirtmişlerdir. Bu bulgular, Japon öğrencilerin kültürlerarası anlayışının İngilizce konuşulan dünyanın kültürleri tarafından yönetildiğini, ancak o dünyadaki kültürler dışındaki diğer kültürleri anlamalarının yetersiz olduğunu göstermektedir. Makalenin sonuçlarına göre Japon öğrencilerin gerçek küresel vatandaşlar olabilmeleri için kültürlerarası anlayış ve iletişim için Japon yükseköğretimine kozmopolit bir eğitim önermektedir.

Anahtar Sözcükler: *Japon Yükseköğretiminde Asyalı öğrenciler, öznellik, kültürlerarası anlayış.*

Introduction

In 2014, the former Japanese Prime Minister Shinzo Abe announced a major reform of higher education; the Top Global University Project. The purpose of this project is to enhance the international competitiveness of higher education in Japan and to internationalize Japanese universities. Referring to the Times Higher Education World University Rankings, the former Prime Minister Abe stated that "the number of foreign students in university will define its success" (East Asia Forum, 2014). One of the tools to be used to achieve this goal was to attract foreign students. The project has its own budget. The universities, whether public or private, collaborated by deciding to conduct promotional activities to invite foreign students to their campuses. As a result, the number of foreign students in universities designated by The Japanese Ministry of Education, Culture, Sports, Science, and Technology (hereafter MEXT) has increased dramatically over the past five years. Although these universities have been receiving students from different parts of the world, students are predominantly from geographically and culturally close Asian countries. With the enforcement of this reform, statistical data on these students were collected by MEXT and the Japan Students Service Organization (JSSO). However, what is notably absent from these data is any attention being given to them from a qualitative perspective. In particular, how these individuals experience and interact with their social world and how major contextual factors such as social and political factors affect the ways in which their subjectivities are formed remain unexplored. Examining these aspects is important if classrooms are to become globalized in a real sense. Simply collecting numbers of foreign students does not demonstrate that Japanese universities have become international. Unless these students' status within Japan is understood, it will be impossible to declare the Global Project successful.

In this case study, I therefore investigate qualitatively the experiences of six undergraduate students from different Asian countries. In addition to examining empirical materials including scheduled face-to-face and impromptu interviews via SNS, this case study employs Foucault's (1980) conceptualization of the relationship between power, subjectivity, and agency to reveal how Asian students studying in Japanese universities form their subjectivities and negotiate within Japanese society.

Top Global University Project: A Brief Overview

The Top Global University Project (TGUP) is a government-funded project that started in 2014 and is slated to continue to 2023. MEXT provides financial support for universities that are making substantial efforts to internationalize by building and enhancing partnerships and exchange programs with world-leading universities. Reforms to personnel and administrative structures, educational systems, and environmental infrastructure designed to foster students' ability to deal with globalization are also included. MEXT adopted a two-track approach to the project. Type A designates world-class universities that have the potential to be ranked in the top 100 in world universities rankings, while Type B represents universities that attempt to create an innovative curriculum and programs that will contribute to the move of Japanese society toward globalization. In September 2014, MEXT announced the selection of universities for the TGUP, designating 13 universities as Type A and 24 as Type B out of 109 applying universities. Broad criteria for selection were based on internationalization, governance, and educational reform. For example, the specific criteria for internationalization, for instance, were:

1. Percentage of international full-time faculty staff and [domestic] full-time faculty staff who have received their degrees at a foreign university
2. Percentage of international students
3. Percentage of Japanese students who have experienced credit earning study abroad
4. Percentage of Japanese students studying abroad under inter-university agreements
5. Percentage of classes conducted in foreign languages
6. Percentage of students enrolled in degree programs in foreign languages
7. Percentage of students who meet foreign language standards
8. Percentage of syllabus translated into English
9. Percentage of Japanese students who stay in international dormitories
10. Flexible academic calendar

(MEXT: Top Global University Project)

I teach in both Type A and B universities, and I have observed the number of international students increasing year by year. The case study presented in this paper draws on the experiences of six undergraduate members of the Asian cohort. In examining this particular group of students, I explore not only the experiences in Japan of Asian students but also whether TGUP performs well in terms of intercultural communication between Japanese and other Asian

students. However, it is not my intention to evaluate the intentions of policymakers or the decisions made regarding implementation of the project. Indeed, in terms of outcomes, the project has brought about sweeping, positive changes. For instance, Japanese students now have more opportunities to immerse themselves in English environments without having to study abroad.

Literature Review

Whereas many studies have focused on Asian students studying in English-speaking countries (e.g., Benson, Barkhuizen, Bodycott, & Brown, 2012, 2013; Block, 2006; Churchill, 2009; Jackson, 2008; Piller & Takahashi, 2006; Sato, 2014, 2015), few studies have examined the position of Asian students studying in Japanese universities, especially from a qualitative perspective. In the context of intercultural communication, individual's agency and will, i.e., the ability and will of an individual to act in a given environment, more precisely, "the ability to be willing to be open to Others and the world and the ability to engage in cosmopolitan action" (Sobré-Denton & Bardhan, 2013, p. 68) are mainly focused. However, how this agency is determined tends to be neglected. Therefore, this section reviews Foucault's (1980) conceptualization of the relationship between power, subjectivity and agency, and it will function as the theoretical framework for this study.

Relationship Between Power, Subjectivity and Agency

Foucault (1980) developed a novel way of conceptualizing power. In general, the prevalent conception of power is what Foucault labels "juridical power." Traditionally, this power is based on the rule of law and presupposes power relations between a sovereign and subjects whereby a sovereign imposes his will on his subjects. In this context, power is seen as operating within the State. As long as the exercise of power is viewed as the imposition of the will of a powerful individual on that of a powerless one, power is interpreted as a restrictive, repressive, and negative force. Foucault argues that this power should be viewed in terms of "an essentially negative power, presupposing on the one hand a sovereign whose role is to forbid and on the other a subject who must somehow effectively say yes to this prohibition" (1980, p. 140).

However, Foucault extends his analysis of power by challenging this notion of power as sovereignty. Foucault critiques its assumption that power is restricted to the relation between a sovereign and subjects by law. Insofar as power is viewed in this way, it is assumed that wherever subjects are out of the reach of the sovereign, they are free from power. Foucault denies this kind of domination, that is, one person exercising power over others, or one group doing so over another. Instead he argues that there exists non-sovereign power, which he defines as "disciplinary power" (p.105), and which lies outside of sovereignty. Foucault thus views power as

> *"the manifold forms of domination that can be exercised within society. Not the domination of the King in his central position, ... but that of his subjects in their mutual relations: not the uniform edifice of sovereignty, but the multiple forms of subjugation that have a place and function within the social organism." (p. 96)*

From this perspective, the analysis of power

> *"should not concern itself with the regulated and legitimate forms of power in their central locations, with the general mechanisms… On the contrary, it should be concerned with power at its extremities, ... that is, in its more regional and local forms and institutions." (p. 96)*

Foucault argues that the peripheral relations of domination and subjugation that are obscured by a narrow focus on juridical power should be paid more attention. For Foucault, juridical power is only partial and narrow as it views power simply as an essentially negative, repressive, and prohibitive force. In this context, "Power is what says no" (p.139). Foucault explained this view in a 1977 interview as follows:

> *"If power were never anything but repressive, if it never did anything but to say no, do you really think one would be brought to obey it? What makes power hold good, what makes it accepted, is simply the fact that it doesn't only weigh on us as a force that says no, but it traverses and produces things, it induces pleasure, forms knowledge, produces discourse. It needs to be considered as a productive network which runs through the whole social body, much more than as a negative instance whose function is repression." (Foucault, 1980, p. 119)*

Foucault thus views power as ubiquitous and both repressive and productive. However, this does not mean that Foucault ignores juridical power, which views power as sovereign and repressive, and replaces it with what he defines as "disciplinary power," which views power as

peripheral and productive. Indeed, he argues that power "doesn't only [italic added] weigh on us as a force that says no" (1980, p.139). Both juridical (repressive) and disciplinary (productive) power, he explains, coexist in contemporary Western societies, and the individual subject is one of the primary effects of this repressive and productive power. According to Foucault, if power is always and only viewed as being exercised over individual subjects who are subject to the power of the sovereign, this conception of the individual suggests "an elementary nucleus, a primitive atom, a multiple and inert material" (p. 98). Thus, Foucault argues that as juridical power delimits our actions, individuals are fully formed and stable entities that get caught up in power relations.

However, Foucault also argues that individual subjects do not come into the world fully formed. Rather, they are constituted in and through social relations, which entails power. Thus, power plays a key role in forming individual subjects. According to Foucault, individual subjects are subjected to shifting power relations within their society and can choose the position of subject within these power relations. In other words, for Foucault, power determines individual subjectivity, stating that:

> *"In fact, it [the individual] is already one of the prime effects of power that certain bodies, certain gestures, certain discourses, certain desires, come to be identified and constituted as individuals… The individual is an effect of power." (p. 98)*

As Foucault uses the term "subjectivity" and "agency" interchangeably, he does not draw a sharp distinction between these two terms. However, this statement can be interpreted that subjectivity determines agency, the ability or capacity to act in a given environment. That is, on the basis of an individual's beliefs, consciousness, biases, interpretations, feelings, or imaginings, the individual may have the ability to act. Thus, if power determines individual subjectivity, it follows that individual subjectivity also determines agency. As Foucault argues,

> *"It [the exercise of power] is a total structure of actions brought to bear upon possible actions; it incites, it induces, it seduces, it makes easier or more difficult; in the extreme it constrains or forbids absolutely: it is nevertheless always a way of acting upon an acting subject or acting subjects by virtue of their acting or being capable of action." (Foucault, 1982, p. 789)*

In a nutshell, Foucault argues that power operates within society and determines individual subjectivity, which results in developing agency. In this way, power not only constrains but

also enables human action.

Methodology

In this study, I adopt a qualitative paradigm. This choice is underpinned by Merriam's (2002) definition of qualitative research, which is based on the idea that "meaning is socially constructed by individuals in interaction with their world" (p. 3), and is suitable for researchers interested in "[l]earning how individuals experience and interact with their social world, the meaning it has for them" (p. 4) and in investigating how major contextual factors such as social and political factors affect how individuals construct reality. More specifically, narrative inquiry is the best way of representing and understanding experiences that are difficult to observe directly and are best understood from the perspectives of those who experience them. According to Lather (1992), narrative inquiry can be categorized into three theoretical paradigms: *understanding* (interpretive), *emancipating* (critical and feminist perspectives being included), and *deconstructing* (postmodern). As my focus in this study is not simply to *understand* Asian students studying in Japan but to also *critique* Japanese students' prejudices due to their indifference to and ignorance of other cultures, my theoretical stance as regards methodology is critical as well as interpretive. Data[2] will consist of my participants' narratives, especially first-person accounts of their experiences. My decision to employ narrative analysis is also supported by Riessman (2008), who argues that,

> *"A good narrative analysis prompts the reader to think beyond the surface of a text, and there is a move toward a broader commentary. Just because narrative approaches interrogate cases (rather than population-based samples), it cannot be generalized. But inference is of a different kind…. Making conceptual inferences about a social process (the construction of an identity group, for example, from close observation of one community) is an equally "valid" kind of inquiry with a long history in anthropology and sociology." (p. 13)*

Data Collection

There were six student participants: three males, and three females (Table 1). All participants studied in a university in Tokyo and came from Asian countries. All of them were my students. They were selected for this study on the basis of their willingness to participate. All names are pseudonyms.

Table 1
Participants' backgrounds

Name	Home Country	Gender	Age
Yuan	Malaysia	F	20
Thao	Vietnam	M	24
Yong-ha	South Korea	M	20
Seung	South Korea	F	20
Xia	China	F	22
Tu	Taiwan	M	20

The data in this study were gathered within the scope of a doctoral research accepted by the Research Ethics Committee of University College London on 08.01.2016.

Method

The interviews were my main data collection method since the purposes of this research were to explore the views, experiences, beliefs and motivations of individuals. Interviews are believed to provide a deeper understanding of social phenomena than would be obtained purely quantitative methods such as questionnaires. To collect narrative data from the participants, face-to-face and one-on-one semi-structured interviews were conducted between April 2016 and May 2018 in Tokyo. The interviews were carried out in a relaxed manner and held at times and in places convenient to the participants on the university campus we all belong to. I conducted the interviews based on Seidman's (2006) model for "in-depth, phenomenologically based interviews" (p. 15). Seidman suggests three 90-minute interviews separated by several days' intervals, which allows both interviewer and participant to understand the experience and to place it in context. However, considering the participants' and my own schedule, it was necessary to adjust the number of interviews held for this study. Some participants had an in-person interview only once, but their interviews were complemented by email and SNS. I tried to follow the progression on Seidman's (2006) protocol. The interviews were conducted as follows. First, the participants were asked to give biographical details. Second, they were asked to describe how they live their lives and their personal feelings toward each event recounted. Third, they were asked to reflect on their social experiences to examine how these are connected to their present lives. Finally, they talked about what they envisaged doing in the future. Following Seidman, I tape-recorded all interviews. Seidman describes benefits of tape-

recording as follows: First, in order that the researcher may transform spoken words into a written text to examine, tape-recording is most reliable. Second, preserving the words of the participants allows the researcher to work from original data as the researcher can return to the source and check for accuracy whenever necessary. Tape-recording also benefits the participants. The fact that what they have said is recorded can give them confidence that their words will be treated valuably and responsibly. In addition, it also allows participants to decide what in the recording they choose to retain and what they wish to delete.

Data Organization and Processing

A key criterion for evaluating the quality of research data and analysis concerns its "reliability", defined by Thomas (2013) as "the extent to which a research instrument such as a test will give the same result on different occasions" (p.138) and by Gall et, al. (2003) as "the extent to which other researchers would arrive at similar results if they studied the same case using exactly the same procedures as the first researcher" (p.635). Both Thomas and Gall et, al. take a relatively positivist perspective. However, my theoretical position, an interpretive perspective as mentioned above disputes "the assumption that there is a single reality and that studying it repeatedly will yield the same results" (Merriam, 1998, p.205). In interpretive qualitative research,

> *"Researchers seek to describe and explain the world as those in the world experience it. Since there are many interpretations of what is happening, there is no benchmark by which to take repeated measures and establish reliability in the traditional sense" (Merriam, 1998, p.205).*

Namely, the notion that reliable procedures will lead to predictable or uniform outcomes is flawed.

However, this does not mean that the way data is collected, handled and presented lacks rigorous. Instead of reliability, the validity of the interview data arises from its "authenticity" (Scott, 1990, p.6), which is related to the accuracy and honesty of the data. In this respect, I adopted an audit trail approach to illustrate that findings are based on the participants' narratives instead of my own preconceptions and biases and establish the confirmability of this study's findings. Validity is divided into two categories: internal and external. "Internal validity seeks to demonstrate that the explanation of a particular event, issue or set of data which a

piece of research provides can actually be sustained by the data" (Cohen et al., 2011, p.183). That is, the extent to which the written findings are evidently generated from the data and their analysis, whereas "external validity refers to the degree to which the results can be generalized to the wider population, cases, times or situations, i.e. to the transferability of the findings" (p.186). As this study focuses on the experiences and perspectives of a small number of participants, external validity is not established. However, given the varied sources from which analysis draws, the findings may have implications for Japanese students who do not exactly know what intercultural understanding is and for university courses in which students from different Asian countries study.

Thus, in order to establish internal validity, I followed Nagatomo's (2012) transcription method for interviews. I transcribed each interview from audio recordings immediately after the interview. First, I verbatim transcribed all that include hesitant phrases and fillers sounds, such as "um", "like", "you know", "I mean", "actually", "basically" and so on, as well as any code-switching into Japanese or English. Then, retaining this copy, I created a refined version of the transcription, in which hesitant phrases, filler sounds, and grammatical errors were eliminated as my study focuses on *what* is said rather than *how, to whom, or for what purpose* it was said. This second version was sent to the participants immediately after each interview, which enabled them to review detailed interview responses (member checking) and verify the interpretive accuracy. To assure internal validity, member checking is one of the strategies (Simon and Goes, n.d.).

All excerpts included here were originally a mix of Japanese and English, but I translated them into English for readability in the analysis and interpretation section that follows. I tried to keep the participants' narratives as close as possible to the original with a focus on *what they said*, but eliminated fillers sounds and modified grammatical mistakes such as verb tense and form. Finally, I invited an academic who know both Japanese and English to check my translation, which helped increase the quality of research data.

Analysis

As my interest was the participants' emotional attitudes toward Japan and Japanese people before and after living in Japan, I focused on changes in such attitudes as well as what factors

caused these changes. Therefore, I had pre-determined to divide the participants' narratives into three phrases (themes): Expectations & Gaps, Outcomes, and Vision for the future. Polkinghorne's (1995) describes two types of approaches to data analysis: *narrative analysis* and *analysis of narratives*. According to his definition (pp. 5-6), "narrative analysis" refers to "studies whose data consist of actions, events, and happenings but whose analysis produces stories." In this approach, the data (interview transcript) is treated as non-narrative data since the data is not yet in story form. In contrast, "analysis of narratives" refers to "studies whose data consist of narratives or stories but whose analysis produces paradigmatic typologies or categories." This approach is called "thematic," "content," or "grounded theory" analysis. Given this distinction, the first phase in my data analysis was "narrative analysis," in which I turned participants' fragmented narratives on the interview transcript into stories. However, in the case that short extracts from interviews in which the participants told stories, for instance, they were treated as narrative data. The second phase of my data analysis was an "analysis of narratives," in which I used participants' narratives refined into stories (and short extracts) as data and categorized them into three themes in accordance to each phase as mentioned above.

Findings

Student Perspectives: Expectations and Gaps

Upon arriving in Japan, all the students in this study had high hopes for their sojourn and imagined that they would get along with Japanese people in addition to developing their command of Japanese. Yuan elaborated on her expectations as follows:

> *"I guess we all had only a positive image of Japanese people, especially due to the fact that even when the Great East Japan Earthquake occurred in 2011, disaster victims were well-behaved and patiently queued for the hot meals provided. No looting and the state of lawlessness and disorder that often comes with disasters were have seen. Therefore, I respected them and looked forward to having Japanese friends."*

Likewise, Thao expressed his expectation of making friends with Japanese people.

> *"Many Vietnamese people appreciate Japan's financial support for economic reforms in Vietnam. As the remarkable recovery of postwar Japan caught the attention of the Vietnamese, we respect the industriousness of the Japanese people. As for me, while I was writing my bachelor's thesis in Vietnam, I became interested*

in advanced Japanese technology, especially car suspensions. Then I wanted to work with Japanese people in the field of science and technology in Japan."

Before they studied in Japan, these students had never visited Japan or had any Japanese friends in their country. They found out about Japan and Japanese people only through mass media. They thought well of Japanese people in their imaginary world.

In reality, Japanese discrimination against them was contrary to their expectations. Only after living in Japan did they experience Japanese narrow-mindedness toward other Asians on many occasions. Yuan lamented this.

At first, Japanese classmates were friendly, and I got along with them in and out of the classroom, but as the months went by, they avoided me and formed a clique and only hung out with one another. Eventually I was excluded from them. I don't know why they changed their attitude toward me, but I am not shy at all. Whenever I have questions and opinions, I always raise my hand without any hesitation. I assume that for them, I might look as if I were confident and showing off my ability, which may have annoyed them… I don't know… Some classmates are returnees[3] from English-speaking countries, so they are supposed to be used to the way I do things. But even they don't talk to me anymore now."

Yuan did not know about Japanese society, in which "Tall trees catch much wind." She behaved in exactly the same fashion as she had done in her country, Malaysia. She had learned from her mother, who is a teacher in Malaysia, that conforming to Western values is to become a global citizen, so she did not hesitate to express what she thinks, nor did she care about how her classmates saw her. Meanwhile, although Japanese universities have adopted global standards in many ways, many Japanese students still seem to her to be unfamiliar with other Asian countries, which invites bias against them and leads to acts of discrimination. In addition to this experience in university, she was also discriminated against by a Japanese person in more obvious way in her part-time workplace, which is an amusement park.

"I was having OJT (on-the-job training) at the Information Center inside the theme park. While my trainer went away for a few minutes, an incident occurred. An old man came up to me, saying that he wanted a stamp for his parking ticket, which is

[3] The term "returnee" refers to persons who return to the country where they were born after living or spending a substantial amount of time elsewhere.

> *one of the services for the customers who come to the theme park. They can get a few hours of free parking with the stamp. However, I misunderstood him and gave him the wrong information. Shortly after, he found out that this information was wrong. He came back to me with a furious look on his face, looked at my name tag, which said "Yuan" and shouted at me: "Go back to China if you don't understand such easy Japanese! We don't need gaijin[4] [foreigners] like you!!" I thought that if I had not used my Chinese name, he wouldn't have spoken that way."*

Yuan could do nothing but kept apologizing and felt sad to see such overt discrimination in Japan despite the fact that Japan is a developed country. As she had several experiences of being taken for Chinese and discriminated against by Japanese people because of it, she stopped reading Chinese novels in public places. She wanted Japanese people to see her as Malaysian. In fact, she would rather be mistaken for Japanese than be identified as mainland Chinese, whom many Japanese people dislike and criticize. She described Japanese chauvinism as follows:

> *"After all, Japanese people have a prejudice against foreigners, especially other Asians. I am Asian, but I speak Japanese well (if I may say so), so I have Japanese friends, but still, the Japanese are too much patriotic. I don't like Japanese supporters in the Olympics, for instance. The way they support Japanese athletes exactly shows their chauvinism."*

Before she came to Japan, Japan had long been her passion. But once she lived in Japan, she realized that while Japan may be the best place to visit as a traveler, living in Japan as a foreigner is not. A Korean male student, Yong-ha also expressed his disappointment over Japanese bias against other Asian people, especially Chinese and Korean.

> *"Whenever my Japanese coworkers in my part-time workplace, a café, see Chinese customers coming in, they immediately say: "Here are noisy Chinese again! They have bad manners." I wanted to say that all Chinese people are not necessarily rude or impudent, because I am also prejudiced by many Japanese people. I was a bit scared to think something like that was being said behind my back."*

Yong-ha realized that Japanese people have a limited view of foreigners. As a result, they judge them based on a stereotype. He thought that his own country, Korea, is similar to Japan in this respect, which disappointed his hope of studying in Japan further. Before coming to Japan, he

[4] The term gaijin is a word means "foreigner" but includes discriminative connotations.

thought that advanced Japan was more open to other Asians.

Thao experienced feeling alienated from both classmates and co-workers. He found his Japanese classmates superficially nice but that they seemed to avoid having close relationships with him. He even felt discriminated against. He described what happened:

> *"The other day, one of my Japanese classmates discussed a topic with me in a friendly manner in class, but after we left the classroom, he acted as if he were a different person. When I ran into him in a different place on campus, I was going to say "Hello!," but as soon as he glanced at me, he clearly ignored me (I am sure our eyes met!) I was perplexed by this incident. Unless a teacher assigns students to work together, Japanese students do not bother to sit and mingle with foreign students, so I am always alone in your class, too, as you can see, while Japanese students are always together with their friends. I want young Japanese people to be more open to other Asians in a real sense; otherwise Japan will not be globalized.*

In general, many Japanese students remain indifferent to and ignorant of the outside world. They have become inward-looking. Unless foreign students can speak Japanese fluently, many Japanese students are not interested in making friends with them. As one Japanese student described it: *"I really admire their hard work in learning Japanese in addition to English, but I don't know where to begin talking, so I don't bother to talk to them."*

Moreover, in Thao's part-time workplace, a Japanese traditional pub, he felt a sense of alienation:

> *"Japanese peers do not talk to me even during breaks. They are always together talking about something funny. I often hear them laughing loudly. Actually, at first, they were kind and talked to me, but once they found it difficult to have a smooth conversation with me, they gave up talking to me. They just give me a word of greeting when we meet. In addition, one day the manager yelled at me because the number of ice cubes I put in a glass was wrong. I did not know about this rule (the Vietnamese are easy-going, so no one cares about it), but he said he had told me before. But I did not understand why he yelled at me like that. It's just the number of ice cube!! Then, I realized that my Japanese is not good enough for me to achieve a close relationship with them."*

Thao initially wanted to improve his Japanese by interacting with Japanese people in his local community, but perversely, he found it difficult to interact with Japanese people without high

proficiency in Japanese.

Two other participants, Xia and Tu, also explained the difficulties they experienced in making Japanese friends, reporting that even with a good command of Japanese, it is still difficult for them to understand what Japanese people really think as Japanese people often use *tatemae* (publicly stated opinions) as well as ambiguous words as they do not want to be seen in a negative light. As a result, they do not show *honne* (true desires and feelings). Tu, a Taiwanese male student, pointed out that,

> *"Although I am Taiwanese, my ways of thinking and behavior are rather Western, I think. It is because I lived in different countries because of my father's job and I went to international schools, where I was encouraged to express my opinions without any hesitation or fear about how people think of me. Because of that, I like taking the lead. But in Japan, it does not work. In fact, during a group project in university, when I asked as a leader if the group members had any questions or problems with my management, they said: "No, nothing, thank you, you are doing a great job!", so I completely trusted their statements, kept taking the initiative, and I kept going. But I found out later that they had complained about my leadership behind my back and that they had seen it as a bossy attitude, so they did not bother to argue against me. It was shocking when I learned about it, and I was very frustrated. Since then, I have lost confidence in taking a leadership role in Japanese society, so currently I try to be reserved."*

The more these Asian students become familiar with Japanese customs and manners, the more they are disappointed at exclusive, discriminatory, and contradictory Japanese attitudes.

1. Student Perspectives: Outcomes

As their sojourns in Japan progressed, the students' perspectives on Japan and Japanese people changed, but they still continue to try to conform to Japanese norms. Yuan started to "keep her head down" in class. She explained this change as follows:

> *"I tried to be quiet like other Japanese students, and even refrained from expressing my opinions and disagreeing with my teachers because one day I noticed that a teacher seemed annoyed by my occasional rebuttals and questions, and I got a bad grade from the teacher. I thought I had contributed to the class as no students were active and the class was completely dormant. But since then I have changed my attitude towards class."*

Currently, even when Yuan encounters conflicting opinions, she tries to shut herself up and just

keeps a distance from her opponent and behaves like Japanese students, who always sit at the back of the classroom.

In Thao's case, he started to believe that his lack of Japanese proficiency could prevent Japanese people from having good relationships with him. As a result, he also changed his attitude toward dealing with Japanese society. He explained how he changed as follows:

> *"At first, I was perplexed and frustrated by the behavior of Japanese people, so I got the feeling that I feel more comfortable being with other Asian students, like Chinese and Korean students in school and keeping a distance from Japanese co- workers in my workplace. But recently. I have become accustomed to the narrow- mindedness of Japanese people, and I do not care anymore about it. I changed my mindset. So whenever I am asked, I participate in drinking parties after school and I work to build trusting relationships with Japanese people around me although I'm really, really worried about money and my studies. Maybe I have pushed myself to hard?!"*

Drinking parties are typical Japanese custom intended to promote friendship. Even occasional failure to attend such a party gives the impression that you are unsociable. Although Thao became distressed about money as his father sent him only derisory amounts, he was unable to turn down invitations from Japanese people despite the fact that he does not really want to participate in the parties.

Like Yuan, four other participants, Yong-ha, Seung, Xia, and Tu, also have a good command of spoken Japanese. However, unlike Yuan but like Japanese students, they tend to be quiet in class and always use Japanese unless their teachers require them to use English despite the fact that they also have a good command of spoken English. However, they do not show their plurilingual identity in their interactions with Japanese classmates. I asked them the reason for this, and these three participants made a similar remark, explaining that behaving like Japanese people is a good way to avoid being alienated from them and an effective way to have close relationships with them and that they therefore get along well with Japanese classmates.

2. Student Perspectives: Vision for the Future

As all participants' narratives demonstrate, they seem under pressure to conform to specific social power and norms in order to join real Japanese society. This results in losing admiration and passion for Japan. All participants expressed the desire to go to another country after

graduation from a Japanese university, one where racial diversity is promoted and social justice is established. They do not wish to worry about how Japanese people see them but just want to be themselves. Thao described his future plan in assertive terms:

> *"I don't intend to stay in Japan after my graduation. Before I came to Japan, I really wanted to work for a Japanese company, but now I don't. Currently, I feel like working for a company where people coming from different cultural backgrounds work. Given its diversity and cultural openness, America comes to mind. When I was in Vietnam, I did not like studying English even though my father kept suggesting I should study English. I ignored his suggestion and studied Japanese hard. But now, my interests and passions have changed to America!! I started to watch Hollywood movies to master English. I am earning money through part-time work in Japan to study in America. Then, hopefully, I might be able to get a job there."*

Yuan feels the similar way as Thao does. She receives a large scholarship from the Japanese government every month. In return, the Japanese government expects her to make a major contribution to the relationships between Japan and Malaysia once her studies are completed. However, she remarked that,

> *"I am a Chinese Malaysian. To be honest, this may sound selfish or convenient to me, but I don't have any roots in Malaysia. I don't speak Malay as much as they [the Japanese government interviewers] expect. I feel pressured by the scholarship I earned from the Japanese government. Anyway, I need to find a job that will be a bridge between the two countries. But after that, I would like to return to being a student again in a different country. Sorry, but no more Japan! Ha ha!"*

For their part, Xia, Tu, and Yang-han have the ability to behave like Japanese people and have a good command of Japanese, yet they feel uncomfortable living in Japan as foreigners as they have realized that Japan is not as global a society as they expected and Japanese people are exclusive. Consequently, they too have decided not to stay in Japan after their graduation from Japanese university. Their interests also changed to another country.

However, they want to retain or even develop their Japanese language skills as they know that having other language skills in addition to their mother tongue and English will give them an advantage for employment either when they apply to a multinational company or once they go back to their home country.

Discussion and Implications

The participants' narratives show there are gaps between what they had imaged about the Japanese and the real Japanese before them. They have come to understand that in addition to prejudices against other Asians, a lack of Japanese proficiency and failure to behave like the Japanese can hinder them from interacting with Japanese people, which ultimately leads to developing a sense of alienation or discrimination. Consequently, although they demonstrate cultural openness, they are under pressure to conform to specific social power, norms, discourses, and systems in order to join Japanese society. Individuals are subjected to these forces, and individual subjectivity is formed through them. This fits Foucault's claim that social power, norms, discourses, and systems determine individual subjectivity. Agency− the ability and will of an actor to act in a given environment− can then be exercised. Ultimately, these students ended up feeling uncomfortable being actors and decided to leave Japan.

Many Japanese people are ignorant of other Asian countries and their cultures. In the context of Japanese university settings, the main focus has been on dominant cultural patterns, specifically the cultures of the English-speaking world. When speaking of the cultivation of global human resources, for instance, almost all Japanese universities prioritize the development of English language competencies, not deepening cultural knowledge and understanding. In effect, most people blindly and unquestioningly accept this status quo and fail to pay close attention to other cultures, especially "periphery cultural realities" (Holliday, 2011, p. 12).

I argue that discrimination and prejudice arise from ignorance. Given this situation, the Top Global University Project initiative and the institutions that favor it should pay more attention to a cosmopolitan pedagogy so that Japanese students can communicate with foreign students as global citizens as opposed to only emphasizing English language competencies. Specifically, we as educators should encourage students to address human rights issues and facilitate the development of a concern for social justice in our communities first and then at national and global levels. For this purpose, the notion of cosmopolitanism should be taught as the object of classes. Then we should create a learning experience in which students can discuss human rights issues at local and global levels while engaging in critical self-reflection. Such a cosmopolitan pedagogy may help Japanese students develop an openness to cultural differences and grow to be global citizens in a real sense.

Finally, my participants' narratives indicate that Norton's (2013) argument that where there are unequal power relations between language learners and target-language speakers language learners' commitment to learning the target language is discouraged turns out not to be consistent with the findings of this research. This study found that even if they experience unequal power relations between themselves and Japanese people, my participants still invest in the Japanese language with a sense of superiority about their English competence compared to that of many Japanese students and with the understanding that the Japanese language will add value to them, or what is termed "cultural capital" by Bourdieu and Passeron (1977), rather than solely aspiring to Japanese technology, a dimension that needs exploring in future studies.

Statements of ethics and conflict of interest

"I, as the Corresponding Author, declare and undertake that in the study titled as *"The Formation of Subjectivity in Asian Students in Japanese Higher Education"*, scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation."

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Research Article

Analysis of Unit Evaluation Questions in the 4th and 5th Grade Social Studies Books[1,2]

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Abstract

In today's information society, the importance of measurement evaluation, which is one of the indispensable elements of education, is increasing. Because the social studies course is a course for acquiring knowledge, skills, attitudes and values about society and life, the types of questions to be used while preparing the textbooks should be selected in accordance with the characteristic of the behaviour to be measured. In this study, it was determined whether there was a quality and quantity difference between the unit end evaluation questions of the textbooks of the 4th and 5th grade prepared according to the old (2005) and the new (2017). In addition, proposals have been made regarding the positive and negative aspects of the change. This research was conducted through a document review which is one of the qualitative research methods. As a result; only the traditional measurement and evaluation methods were included in the 4th and 5th grade social studies textbook unit final assessment, 2005 and 2017 social studies curriculum. The maximum number of mistakes in short answer and paired questions was determined in the 2017 curriculum., and the maximum number of errors in the correct answer and multiple choice tests was determined in the 2005 curriculum.

Keywords: *4th and 5th class, social studies books, unit assessment, analysis of bloom taxonomy questions*

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4. ve 5. Sınıf Sosyal Bilgiler Kitaplarında Yer Alan Ünite Değerlendirme Sorularının Analizi

Öz

Öğretimin vazgeçilmez unsurlarından biri olan ölçme-değerlendirmenin önemi giderek artmaktadır. Sosyal bilgiler dersi toplumsal yaşamla ilgili bilgi, beceri, değer ve tutum kazandırmaya yönelik bir ders olması hasebiyle ders kitapları hazırlanırken kullanılacak soru türlerinin, ölçülecek davranışın özelliğine uygun olarak seçilmesi gerektiği söylenebilir. Bu araştırmada, eski (2005) ve yeni (2017) programa göre hazırlanmış 4. ve 5 sınıfta ders kitaplarının ünite sonu değerlendirme soruları arasında nitelik ve nicelik yönünden bir farklılık olup olmadığına bakılıp yapılan değişikliğin olumlu ve olumsuz yönlerine ilişkin önerilerde bulunulmuştur. Bu araştırma, nitel araştırma yöntemlerinden doküman incelemesi ile gerçekleştirilmiştir. Sonuç olarak; 2005 ve 2017 Sosyal Bilgiler programı 4. ve 5.sınıf sosyal bilgiler ders kitapları ünite sonu değerlendirme sorularında sadece geleneksel ölçme-değerlendirme yöntemlerine yer verilmiştir. En fazla hata 2005 programında çoktan seçmeli testlerde tespit edilmiştir. Kısa cevaplı ve eşleştirmeli sorularda en fazla hata 2017 programında tespit edilmişken doğru-yanlış ve çoktan seçmeli testlerde ise en fazla hata 2005 programında tespit edilmiştir.

Anahtar Sözcükler: *4. ve 5. sınıf sosyal bilgiler kitapları, ünite değerlendirme, bloom taksonomisi sorularının analizi*

Introduction

One of the main purposes in realizing education is the transfer of knowledge, skills and values in the curriculum at the desired level. In line with this purpose, learning environments and materials should be selected in accordance with the target; teaching methods and techniques that make students active should be used; the learning-teaching process and the measurement-evaluation practices should be compatible with and supportive of each other while checking students' development by monitoring their skills and achievements (Ministry of National Education [MNE], 2017:10).

Measurement denotes describing, and in a broader sense, determining the properties of a particular object or objects and expressing the results with numbers or symbols (Kan, 2011:3; Tan, 2009:32). Evaluation is comparing the measurement results with a particular criterion and reaching a standard of judgment according to that criterion (Tüysüz, 2014:12). It is necessary to make measurement before making evaluation.

A teacher primarily determines a number of markers, which are the desired qualities that students are generally expected to have, that can be considered as an indicator of the success level of students in the course. These desirable characteristics are expressed as goals and behaviours in the 1999 curriculum and as "achievements" in the 2005 and 2017 curriculum. Then, he/she selects and applies measurement-evaluation techniques appropriate to the structure of the outcomes in order to determine the level of his students' achievements within the scope of social studies course.

The importance of measurement-evaluation, which is one of the indispensable elements of teaching, is gradually increasing and in order to prepare and implement an education-training curriculum according to the requirements of the era, and to achieve the success of the curriculum prepared and applied, measurement and evaluation should be done in a more planned and systematic way (Algan, 2008: 15).

In the curriculum "*an understanding of measurement and evaluation aimed at providing continuous feedback in order to monitor and guide students in the process, to identify and eliminate learning difficulties, and to support students' meaningful and permanent learning"*

has been adopted. Monitoring the development of students and guiding them according to this development in order to make sense of the numerical values obtained as a result of this assessment and evaluation is among the principles that are considered important in the curricula. In the education process, measurement-evaluation activities can be carried out in three different ways: "recognition, monitoring and result-oriented" (Ministry of National Education [MNE]:10-11):

- ***With the recognition evaluation,*** the levels of students' higher-order thinking skills, their pre-learning in terms of acquisitions and values are determined. In this evaluation tools like observation and interview forms, readiness and ability tests, etc. can be used.
- ***Monitoring-based evaluation*** is process-oriented and its main purpose is to improve education from the beginning to the end of the semester, to reveal students' interests and abilities, and to identify learning deficiencies, rather than grading students. In this evaluation, open-ended questions, diagnostic branched tree (DBT), structured grid, conceptual association (CA), application activities, monitoring/ unit tests, self, peer and group evaluation, projects, rubric observation forms, etc. can be used.
- ***Result-oriented evaluation*** is the evaluation in which the level of learning is determined at the end of the learning-teaching process and the success levels of the students are determined. In this evaluation, tools like practice exams, final exams, observation and interview forms, projects, etc. can be used.

Although there are many classification systems developed to determine the cognitive levels of the questions asked to measure the cognitive achievement of students, the most accepted of these classifications in the literature is the cognitive development level classification developed by Bloom and known as Bloom's Taxonomy (Atılgan, Kan & Doğan, 2011:82). Yanpar (2007: 114) states that the questions in a textbook should be various, and comprehension, application, analysis, synthesis and evaluation questions should also be included in the textbook in addition to the questions measuring the level of knowledge. In order for educational activities to reach the determined goals, students are expected to be able to recognize, comprehend, apply, analyse, synthesize and evaluate the knowledge.

Textbooks are the most important pillar of the bridge between the curriculum and the student, and they are one of the basic elements of the education curriculum. They are the basic materials

that enable the teacher to use his power effectively, to give what he wants to teach in a more planned and systematic way, and to the student to repeat what the teacher says at any time and place, regardless of time and place. (Şenses, 2008:17). The change in the curriculum naturally has affected the textbooks and this made it necessary to change the structure and content of the textbooks. The first and basic resources for teachers to carry out the education and training process are textbooks. Textbooks are the concretization of the curriculum, giving the curriculum in a concrete form. It is not possible to have a course without a textbook. In other words, the textbook is a real helper for an effective and efficient lesson (Oruç, 2009:269).

Since Social Studies course is a lesson aimed at gaining knowledge, skills, values and attitudes about social life, it can be said that the types of questions to be used while preparing textbooks should be selected in accordance with the characteristics of the behavior to be measured. For example, discussion questions, problems, open-ended, short answer or test type questions can be used. However, it may not be possible to see whether or not the students have reached the goals given in the curricula with tests or questions that only measure knowledge. (Duman, Karakaya, Çakmak, Erayi & Özkan, 2001). When the newly prepared Social Studies curriculum is compared with the previous curricula, it is seen that a structural change has occurred. This situation also affected the understanding in the preparation of the textbooks, so there have been great changes in the end-of-unit evaluations of the textbooks.

When the literature is examined, it has been found that the measurement and evaluation techniques used in the lessons are determined according to the opinions of the teachers (Algan, 2008; Demirezen, 2005; Günay, 2006; Turan, 2010; Yıldırım, 2006) and the examination of the textbooks (Turgut, 2011). However, among these studies, the study, which included the examination of Social Studies books (Turgut, 2011), was conducted in 5 classes, including unit preparation questions, in-text questions, topic preparation questions, subject evaluation questions, and unit evaluation questions in secondary school social studies 6th and 7th grade textbooks handled as a kind of question category and it is not handled in terms of question types and Bloom's Taxonomy and only covers the 2005 curriculum. In addition, there haven't been found any other studies that examine the 2005 and 2017 textbooks together. 2005 Social Studies curriculum is the curriculum implemented until 2017, and as of 2017, the new Social Studies curriculum will be implemented gradually (first in 4th and 5th grades and next year in 6th and 7th grades). For that reason, in the research, since the new curriculum will be

implemented only in 4th and 5th grades in the 2017-2018 academic year, in order to determine and compare the changes and innovations in the new curriculum, the textbooks in 4th and 5th grade prepared according to the old (2005) and new (2017) curriculum, it will be checked whether there is a difference in terms of quality and quantity between the end-of-unit evaluation questions and suggestions will be made by looking at the positive and negative aspects of the change made. For this purpose, answers to the following questions were sought. In the Social Studies 4th and 5th grade Social Studies textbooks of 2005 and 2017;

1. What types of questions are included in what quantity in which learning domain?
2. What types of questions are included in what frequency?
3. What are the errors made in question types?
4. Which level of Bloom's Taxonomy is included in what quantity in which learning domain?
5. What is the distribution of question types used according to Bloom's Taxonomy?

Method

Design

This research was carried out by document analysis, one of the qualitative research methods that includes the analysis of written materials containing information about the phenomenon or phenomena aimed to be researched (Yıldırım & Şimşek, 2016:189).

Population and Sample

According to Yıldırım and Şimşek (2016; 197) in research based on document review, "*It may not be possible for all document data to be analyzed as a whole. For this reason, researchers often try to create a sample from the available data set."* And in this study, Social Studies textbooks in the 4th and 5th grade prepared according to the 2005 and 2017 curriculum using the easily accessible situation sampling method (Evirgen, Özdural, Özkan & Öztürk, 2017; Evirgen, Özkan, Öztürk & Özdural, 2017; Özensoy & Aynacı, 2016; Şahin, Bayram & Midilli, 2016) have been chosen for review.

In the study;

- In the 4th grade, Koza Publishing House's book with the decision of the Board of Education and Discipline of the Ministry of Education dated 25.05.2015 and numbered 34 (in the 76th row of the attached list),
- In the 4th grade, the Ministry of National Education (MNE Publishing House) State books, with the letter of the Education and Discipline Board of the Ministry of National Education on 14.06.2017 and numbered 8982336,
- In the 5th grade, with the decision of the Board of Education and Discipline of the Ministry of National Education, Berkay Publishing House's book, dated 25.05.2015 and numbered 34 (75th in the attached list),
- In the 5th grade, Ministry of National Education (MNE Publishing House) State books, with the letter of the Education and Discipline Board of the Ministry of National Education, dated 14.06.2017 and numbered 8982336, Social Studies textbooks were used in the accepted primary education 4th and 5th grade.

The ethical committee permission is not required in this study since the data were gathered before 2020 and through document analysis.

Data Collection and Analysis

In order to collect the data, the "measurement and evaluation methods" scale developed and used in the thesis study conducted by Kıbrız (2015) was used. This scale is grouped under 3 main headings as traditional, alternative measurement-evaluation methods and measurement forms. In this context, the research was conducted on the Social Studies textbooks in the 4th and 5th grades of primary education, based on the end-of-unit evaluation questions. Findings consist of the data contained in this book.

One of the types of content analysis inductive analysis, within the scope of the research, was used in analysing the data obtained. For reliability, the researchers made separate encodings on the books, and the consistency rate was calculated by comparing the codes.

The numbers of consensus and disagreement were determined in all comparisons on the codings made by both researchers, and the (internal) reliability of the study was calculated using Miles and Huberman's formula (as; Reliability = Consensus / Consensus +

Disagreement). In the study, using this formula, the percentage of agreement in coding is calculated as: 0.92 for the 2005 curriculum for the 4th grade; 0.91 for the 5th grade; 0.93 for the 4th grade in 2017 curriculum and 0.89 for the 5th grade. According to Miles and Huberman (1994: 64), "If the harmony between expert and researcher evaluations approaches 90% or exceeds 90%, a desired level of reliability is achieved."

Results

In this section, the data gathered within the scope of the research are presented in table. Which questions were included in support of the data, which step of these questions list in Bloom's Taxonomy and what kind of mistakes were made in these questions are presented.

Table 1

Types of unit final assessment questions in the 4th and 5th grade Social Sciences Textbooks

Learning Domains	Question Types	Curriculum Year			
		2005		2017	
		Grade			
		4	5	4	5
Individual and Society	Written Exam (Open Ended Questions)	-	4	6	4
	Short Answers (Sentence Completion)	6	5	4	6
	Multiple Choice Tests	7	6	4	6
	True-False Questions	5	1	5	8
	Matching Questions	-	-	1	1
	Total	18	16	20	25
Culture and Heritage	Written Exam (Open Ended Questions)	-	6	5	5
	Short Answers (Sentence Completion)	6	5	9	7
	Multiple Choice Tests	7	6	6	6
	True-False Questions	8	1	11	9
	Matching Questions	-	-	1	1
	Total	21	18	32	28
Humans, Places and Environments	Written Exam (Open Ended Questions)	-	6	3	4
	Short Answers (Sentence Completion)	7	5	5	7
	Multiple Choice Tests	9	5	10	7
	True-False Questions	8	1	8	5
	Matching Questions	-	-	-	-
	Total	24	17	26	23

Science, Technology and Society	Written Exam (Open Ended Questions)	-	5	5	7
	Short Answers (Sentence Completion)	6	6	4	8
	Multiple Choice Tests	4	6	4	4
	True-False Questions	5	1	5	8
	Matching Questions	-	-	2	1
	Concept Puzzle	1	-	-	-
	Total	16	18	20	28
Production, Distribution and Consumption	Written Exam (Open Ended Questions)	1	5	5	2
	Short Answers (Sentence Completion)	3	5	5	6
	Multiple Choice Tests	7	5	7	6
	True-False Questions	-	1	5	8
	Matching Questions	-	-	2	-
	Total	11	16	24	22
Active Citizenship *	Written Exam (Open Ended Questions)	2	10	5	4
	Short Answers (Sentence Completion)	3	10	4	9
	Multiple Choice Tests	12	10	7	6
	True-False Questions	11	2	4	10
	Matching Questions	1	-	2	1
	Total	29	32	22	30
Global Linkages	Written Exam (Open Ended Questions)	-	5	5	2
	Short Answers (Sentence Completion)	2	5	7	5
	Multiple Choice Tests	5	5	6	6
	True-False Questions	4	1	10	8
	Matching Questions	-	-	2	-
	Total	11	16	30	21

*In the 2005 curriculum, Groups, Institutions and Social Organizations, were combined and re-created as an Active Citizenship learning field in the 2017 curriculum with Power, Management and Society learning fields.

When Table 1 is examined, the most questions are included in the learning field of Culture and Heritage (60) in the 2017 curriculum, while least in the 2005 curriculum in the Global Links with Production, Distribution and Consumption (27).

In terms of units;

In the field of Individual and Society learning, in the 2017 curriculum, 25 questions were included in the 5th grade, while 21 questions were included in the 4th grade. In the 2005 curriculum, 16 questions were included in the 5th grade, while 18 questions were included in

the 4th grade. In the 2005 curriculum, both written probe and matching questions were not included in the 4th grade while in the 5th grade no matching questions were included. All question types were included in the 2017 curriculum, with the highest number of true-false (8) and least with matching (1) question types.

In the field of learning culture and heritage, 28 questions were included in the 5th grade in the 2017 curriculum, while 32 questions were included in the 4th grade. In the 2005 curriculum, 18 questions were included in the 5th grade, while 21 questions were included in the 4th grade. In the 2005 curriculum, both written probe and matching questions were not included in the 4th grade and in the 5th grade no matching questions were included. In the 2017 curriculum, all question types were included, the highest number with true-false (11) and least with matching (1) question types.

In the field of People, Places and Environments, there are 23 questions in the 5th grade 2017 curriculum, and 26 questions in the 4th grade. In the 2005 curriculum, there are 17 questions in the 5th grade, while 24 questions in the 4th grade. In the 2005 curriculum, both written probe and matching questions were not included in the 4th grade; while matching questions were not included in the 5th grade. In the 2017 curriculum, only the matching question types were not included, however most used question types were multiple choice (11) and the least written examination (3).

In the 2017 curriculum, in the learning field of Science, Technology and Society, there are 28 questions in the 5th grade, while 20 questions in the 4th grade. In the 2005 curriculum, 18 questions were included in the 5th grade, while 16 questions were included in the 4th grade. In the 2005 curriculum, both true-false and matching questions were not included in the 4th grade; whereas matching questions were not included in the 5th grade. In the 2017 curriculum, only the matching question type was not included in the 5th grade, but mostly short answer and true-false (8) and least matching (2) question type were given.

While 22 questions were included in the 5th grade in the 2017 curriculum in the field of Production, Distribution and Consumption learning, 24 questions were included in the 4th grade. In the 2005 curriculum, 16 questions were included in the 5th grade, while 11 questions were included in the 4th grade. In the 2005 curriculum, both written probe and matching

questions were not included in the 4th grade while matching questions were not included in the 5th grade. In the 2017 curriculum, only in the 5th grade matching question type was not included, but the most used question types were true-false (8) and the least matching and written probe (2). In addition, a concept puzzle was included in the 4th grade in the 2005 curriculum.

In the learning field of Active Citizenship, in the 2017 curriculum of 5th grade there were 30 questions, while 22 questions in the 4th grade. Since the groups, institutions and social organizations combined with the fields of power, management and community learning in the 2005 curriculum, the number of questions were given together. While there were 32 questions in the 5th grade, there were 29 questions were in the 4th grade. Matching questions were not included only in the 2005 curriculum of the 5th grade. In the 2017 curriculum, all question types were included, with the most true-false (10) and least matching (1) question types.

In the Global Connections learning field, in the 2017 curriculum, 21 questions were included in the 5th grade, while 30 questions were included in the 4th grade. In the 2005 curriculum, 16 questions were included in the 5th grade, while 11 questions were included in the 4th grade. In 2005 curriculum, there were neither written probe nor matching questions in 4th grade while no matching questions in the 5th grade. In the 2017 curriculum, only in the 5th grade there were no matching questions included, but the most used question types were true-false (10) and the least matching and written probe (2).

Table 2

Types of Unit Final assessment Questions in Social Studies Textbooks of 4th and 5th Grade

MNE Publishing House	Curriculum Year			
	2005		2017	
	Grade			
	4	5	4	5
Written Probe (open ended questions)	3	42	34	28
Short Answers (Sentence Completion)	33	41	38	48
Multiple Choice Tests	51	42	44	41
True-false Questions	41	8	48	56
Matching Questions	1	-	10	4
Concept Puzzle	1	-	-	-
Total	130	133	174	177

When we look at Table 2, 351 questions were included in the 2017 curriculum the most, while 177 questions were included in the 5th grade the most in the 2017 curriculum at the grade level

whereas least with 130 questions in the 4th grade in the 2005 curriculum. While the matching question, one of the traditional measurements and evaluation methods, was not included only in the 5th grade in the 2005 curriculum, the concept puzzle, one of the alternative measurement and evaluation methods, was included only once in the 4th grade in the 2005 curriculum.

When we look at *the written probe questions*, they were used most in the 2005 curriculum with 42 questions in the 5th grade, and least with 3 questions in the 4th grade in the 2005 curriculum. In the 2017 curriculum, written probe questions were included in the 4th grade with 34 questions and in the 5th grade with 28 questions. *Short-answer questions* were used most in the 2017 curriculum with 48 questions in the 5th grade, and least in the 2005 curriculum with 33 questions in the 4th grade. *Multiple-choice questions* were used in the 4th grade with 51 questions the most in the 2005 curriculum and the least with 41 questions in the 5th grade in the 2017 curriculum. While *true-false questions* were included with 56 questions in the 5th grade the most in the 2017 curriculum, the least with 8 questions in the 2005 curriculum in the 5th grade. *Matching questions* were found with 10 questions in the 4th grade the most in the 2017 curriculum, and no questions in the 5th grade in the 2005 curriculum.

Table 3

Errors in Unit Final Assessment Questions in Social Studies Textbooks of 4th and 5th Grade According to their Types

Question Types	Curriculum Year			
	2005		2017	
	Grade			
	4	5	4	5
Written Probe (open ended questions)	-	1	-	-
Short Answers (Sentence Completion)	8	16	27	17
Multiple Choice Tests	21	31	26	15
True-false Questions	41	8	-	-
Matching Questions	-	-	21	5
Total	36	56	74	37

Table 3 includes the number of error types in measurement and evaluation questions, and Figure 1 gives examples of the cases in which these errors are given in the books according to their types.

In the written exam questions, only one error was found in the 2005 curriculum in the 5th grade. This mistake is to give the question containing the same answer one after the other (1) for example, "What is your place in the groups and institutions you are in?" and in question 2 "What are the groups you are in and your roles in these groups?" (p.29).

Errors were encountered in the ***short-answer questions*** in the 4th and 5th grades of both curricula. The least errors were encountered in the 4th grade (8) in the 2005 curriculum, and the most errors were found in the 4th grade (27) in the 2017 curriculum. These mistakes include fewer distractors (20), questions not being homogeneous (23), unequal gaps (15), lack of punctuation marks (1), for example, "*……. fulfils the responsibility we assume in the group we are a member of. 5th grade (2017) p.32*" and a comma (,) should come after the word responsibility that will come to the place where there is a space; Giving clues in questions (7) for example *"……., which is the beverage we drink the most along with coffee, consumed every hour of the day. 5th grade (2017) p.62*" and the word coffee in the content indicates the answer to tea in the options, and the missing item root (2) for example "*To design a new technological product that was previously unknown using the known information ……. or ……..."4th grade (2017) p.106*" and the verb of the sentence is missing.

Errors were encountered in the ***multiple choice questions*** in the 4th and 5th grades of both curricula. The highest number of errors were encountered in the 5th grade (31) in the 2005 curriculum and the least in the 5th grade (15) in the 2017 curriculum. These errors are like: the options are not in alphabetical order (67), the negative question roots are not specified (6) and the formal meaning, that is, the header and the question root are not written differently (9), the repetitive words are given in the option (4), the most correct statement is not clarified (7) . (see Figure 1)

(2017 / 4th Grade, p.83) Alphabetical

5. Bazı doğal afetlerin oluşumunda hava olayları ve insanların yaptığı hataların da etkisi vardır. Aşağıdaki afetlerin hangisinde bu etkilerden söz edilemez?

A) Sel
B) Deprem
C) Heyelan
D) Çığ

(2017 /5th Grade, p.189) Negative Structured Question

6) **Aşağıdakilerden hangisi insanlığın ortak mirası için söylendiğinde yanlış olur?**

A. İnsanlığın ortak mirası çok uzun zamanda oluşur.

B. İnsanlığın ortak mirasında sadece bir ulusun payı vardır.

C. İnsanlığın ortak mirası korunmalıdır.

D. İnsanlığın ortak mirası gelecek kuşaklara aktarılmalıdır.

(2017/ 4th Grade, p.161) Formal Error

4. '23 Nisan 1920'de Türkiye Büyük Millet Meclisi'nin açılması ile aşağıdakilerden hangileri gerçekleşmiştir?

I. Egemenlik halka geçmiştir.
II. Bağımsızlık savaşını kazanamamış birçok ülke için örnek olunmuştur.
III. Kurtuluş Savaşı ile ilgili kararlar mecliste alınmıştır.
IV. Cumhuriyet ilan edilmiştir.

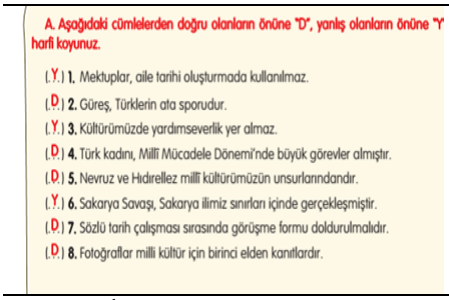
A) Yalnız I
B) I ve II
C) I, II ve III
D) Hepsi

(2017/ 4th Grade, p.161) Repeating Word

2. "Gülay hastalığından dolayı okula devam edemiyor. Evlerine gelen öğretmen derslerinde yardımcı oluyor." Gülay'ın bu durumunda, hangi hakkının devlet tarafından sağlandığı söylenebilir?

A) Sağlık hizmetlerine erişim hakkı
B) İfade özgürlüğü hakkı
C) Eğitime erişim hakkı
D) Yaşama ve gelişme hakkı

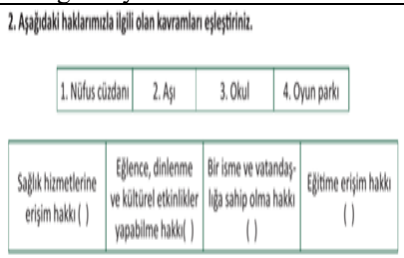
(2005 /4th Grade, p.56) No Correction



A. Aşağıdaki cümlelerden doğru olanların önüne "D", yanlış olanların önüne "Y" harfi koyunuz.

(Y) 1. Mektuplar, aile tarihi oluşturmada kullanılmaz.
(D) 2. Güreş, Türklerin ata sporudur.
(Y) 3. Kültürümüzde yardımseverlik yer almaz.
(D) 4. Türk kadını, Millî Mücadele Dönemi'nde büyük görevler almıştır.
(D) 5. Nevruz ve Hıdrellez millî kültürümüzün unsurlarındandır.
(Y) 6. Sakarya Savaşı, Sakarya ilimiz sınırları içinde gerçekleşmiştir.
(D) 7. Sözlü tarih çalışması sırasında görüşme formu doldurulmalıdır.
(D) 8. Fotoğraflar millî kültür için birinci elden kanıtlardır.

(2017/4th Grade, p.160) No Homogeneity and Formal Error



2. Aşağıdaki haklarımızla ilgili olan kavramları eşleştiriniz.

1. Nüfus cüzdanı	2. Aşı	3. Okul	4. Oyun parkı

Sağlık hizmetlerine erişim hakkı ( )	Eğlence, dinlenme ve kültürel etkinlikler yapabilme hakkı( )	Bir isme ve vatandaşlığa sahip olma hakkı ( )	Eğitime erişim hakkı ( )

(2017 /5th Grade, p.115) Unequal Gaps

B) Boşlukları Dolduralım

Aşağıdaki cümlelerde boş bırakılan yerlere, verilen kavramlardan uygun olanı yazınız.

1) Buluşların sonuçları olarak ..... yaşanır.
2) ..... alanındaki teknolojik gelişmeler insan hayatını çok kolaylaştırdı.
3) Buluşların temelinde ..... ve ..... vardır.
4) Teknolojik gelişmeler ..... ile yakından ilişkilidir.
5) ..... insanlarının ortak özelliklerinden biri de yaratıcılıktır.
6) ....., 7-12 yaş grubu için yayımlanan bilim dergisidir.

bilim
Bilim Teknik
teknolojik gelişme
buluş
iletişim
hayal gücü
merak
Bilim Çocuk

(2017/ 4th Grade, p.29) Giving Clue

sorumluluk	Ankara	23 Aralık 1994	eğitsel ve sosyal	bağımsızlık

1. Çocuk Hakları Sözleşmesi 2 Eylül 1990'da yürürlüğe girmiştir. Türkiye'de sözleşmeyi ..... onaylayarak yasalarını da sözleşmeye göre uyarlamaya söz verdi.
2. .....kişinin kendi ve başkalarına karşı yerine getirmesi gereken görevlerini zamanında, tam olarak yerine getirmesidir.
3. TBMM 23 Nisan 1920'de ..... açılmıştır.
4. Okulumuzda düzenlenen anma ve kutlama programları ..... etkinliklerimizdendir.

Figure 1. Examples of question errors

While no errors were encountered in the 2017 curriculum for ***true-false questions***, errors were encountered at both grade levels in the 2005 curriculum. The most errors were encountered in the 4th grade (41) in the 2005 curriculum. These errors are in the form of requesting only the correct or incorrectness of the statements given and not making any corrections. This situation increases the chance success to 50%.

Matching questions were encountered only in the 4th grade (21) and the least in the 5th grade (5) in the 2017 curriculum. These errors are as: formal errors (12), few options (10), and non-homogenous questions (4). When Table 4 is examined, according to the Bloom's Taxonomy, the most questions were included in the knowledge level in the field of People, Places and Environments in the 2005 curriculum (20) and in the knowledge level in the Global Connections learning field in the 2017 curriculum (27).

Table 4

Levels of Unit Final assessment Questions in the 4th and 5th Grade Social Sciences Textbooks According to Bloom's Taxonomy

Learning Domains	Levels of Bloom's Taxonomy	Curriculum Year			
		2005		2017	
		Grade			
		4	5	4	5
Individual and Society	Knowledge	12	8	10	14
	Comprehension	3	7	4	7
	Application	-	-	1	-
	Analysis	3	-	4	2
	Evaluation	-	-	-	-
	Synthesis	-	1	1	2
	Total	18	16	20	25
Culture and Heritage	Knowledge	16	8	21	17
	Comprehension	3	4	8	7
	Application	-	-	-	-
	Analysis	2	4	1	3
	Evaluation	-	-	-	-
	Synthesis	-	2	2	1
	Total	21	18	32	28
Humans, Places, and Environments	Knowledge	20	6	18	15
	Comprehension	3	6	5	2
	Application	-	-	-	-
	Analysis	1	3	3	5
	Evaluation	-	-	-	-
	Synthesis	-	2	-	1
	Total	24	17	26	23
Science, Technology, and Society	Knowledge	11	7	11	17

	Comprehension	4	8	6	8
	Application	1	-	-	-
	Analysis	-	2	3	1
	Evaluation	-	1	-	-
	Synthesis	-	-	-	2
	Total	16	18	20	28
Production, Distribution, and Consumption	Knowledge	4	6	14	15
	Comprehension	4	3	9	3
	Application	-	-	-	-
	Analysis	2	5	1	3
	Evaluation	1	-	-	-
	Synthesis	-	2	-	1
	Total	11	16	24	22
Active Citizenship	Knowledge	16	15	12	20
	Comprehension	8	9	8	7
	Application	-	-	-	-
	Analysis	3	5	2	1
	Evaluation	1	-	-	-
	Synthesis	1	3	-	2
	Total	29	32	22	30
Global Linkages	Knowledge	8	6	23	13
	Comprehension	2	3	2	2
	Application	-	-	-	-
	Analysis	1	3	3	4
	Evaluation	-	-	-	-
	Synthesis	-	4	2	2
	Total	11	16	30	21

When Table 4 is examined, according to the Bloom's Taxonomy, the most questions were given in the knowledge level in the field of People, Places and Environments in the 2005 curriculum (20) and in the knowledge level in the Global Connections learning field in the 2017 curriculum (27).

In terms of learning fields;
In the learning field of Individual and Society, questions were not included in the assessment in the 2017 curriculum, and in the application and evaluation stages in the 2005 curriculum. The levels of knowledge and comprehension are included in both curriculum and grade levels. The most questions were given in the knowledge level (14) at the 5th grade level of the 2017 curriculum.

In the learning field of culture and heritage, no questions were given in the application and evaluation stages of the 2017 and 2005 curriculum. At both curriculum and grade levels

questions were given in the levels of knowledge, comprehension and analysis. The most question was given in the knowledge level (21) at the 4th grade level of the 2017 curriculum.

In the field of people, places and environments learning, in the 2017 and 2005 curriculum, there were no questions in the application and evaluation stages. Questions were included in the levels of knowledge, comprehension and analysis at both curriculum and grade levels. Most questions were included in the knowledge level (21) at the 4th grade level of the 2017 curriculum.

In the learning field of science, technology and society, questions were included at every level in the 2017 and 2005 curriculum. Questions were included in the levels of knowledge and comprehension at both curriculum and grades. Most questions were included in the knowledge level (17) at the 5th grade level of the 2017 curriculum.

Only in the implementation stage were there no questions in the 2017 and 2005 curriculum in the learning field of production, distribution and consumption. Questions were included in the levels of knowledge, comprehension and analysis at both curriculum and grades. Most questions were included in the knowledge level (15) at the 5th grade level of the 2017 curriculum.

Only in the implementation stage were there no questions in the learning field of active citizenship, in the 2017 and 2005 curriculum. Questions were included in the stages of knowledge, comprehension and analysis at both curriculum and grade levels. Most questions were given in the knowledge level (20) at the 5th grade level of the 2017 curriculum.

In the global links learning field, in the 2017 and 2005 curriculum, questions were not included in the application and evaluation stages. Questions were included in the stages of knowledge, comprehension and analysis at both curriculum and grade levels. Most questions were included in the knowledge level (23) at the 4th grade level of the 2017 curriculum.

Table 5

Levels of Unit Final assessment Questions in Social Studies Textbooks of 4th and 5th Grades According to Bloom's Taxonomy

Bloom's Taxonomy Question Levels	Curriculum Year			
	2005		2017	
	Grade			
	4	5	4	5
Knowledge	87	56	109	111
Comprehension	27	40	42	36
Application	1	-	1	-
Analysis	12	22	17	19
Evaluation	2	1	-	-
Synthesis	1	14	5	11
Total	130	133	174	177

In Table 5, when the textbooks prepared according to the 2005 and 2017 curricula are examined, according to the Bloom's Taxonomy, the most questions are in the knowledge level (363) and the least in the application level (2). There were questions in the comprehension level (145), the analysis level (70), the synthesis level (31) and the evaluation level (1).

In the ***knowledge level***, the most questions were in the 5th grade (111) in the 2017 curriculum, and the least questions were included in the 5th grade (56) in the 2005 curriculum. In the ***comprehension level***, the most questions were included in the 4th grade (42) in the 2017 curriculum and the least questions were in the 4th grade (27) in the 2005 curriculum. In the ***application level***, 1 question was given in the 4th grade of both curricula. In the ***analysis level***, the most questions were in the 5th grade (22) in the 2005 curriculum, and the least in the 4th grade (12) of the same curriculum. In the ***synthesis level***, the most questions were in the 5th grade (14) in the 2005 curriculum, and the least questions were included in the 4th grade (1) in the 2005 curriculum. ***Evaluation level*** was included only in the 2005 curriculum of the 4th grade (2) and 5th grade (1).

Conclusion, Discussion and Suggestions

Some of the studies in the literature (Algan, 2008; Demirezen, 2005; Günay, 2006; Turan, 2010; Turgut, 2011; Yıldırım, 2006) cover 6th and 7th grade books, some of them are not

handled in terms of question types and Bloom's Taxonomy, and since it only covers the 2005 curriculum, it does not contribute to the discussion part of the study.

Not only was it stated that an assessment-evaluation approach was adopted to provide continuous feedback in curricula in order to guide students through the process, to identify and eliminate learning difficulties, and to support students' meaningful and permanent learning (MNE, 2017: 9); in 2005 and 2017 Social Studies curriculum 4th and 5th grade social studies textbooks, only traditional measurement-evaluation methods were added in the unit-end evaluation questions, and only in the 2005 curriculum of 4th grade Science Technology and Society in learning field the concept puzzle from alternative measurement and evaluation methods was used.

Compared to the 2005 curriculum, there is a 50% increase in the number of questions in the 2017 curriculum. The highest increase was in the written probe questions in the 4th grade and in the true-false questions in the 5th grade in the 2017 curriculum. In addition, while the matching question was included only once in the 2005 curriculum, there was a significant increase in the 2017 curriculum and 14 questions were included. While multiple choice questions were mostly included in the 2005 curriculum, true-false questions were mostly included in the 2017 curriculum. Except for the multiple-choice test, there was an increase in all measurement and evaluation methods in the book in the 2017 curriculum compared to the 2005 curriculum, and there was a 10% decrease in the number of multiple-choice questions.

Some errors have been detected both in the 2005 and 2017 curriculum. These errors differ according to the characteristics of the question types. In parallel with the increase in the number of questions in the 2017 curriculum, the number of errors is also higher in the 2017 curriculum. The most errors were detected in the multiple-choice tests in the 2005 curriculum. Considering the errors in the MNE Publishing House in the study conducted by Kıbrız (2015), it was concluded that "the number of erroneous questions in the traditional measurement and evaluation method multiple choice tests is more often" supports the study. While the highest number of errors in short-answer and matching questions were detected in the 2017 curriculum, the highest number of errors in true-false and multiple-choice tests were detected in the 2005 curriculum.

In the books, short-answer questions in the sentence completion type are included, and these questions have few distractors, the questions are not homogeneous, the blanks are not equal, and the errors are given in the questions. In the questions, the clue is the word in the question, the word that will come to the end of the word that will come to the blank, and are suffixes such as "dır, dı" (is, are, was, were). With these clues, the student can easily identify the distractors by examining the harmony of the word and the suffix in the sentence. Including distractors up to 50% more than the number of blanks in such questions will reduce the chance of success of the student. In addition, the blanks reserved for the word to be typed must be long enough to fit the longest word or phrase in the distractors. In this case, there is a possibility that every distractor may suit to every blank. The homogeneity of the questions means that the date, number, name, place or similar concepts (rainfall patterns, landforms, etc.) appear in the blanks in all questions. If the questions are not homogeneous, the distractors will also be mixed, so some questions will be answered directly.

In the study, it was found that the options were not in alphabetical order ***in multiple choice tests***. In multiple choice tests, giving dates and numbers in order of magnitude and names in alphabetical order helps the student to save time. In order to provide ease of reading and perception, if words are to be used as options, the options should be listed in alphabetical order, if numerical options are to be used, the options should be listed in order of size. Errors were encountered *not specifying the roots of negative questions and not clarifying the most correct statement*. If a negative root is written, it should be written in bold and the concept indicating negativity should be underlined. Likewise, if the most correct answer is at the root of the item, this part should be underlined and written in bold. In addition, *the error of giving repetitive words in the option* was also encountered. Repeating words should not be used in the options of an item, instead, repeating words in the options should be taken to the item root.

In ***true-false questions***, the expressions are in the form of asking only the correct or incorrectness, and not making any correction increases the chance of success to 50%. Since there is a 50 percent chance of answering the question correctly, a correction formula must be applied and each wrong question must delete a correct answer. Or, to ensure scoring reliability, the wrong part of the sentence that is wrong is asked from the students to be underlined and the correct is written instead. In this way, even if the student answers the question correctly with luck, as he cannot write the correct one, he does not get any points.

There are formal errors, few options and inhomogeneity of questions in ***matching questions***. There should be a clear guideline on how to match test questions. Including options up to 50% more than the number of premise (item root) in such questions will reduce the student's chance of success. Homogeneity of the questions means that the item roots (premises) and the content of all options are the same. In case the questions are not homogeneous, the answers will be given directly in some questions because the options will be mixed.

Bloom's Taxonomy consists of six levels. These levels from simple to complex are as follows: knowledge, comprehension, application, analysis, synthesis and evaluation level. Bloom's Taxonomy has been criticized for its incremental ranking and not being appropriate for every subject area (Senemoğlu, 2005). However, changing world conditions have also affected Bloom's Taxonomy. Considering the changes in the world, Anderson and Krathwohl (2001) revised the taxonomy to enable educators to focus on the original version of the Bloom's Taxonomy. With the update they made, they changed the place of the synthesis level and the evaluation level (Cited in Günaydın, 2018: 40).

Bloom's cognitive domain taxonomy is divided into 6 basic level: knowledge, comprehension, application, analysis, evaluation and synthesis. There is a hierarchical structure between these levels and the way to go to the upper level is to pass the lower level. While the first three levels (knowledge, comprehension, application) measure lower-level mental processes, the last three levels (analysis, evaluation, synthesis) measure higher-level mental processes. In both curriculum, the number of questions measuring low-level mental processes is more and the number of questions measuring high-level mental processes is few. Again, in both curricula, most students say and write the **knowledge** they have been taught without changing at all, transform the information into another format without distorting it, summarize it, find the main idea, explain and give examples in their own sentences, as well as based on what was given, the questions at the level of comprehension were included before and after predicting what might happen; while at the analysis stage questions where he can divide the minimum whole information into logical parts, and the synthesis stage where he combines the parts to form a unique whole, are included. While the questions in the evaluation step where he made comments, criticized or made judgments using criteria were included in 3 questions in the 2005 curriculum, they were not any in the 2017 curriculum.

The following situations can be suggested within the framework of the findings obtained from the study:

- In book review commissions, the participation of a measurement-evaluation expert among those who participate in the panel can contribute to the reduction of errors in measurement-evaluation in books.
- Alternative measurement-evaluation methods can be included as stated in the curriculum guide.

Statements of ethics and conflict of interest

"I, as the Corresponding Author, declare and undertake that in the study titled as "*Analysis of Unit Evaluation Questions in the 4th and 5th Grade Social Studies Books"*, scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation."

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Research Article

Analysis of Some of the Primary Education Curricula in Terms of International Social and Emotional Skills[1]

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Abstract

Social and emotional skills are the basic competencies required for individuals, who are a social creature, to continue their development in a healthy and desired way. In this study, it is aimed to analyze the curricula that are responsible for the formal acquisition of these competencies. In the study, Turkish, life studies, social studies, science and mathematics curricula at primary education level were examined in terms of international social and emotional skills. The study, which is an example of qualitative research, was conducted according to the case study model. In the analysis of the curricula, the international social and emotional skills determined by the OECD were considered as criteria and document analysis technique was used. According to the findings obtained in the study, it was determined that the majority of these skills were included in the curricula, but the attainment rate associated with these skills was not sufficient. It was also concluded that the belief in success, stress resistance, trust, and curiosity were skills that were not included in any of the curricula. Another important deficiency determined in the study is that none of the social and emotional skills were included in the mathematics curriculum.

Keywords: *Curriculum, skill, social and emotional skills*

[1] The ethical committee permission is not required in this study since the data were gathered through document analysis.

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Bazı İlkokul Öğretim Programlarının Uluslararası Sosyal ve Duygusal Beceriler Açısından İncelenmesi

Öz

Sosyal ve duygusal beceriler sosyal bir canlı olan bireylerin gelişimlerini sağlıklı ve istendik yönde sürdürebilmeleri için gerekli olan temel yeterliklerdir. Bu çalışmada söz konusu yeterliklerin formal kapsamda kazandırılmasından sorumlu olan öğretim programlarının analiz edilmesi amaçlanmıştır. Çalışmada ilkokul Türkçe, hayat bilgisi, sosyal bilgiler, fen ve matematik dersi öğretim programları uluslararası sosyal ve duygusal beceriler açısından incelenmiştir. Bir nitel araştırma örneği olan çalışma durum çalışması modeline göre yürütülmüştür. Çalışmada öğretim programlarının analizinde OECD tarafından belirlenmiş olan uluslararası sosyal ve duygusal beceriler ölçüt alınmış olup doküman incelemesi tekniği kullanılmıştır. Çalışmada elde edilen bulgulara göre söz konusu becerilerden büyük bir çoğunluğuna programlarda yer verilmiş olduğu ancak söz konusu becerilerle ilişkili kazanım oranının yeterli düzeyde olmadığı belirlenmiştir. Başarma inancı, strese dayanıklılık, güven, merak becerilerinin öğretim programlarının hiçbirinde yer verilmemiş olan beceriler olduğu sonucuna ulaşılmıştır. Çalışmada belirlenmiş olan bir diğer önemli eksiklik ise matematik öğretim programında sosyal ve duygusal becerilerden hiçbirine yer verilmemiş oluşudur.

Anahtar Sözcükler: *Öğretim programı, beceri, sosyal ve duygusal beceri*

Introduction

Curricula are life arrangements that contain all the activities of a discipline that are aimed to be gained by individuals (Demirel, 2007). The main elements in these life arrangements consist of the attainments/objectives that express the learning outcomes; the content elements that meet the scope of learning in other words the learning areas and the topics related to the course; the teaching experiences that indicate how learning will be carried out, and the assessment-evaluation situations that asses all these elements. Apart from these basic elements, to make the curriculum more comprehensive and qualified, it is possible to include the values, skills, and concepts expected in the related course in the curricula (Çoban & Akşit, 2018). To achieve the objectives of the curricula, all of the mentioned items can fulfill their duties and functions completely (Özkan, 2009); also these items must be compatible with each other.

Attainments, which are the first of the basic elements in the curriculum, are the expressions that describe the knowledge, skills, and competencies of the cognitive, affective and psychomotor areas that we can call the dimensions of learning, which students are expected to have at the end of a unit, term or academic year (ERG, 2012). The two important reference points that are taken into account when determining these achievements are the needs of the individual and society. The rapid change in the world changes these needs at the same speed and accordingly, it is an increasing effort that the attainments in the curricula can be arranged to meet these needs. For this reason, today, It is aimed to reflect the skills that students will need in their personal, social, academic and business life to the curriculum at both national and international levels (MEB, 2018).

Skills are defined as the abilities designed to be acquired, developed and transferred to students in the learning process (Narin, 2007). Through these skills, students are expected to achieve attainments that they will earn and use throughout their life vertically at the end of a year and horizontally at the end of the curriculum in connection with their development in learning areas (Özatalay, 2007). The acquisition of skills takes place at the end of a process. Knowledge must first be obtained. While learning takes place, skills should be gained, developed and transferred to life (Hezen, 2009).

Skill consists of three components: knowledge, practice knowledge and making work. These components can be summarized as follows;

1. Knowledge includes information about the job (task) to do.
2. Practise involves knowing about work (task), knowledge, and mobilizing mental resources. All mental and physical resources must be mobilized to take action.
3. Making work is realizing the task by mobilizing all physical and mental resources. During the work, the psychological and social status of the individual is important (Dionnet, 2002).

Nowadays, skills are given more place in the curriculum and attention is paid to ensure that all curriculum elements, especially the attainments, reflect these skills. Skills included in the curriculum can be skills specific to the subject in question, as well as common basic skills required by individuals who are common to all lessons. It is possible to define basic skills as competencies that individuals need to acquire through formal education. These skills are accepted as the basic conditions for the human model desired to be in the 21st century (Altunbay, 2015). For this reason, it is important to include all basic skills adequately in the curriculum in terms of individual achievements and social cohesion of people in their future lives.

Various studies are carried out to determine the skills expected to take place in the curriculum and different criteria emerge as a result of these studies. By the Ministry of Education, through the Turkey Qualifications Framework eight key competencies were identified for the skills take part in the curricula developed after 2018. These competencies, which are common to all of the curricula, are included in the curricula together with their descriptions and it is tried to be clarified which skills can be gained within the scope of competence. These competencies are as follows;

1. Communication in the mother language,
2. Communication in foreign languages,
3. Mathematical competence and basic competencies in science/technology,
4. Digital competence,
5. Learning to learn,
6. Social and citizenship competencies,
7. Taking initiative and entrepreneurship,

8. Cultural awareness and expression (MEB, 2018).

In some of the curricula, apart from these competencies, course-specific skills are also included. In the curriculum of life sciences, 23 skills and in the curriculum of social sciences 27 skills were included. 6 of these skills are common. The skills in the curricula are as follows;

Table 1
Skills in life sciences and social studies curriculum

Life Sciences Curriculum Skills	Common Skills	Social Sciences Curriculum Skills
Information and communication, using technologies, balanced nutrition, protection of nature, observation, communication, career awareness, use of resources, self-protection, self-knowledge, personal care, compliance with rules, recognition of national and cultural values, self-management, health protection, problem-solving, social participation, time management.	Research, Perception of space, perceiving change and continuity, cooperation, entrepreneurship decision making	Environmental literacy, digital literacy, critical thinking, empathy, financial literacy, observation, map literacy, legal literacy, communication, stereotypes, and prejudice, using evidence, location analysis, media literacy, self-control, political literacy, problem-solving, social literacy participation, drawing and interpretation of tables, graphics and diagrams, using Turkish correctly, beautifully and effectively, innovative thinking, perception of time and chronology

Another curriculum that includes course-specific skills is the science curriculum. Skills included in this curriculum are presented under the headings of scientific process skills, life skills and engineering and design skills. The life skills included in the life skills title are listed as analytical thinking, decision making, creative thinking, entrepreneurship, communication and teamwork.

Apart from the work carried out by the Ministry of National Education, different studies are conducted to determine international common skills as a result of the globalized and standardized learning approach. One of them, and which was conducted by the OECD, "OECD FUTURE OF EDUCATION AND SKILLS 2030-OECD Learning Compass 2030". This is an important study carried out with dozens of experts including the experts from TTKB (Board of Education and Discipline), Turkey. With this study, which was initiated in 2015, some standards were tried to be determined to prepare the education systems of the countries for the future. In this study, in line with this purpose, first of all, competencies

(knowledge, skill, attitude and values) were tried to be determined for today's students with a collaboration that lasted about two years. Secondly, to develop these competencies, an attempt was made to answer the question of how we can effectively use learning environments, in other words, curriculum. The skills determined by the study in question were classified under three headings as cognitive and metacognitive skills, social and emotional skills, and practical and physical skills.

The cognitive skills tool language included in the first of these titles consists of the use of learning strategies such as using the knowledge and numbers acquired, and reasoning. It includes verbal and non-verbal high-level thinking skills. Metacognitive skills include learning to learn and recognizing one's knowledge, skills, attitudes and values (OECD, 2018). Social and emotional skills consist of a series of individual capacities that can arise in consistent thought patterns. These skills include emotions and thoughts that enable individuals to develop their relationships at home, at school, at work and in the community as well as their own development, as well as fulfill their responsibilities. Other skills include using physical skills, physical tools, processes, and functions; applied skills are defined as the ability to manipulate materials, tools, equipment and artifacts to achieve specific results (OECD, 2018).

All of the skills listed above are among the basic skills that individuals will need throughout their lives. For this reason, the academic, social and individual achievements of individuals need to meet three of these skill types at the required rate. However, curricula mostly focus on cognitive and metacognitive skills. A study on social and emotional skills, called “OECD Study On Social and Emotional Skills”, was started by OECD in 2018. This study, which is expected to shed light on the development of the social and emotional skills of the students in the participating countries, emphasized the critical importance of emotional and social skills in the learning processes. In the justification of the study, considering the results of important international studies such as PISA, PIAAC and TALIS, it was also referred to the importance and impact of social and emotional skills in terms of academic achievement and social cohesion (OECD, 2018). Accordingly, 5 main skill areas (The Big Five Domains) and a total of 16 skills related to these areas were determined and the study was carried out within the framework of these skills. With this study, it is aimed to examine the primary school curriculum developed by TTKB within the scope of these skills. Although there are many

studies in the literature to examine the skills included in the curriculum, there are a limited number of studies on the curriculum developed in 2018 and afterward and there is only one study (Gündoğan, 2017) for the analysis of emotional and social skills. With the results obtained from this study, it is aimed to determine the functionality of the curricula in terms of gaining social and emotional skills by evaluating the education curricula within the framework of international criteria, apart from eliminating these deficiencies, which are expressed for the literature. In line with this goal, the questions sought in the study are as follows;

1. To what extent do the attainments in the Primary School Turkish Curriculum overlap with international social and emotional skills?
2. To what extent do the attainments in the Primary School Life Sciences Curriculum overlap with international social and emotional skills?
3. To what extent do the attainments in the Primary School Social Studies Curriculum overlap with international social and emotional skills?
4. To what extent do the attainments in Primary School Science Curriculum overlap with international social and emotional skills?
5. To what extent do the attainments in Primary School Mathematics Curriculum overlap with international social and emotional skills?

Methodology

Research Model

This study, in which the primary school curriculum was examined in terms of international social and emotional skills, is a sample of qualitative research and was conducted on the case study model. Qualitative research is one of the ways of generating knowledge that people develop to discover the depth of the social structures and systems that they build with their understanding of their potential, their secrets and their efforts. In the studies designed with the qualitative method, there is an effort to reach a deep perception of the event or phenomenon examined (Morgan, 1996). Case study is a qualitative research approach in which the researcher examines one or more conditions limited over time with data collection tools (observations, interviews, audiovisuals, documents, reports), and situations and thematic

themes are defined (Creswell, 2007). In this study, primary education curricula are taken as cases and tried to be examined systematically within the scope of research questions.

Data Sources

The source of the data in the study is the primary school curricula developed by the TTKB. The curricula were accessed from the official website of TTKB. The curricula of Turkish, Life Sciences, Social Studies, Science and Mathematics courses were analyzed in the scope of the study were handled and the attainmnets of these curricula in the 1-4th grade, which were included in the scope of primary school, were examined. To avoid repetition in the study, the abbreviations of TC for the Turkish Curriculum, LSC for Life Sciences Curriculum, SSC for Social Studies Curriculum, SC for Science Curriculum, and MC for Mathematics Curriculum were used from time to time.

The ethical committee permission is not required in this study since the data were gathered through document analysis.

Data Analysis

In the study, the document analysis technique was used in the examination of the curriculum. Document analysis involves the analysis of written materials that contain information about the phenomenon or facts intended to be investigated (Yıldırım&Şimşek,2018) In the analysis of the curricula, the international social and emotional skills determined by the OECD were considered as criteria. Skills related to the areas in which these skills are included are as follows;

1. Task performance
    1.1. Belief in success
    1.2. Liability
    1.3. Self-regulation
    1.4. Continuity
2. Emotional regulation
    2.1. Stress resistance

2.2. Optimistic
2.3. Emotion control
3. 3. Collaboration
3.1. Empathy
3.2. Confidence
3.3. Working together
4. Open-mindedness
4.1. 4.1 Creativity
4.2. 4.2 Tolerance
4.3. 4.3 Curiosity
5. Working with others
5.1. 5.1 Sociability
5.2. 5.2 Energy
5.3. 5.3 Self-ConfidencE
6. Integrated Skills
6.1. Critical thinking
6.2. Metacognitive thinking
6.3. Self-efficacy (OECD, 2018).

In qualitative researches, instead of expressions of validity and reliability that is used in quantitative research, it would be better to talk about expressions such as credibility, the accuracy of results and competence of the researcher (Krefting, 1991). In this study, the peer debriefing method, which was suggested by the results obtained by Holloway and Wheeler, 1996, was used to provide credibility. Accordingly, the analysis results made by the researcher were sent to the curriculum development and field education specialists and asked to give their opinions. The results of the analysis have been revised according to the opinions of the experts,and presented after the necessary corrections have been made.

Findings

In this part of the study, the findings obtained by examining the primary school curriculum are presented according to the research questions.

Findings of the Turkish Curriculum

In the Turkish curriculum developed by TTKB in 2019, the attainments between grades 1-8 are included. In the study, a total of 235 attainments between grades 1-4, which is within the scope of primary school, were examined, and 37 of these attainments were found to coincide with international social and emotional skills. Since some of these attainments are repeated in the curriculum at different grade levels, they are included once in the list. These attainments are as follows;

- Shares what she/he wrote. (Grade 1-4) **Sociability – Self Confidence**
- Makes unprepared speeches (Grade 1-4) **Sociability – Self Confidence – Creativity**
- Writes poetry (Grade 3-4) **Creativity-Metacognitive Thinking**
- Writes narrative text (Grade 3-4) **Creativity - Metacognitive Thinking**
- Makes inferences about what they read (Grade 3-4) Critical **Thinking-Creativity**
- Participates in discussions and conversations in the classroom (Grade 4) **Sociability - Self-Confidence - Critical Thinking**
- Evaluates the content of what they listen/watch (Grade 4) **Sociability-Self Confidence-Critical Thinking**
- Makes prepared speeches (Grade 4) **Sociability -Self Confidence**
- Evaluates media texts (Grade 4) **Sociability – Self Confidence - Critical Thinking**
- Questions the reliability of information sources (Grade 4) **Critical Thinking**
- Expresses his/her thoughts about the events in the text he read (Grade 4) **Sociability – Self Confidence - Critical Thinking**
- Creates sign. (Grade 4) **Creativity**
- Writes text suitable for the structural features of the letters (4th grade) **Creativity**
- Writes instructions about the process steps of a job (4th grade) **Creativity - Metacognitive Thinking**
- Writes informative text (Grade 4) **Creativity - Metacognitive Thinking**
- Writes short text with imaginary elements. (4th Grade) **Creativity- Metacognitive Thinking**

In the study, the explanations about the attainments in the curriculum were also taken into account in determining the attainments associated with the skills. In this way, it is aimed to clearly understand which behavior or behaviors the attainments meet. For example, for the acquisition of "Creates Sign", which is one of the attainment in the list, the students were asked to think of their signatures by using the initial letter of their names and their surnames, and the signature image to be created was left to their creativity. Since such explanations were made for the majority of the attainments in the curriculum, these explanations were used to analyze the skills accurately and completely.

Some of the attainments that overlap with social and emotional skills in TC overlap with more than one skill. For this reason, in addition to the number of acquisitions that coincide with social and emotional skills, the frequency of skills taking place in the curriculum was also determined. Also, the data prepared to see the distribution of skills on a class basis and to compare them numerically. They are presented in Table 2.

Table 2
Distribution of Social and Emotional Skills in the Turkish Curriculum According to Grade Levels

Skill	1st Grade (47 Attainment)	2nd Grade (46 Attainment)	3rd Grade (64 Attainment)	4th Grade (78 Attainment)	Total/ 1st-4th Grades (235 Attainment)
	f	f	f	f	f
Sociability	2	2	2	7	13
Self Confidence	2	2	2	4	10
Critical Thinking			1	6	7
Creativity	1	1	4	9	15
Metacognitive Thinking			2	5	7
Total	5	5	11	31	52

When Table 2 is examined, it is seen that there are 5 social and emotional skills in the Turkish curriculum. Creativity and sociability are the first two skills that are frequently included in the curriculum. When the distribution of skills by grade levels is taken into consideration, there is an increase in the skills in the curriculum along with the increase in the number of skills at the 1st and 2nd-grade levels and the increase in the 3rd and 4th-grade levels. This increase is at a significant level, especially at the 4th-grade level. The frequency

of skills included in the 4th grade level in the curriculum (31) is higher than the first three grades; this difference is caused by the increase in creativity, sociability and critical thinking skills. Accordingly, it can be said that there are significant deficiencies in the curriculum due to the limited number of social and emotional skills however; it has reached a relatively competent structure with the advancing grade level.

Findings of the Life Sciences Curriculum

Another curriculum examined within the scope of the study is the life science curriculum. In this curriculum, a total of 148 attainments were included in the 1st-3rd grade levels. A total of 33 of these attainments were found to coincide with international social and emotional skills. These attainments and related skills are as follows;

1st Grade Attainments

- Participates in the in-class dating activity. **Sociability-Self Confidence**
- Participates in the process of setting classroom rules. **Sociability-Working Together-Self Confidence-Critical Thinking-Metacognitive thinking**
- Complies with school rules **Self-regulation**
- Follows courtesy rules when communicating at school. **Self-regulation**
- Willing to work in in-school activities. **Responsibility-Working Together-Sociability-Self-Confidence-Energy**
- Willing to participate and play games. **Sociability- Energy- Self Confidence**
- Develops positive emotions and thoughts about school. **Optimism-Emotion Control**
- Follows courtesy rules when communicating with family members at home. **Self-regulation**
- Plans what he/she can do during the day. **Self-regulation**
- Adheres to safety rules when communicating with people around. **Self-regulation**
- Realizes that he/she lives with people from different cultures in our country. **Empathy**

2nd Grade Attainments

- Introduces itself with different features. **Sociability-Self Confidence**
- Respects individual differences. **Empathy**

- Participates in decision-making processes on class-related issues. **Sociability-Working Together-Self Confidence-Critical Thinking**
- Follows the rules of working with the group in activities held in the classroom and at the school. **Responsibility, Collaboration, Sociability**
- Expresses himself clearly and understandably when communicating at school. **Self Confidence, Sociability**
- Follows the rules of listening when communicating at school. **Self Regulation**
- Follows the rules while playing games with friends at school. **Self Regulation**
- Spends his/her money consciously at school according to his/her needs. **Self-regulation**
- Notices the duties and responsibilities that fall on the house. **Responsibility**
- Participates in family decision making processes. **Sociability, Self Confidence, Working Together, Critical Thinking**
- Be sensitive to people who need help in their immediate surroundings. **Empathy**
- implements the works he planned during the day. **Self-regulation, Responsibility**
- helps individuals who need help in traffic. **Empathy, Responsibility**
- Respects the lifestyles and habits of people of different cultures living in our country. **Empathy**

3rd Grade Attainments

- Recognizes their strengths and strengths. **Self-regulation, Self-efficacy**
- Realizes how his behavior affects himself and his friends. **Empathy, Self-regulation, Critical thinking**
- Understands the factors to be considered in the dating process. **Self-regulation, Empathy, Tolerance, Emotion control**
- Willing to participate in studies on social solidarity and solidarity at school. **Responsibility, Empathy, Sociability, Energy, Working together, Self Confidence**
- Expresses the demands and needs of the school in a school environment through democratic means. **Sociability, Self-Regulation**
- Takes care to protect the budget of himself and his family while meeting his/her wishes and needs. **Self Regulation, Empathy, Responsibility**
- Participates in social responsibility projects for the problems of people from different cultures living in our country. **Responsibility, Energy, Empathy, Collaboration, Sociability, Self Confidence**

- Takes responsibility for protecting nature and the environment. **Responsibility**

As seen in the list, there are no attainments repeated in different classes, as in TC. However, the same attainment coincides with more than one skill or even 6 skills. Skills in the curriculum and related grade levels are presented in Table 3.

Table 3
Distribution of social and emotional skills in the life sciences curriculum according to grade levels

Skill	1st Grade (53 Attainment)	2nd Grade (50 Attainment)	3rd Grade (45 Attainment)	Total (148 Attainment)
	f	f	f	f
Self Regulation	5	4		9
Sociability	4	5	3	12
Self Confidence	4	4	2	10
Critical Thinking	1	2	1	4
Metacognitive Thinking	1			1
Working Together	2	3	2	7
Energy	2		2	4
Responsibility	1	4	4	9
Optimism	1			1
Emotion Control	1		1	2
Empathy	1	4	5	10
Self-Efficacy			1	1
Tolerance			1	1
Total	23	26	22	71

As can be seen in Table 3, there are 13 social and emotional skills in the LC. It is noteworthy that while sociality, self-confidence and empathy are the top three skills; metacognitive thinking, optimism, self-efficacy and tolerance skills are included in the curriculum with only one attainment. The level with the highest frequency of skills taking place in the curriculum according to the grade levels is 2nd grade. When the distribution of skills by grade level is considered, it is observed that this distribution varies. For example, while self-regulation skill is included at 1st and 2nd-grade levels, no attainment coincides with this skill at a 3rd-grade level. It is the same for the other skills represented by one attainment in the curriculum. According to this, it can be said that the life studies curriculum does not have a content that can be considered insufficient in terms of gaining social and emotional skills, but it requires

some arrangements because the skills in the curriculum do not show a homogeneous distribution.

Findings of the Social Studies Curriculum

The social studies course curriculum covers the attainments that take place between the 4th and 8th grades. Among these attainments, 33 attainments at the 4th-grade level were examined and it was determined that 8 of them coincide with social and emotional skills. These attainments and related skills are presented below.

- Recognizes individual interests, needs and abilities. **Self-efficacy**
- Substitutes himself/herself for other individuals with different characteristics. **Empathy**
- Respects the different features of other individuals. **Empathy**
- Makes conscious choices between the two by distinguishing his wishes and needs. Self-regulation
- As a responsible individual, he displays conscious consumer behavior. **Responsibility, Self-regulation**
- Creates a sample budget of his/her own. **Self-regulation**
- Takes responsibility for the words and actions in family and school life. **Self-regulation, Responsibility**
- Respects different cultures. **Empathy**

The distribution of the attainments presented in the list on skill basis is given in Table 4.

Table 4
Distribution of social and emotional skills in the social sciences curriculum

Skill	4th Grade (33 Attainment)
	f
Self Regulation	4
Responsibility	2
Empathy	3
Self-Efficacy	1
Total	10

When Table 4 is examined, it is seen that the social and emotional skills at the 4th grade level of social studies lesson are limited by self-regulation, responsibility, empathy and self-

efficacy skills.. and can be said to be an unwanted situation. It is not right to make a judgment for the majority or all of the curriculum, since the attainments at the 4th-grade level, which are only within the scope of primary school, of the social studies curriculum, are examined. However, it can be said that it is an unexpected situation to focus on only a few of the social and emotional skills, even at a single grade level, due to the nature of the course.

Findings of the Science Curriculum

When the attainments of the science curriculum for the 3rd and 4th grades are examined, it is determined that there are 82 attainments for these grade levels, and a total of 17 attainments coincide with social and emotional skills. These attainments and related skills are as follows.

3rd Grade Attainments

- Discusses the dangers of moving objects in daily life. **Sociability, Critical Thinking, Self Confidence**
- Discusses that touching, looking, tasting and smelling certain substances can harm the living body. **Sociability, Critical Thinking, Self Confidence**
- Takes responsibility for taking necessary security measures while working individually or in groups. **Sociability, Responsibility**
- Presents the observation results of a plant's life cycle. **Sociability, Self Confidence**
- Takes an active role in cleaning the environment in which he/she lives. **Sociability, Confidence, Energy**
- Designs an artificial environment. **Metacognitive Thinking, Creativity**
- Proposes solutions by researching to protect the natural environment. **Metacognitive Thinking, Creativity**
- Discusses the damages of battery wastes to the environment and what needs to be done in this regard. **Sociability, Critical Thinking, Self Confidence**

4th Grade Attainments

- Discusses the importance of the freshness and naturalness of nutrients for a healthy life based on research data. **Sociability, Critical Thinking, Self Confidence**
- Takes responsibility for reducing smoking in his/her immediate surroundings. **Sociability, Critical Thinking, Self Confidence, Responsibility, Energy**

- Discusses the separation of mixtures in terms of their contribution to the national economy and efficient use of resources. **Sociability, Critical Thinking, Self Confidence**
- Makes designs for lighting tools that can be used in the future. **Metacognitive Thinking, Creativity**
- Discusses the importance of saving lighting usage in terms of family and national economy. **Sociability, Critical Thinking, Self Confidence**
- Produces solutions to reduce light pollution. **Metacognitive Thinking, Creativity**
- Produces solutions to reduce sound pollution. **Metacognitive Thinking, Creativity**
- Questions the cause of light pollution. **Critical Thinking**
- Questions the cause of sound pollution. **Critical Thinking**

Table 5
Distribution of social and emotional skills in the science curriculum according to grade levels

Skill	3rd Grade (36 Attainment)	4th Grade (46 Attainment)	Total/3rd-4th Grades(82 Attainment)
	f	f	f
Sociability	6	4	10
Self Confidence	4	4	8
Critical Thinking	4	6	10
Creativity	2	3	5
Metacognitive Thinking	2	3	5
Energy	1	1	2
Responsibility	1	1	2
Total	20	22	42

As seen in Table 5, science curriculum includes 7 skills at the 3rd and 4th grades, and sociality, critical thinking and self-confidence are the prominent skills. Energy and responsibility skills are the least frequently included skills in the curriculum. Although the frequency of the skills taking place in the curriculum according to the grade levels is quite close, it can be said that the third-grade level attainments are relatively more effective in terms of gaining social and emotional skills when considering the difference between the number of attainment. In the light of these findings, it can be said the curriculum has some deficiencies in terms of skill diversity however considering that the majority of the attainments in the curriculum belonging to the cognitive field due to the content of the

science course, it can be said that the curriculum has a more competent structure than expected in terms of meeting social and emotional skills.

Findings of the Mathematics Curriculum

In the mathematics curriculum, which is another of the primary school curriculum examined, a total of 229 attainments were included for grades 1-4. When these attainments were analyzed in terms of social and emotional skills, it was determined that no attainment overlapping these skills was included in the curriculum. It has been determined that almost all of the attainments in the curriculum are focused on the cognitive skills related to the numbers and operations, algebra, geometry and measurement, data processing and probability learning. Accordingly, although it has been stated that the values and competencies determined for the overall curriculum were taken as reference in the development of the mathematics curriculum, the absence of any of the social and emotional skills that are in line with these competencies and values is considered to be a significant deficiency in the name of the curriculum.

In the study, it is aimed to analyze the distribution of social and emotional skills in primary education curricula as a whole. Therefore, a comparative presentation of the inclusion of these skills in the curriculum was needed. Accordingly, firstly, it was tried to determine which skills are included in the curriculum and the data in question are presented in Table 6.

Table 6
Social and emotional skills in primary education curricula

TC	LSC	SSC	SC
Self Regulation	Self Regulation	Self Regulation	Sociability
Sociability	Sociability	Responsibility	Trust yourself
Self Confidence	Self Confidence	Empathy	Critical Thinking
Critical Thinking	Critical Thinking	Self-Efficacy	Creativity
Creativity	Metacognitive Thinking		Metacognitive
Metacognitive	Working Together		Thinking
Thinking	Energy		Energy
	Responsibility		Responsibility
	Optimism		
	Emotion Control		
	Empathy		
	Self-Efficacy		
	Tolerance		

As seen in Table 6, the curriculum that includes the most diverse skills is the life sciences curriculum, and the curriculum with the least variety of skills is the social studies curriculum. There is not a common skill that is included in all of the curricula, however, it would be correct to say that sociability, self-confidence and critical thinking skills are prominent skills in all three of the curriculum. Although there are different missing skills for each of the curriculum, it is seen that the "**belief in success, stress resistance, trust and curiosity**" skills are common missing skills that are not included in any of the curricula.

Finally, in the study, it was aimed to make a general evaluation by determining how many attainments of each skill in elementary school curricula were met in which curricula. Thus, in addition to the frequency of the skills included in the entire curriculum in the study, the total number of attainments in the curriculum and the number of acquisitions related to the skills are also included. These data are presented in Table 7.

Table 7
Distribution of social and emotional skills in primary education curricula

Skill	TC(235/37 Attainment) *	LSC(148/33 Attainment)	SSC (33/8 Attainment)	SC (82/17 Attainment)	Total (498/95 Attainment)
	f	f	f	f	f
Self Regulation		9	4		13
Sociability	13	12		10	35
Trust yourself	10	10		8	28
Critical Thinking	7	4		10	21
Metacognitive Thinking	7	1		5	13
Working Together		7			7
Energy		4		2	6
Responsibility		5	2	2	9
Optimism		1			1
Emotion Control		2			2
Empathy		10	3		13
Self-Efficacy		1	1		2
Tolerance		1			1
Creativity	15			5	20
Total	52	67	10	42	171

* Total number of attainments in the curricula and the number of attainments that coincide with social and emotional skills

As can be seen in Table 7, although the curriculum with the least variety and frequency is SSC, it is also the curriculum with the highest rate of attainment (33/8) meeting the social and

emotional skills. Another remarkable finding is related to the distribution of skills. In each curriculum, different skills or skills are emphasized, and the social and emotional skills in the curricula do not show a homogeneous distribution. For example, while creativity skills are dominant in TC, LSC stands out with its social ability skill. Also, it is noteworthy that some skills were included in the curricula in a very limited number. Tolerance, optimism, self-efficacy and emotion control skills are among these skills. According to these findings in the table, it can be said that primary education curricula contain the vast majority of international social and emotional skills, however, there are not enough attainments in the curricula to gain certain skills. In other words, these skills are symbolically included in the curricula.

Discussion, Conclusion and Suggestions

In primary education, which is responsible for providing the basic knowledge, skills, behaviors and habits that all individuals in the society should have, one of the basic skills that students should acquire is social skills. Social skills help individuals, one of the important goals of education, to adapt to the society they live in (Çubukçu & Gültekin, 2006). To gain social skills, the primary school period in which students acquire their first learning experiences is very important. Experiences to be offered to students during this period should be able to support the acquisition of these skills. This is related to the fact that the content of the curriculum, which is the main guide in the organization of learning experiences, is similarly adequate.

These skills, which are often referred to as social skills in the curriculum, were also addressed by the OECD and are expressed as “social and emotional” skills by expanding the scope of these skills. It was suggested that these skills should be included in the curriculum by underlining the increasing importance of these skills for students' cognitive and emotional development. In this study, the primary education curriculum developed in 2018 and after were examined within the scope of these skills.

In the Turkish curriculum, which is the first curriculum examined in the study, it was determined that five social and emotional skills were included; the most frequently used skill was creativity and the self-regulation skill was the least. Also, it was concluded that the most effective grade level in the acquisition of social and emotional skills is 4th grade. When

examining the content of TC, it is noteworthy that, as in the previous curriculum, the skills specific to Turkish lessons were not included. Using Turkish correctly, effectively and beautifully, critical thinking, creative thinking, communication, problem-solving, research, using information technologies, entrepreneurship, decision making, reading between texts, importance to personal and social values are the basic skills of 2005 TC. When the specific objectives of the Turkish Lesson in 2019 TC are examined, it is stated that the language skills listed as listening/watching, speaking, reading and writing in the course should be improved with the items listed here. In the curriculum, under this heading, the skills of researching, exploring, interpreting, structuring in mind, accessing information, organizing, questioning, using and producing information are also highlighted. As can be seen, mostly cognitive skills, especially language skills, are included in TC. For this reason, it can be said that the absence of social and emotional skills is directly related to the curriculum content. However, when the basic skills specific to the course in the 2005 TC are examined, it is seen that some of these skills (critical thinking, creative thinking, communication, entrepreneurship) overlap with the skills determined by the OECD. Accordingly, it will be correct to say that 2019 TC is not a curriculum with the desired quality in terms of social and skills acquisition, and has more inadequate content than the previous curriculum.

When the studies on examining the skills in the Turkish curriculum in the literature are examined, Kayhan (2018) studied the 1st-8th grades within the scope of 21st-century skills in the study, and concluded that only 14 attainments are related to 21st-century skills. In his study, Öztürk (2018) examined the appropriateness of the comprehension attainments in the Turkish curriculum to basic skills and addressed critical thinking skills, creative thinking skills, problem-solving, research and decision-making skills. Accordingly, he determined that some of the attainments he examined did not match the basic facts. Altınsöz (2016) stated that the attainments were not sufficient in terms of critical thinking skills as a result of his study of the 4th-grade achievements of TC. In her study, Hezen (2009) determined that the skill that was featured most in the 2005 TC was critical thinking and the skill that was given the least was entrepreneurship. Gömleksiz and Kan (2007) determined that according to students' views 2005 TC is effective in acquiring problem-solving and decision making skills. In his study, Temizkan (2014) examined Turkish textbooks instead of curriculum and determined that these books were not sufficient to gain skills. In his study, Zevfi (2015) determined that Turkish textbooks are not sufficient in terms of reflecting basic skills and

presenting these skills to students. Similarly, Yaşar (2013) examined the Turkish textbooks and concluded that the main skill in the books is the skill of using Turkish correctly, beautifully and effectively, critical thinking and creative thinking skills. Özatalay (2007) found that most of the Turkish textbooks do not include sufficient studies on these basic skills. When other studies on the examination of the skills in the Turkish curriculum are examined, the deficiencies for cognitive skills are highlighted in these studies (Özbay, 2012; Karadağ, 2012). As can be seen, the studies in which the Turkish curriculum and textbooks have been examined are mostly related to 2005 TC, but almost all of these studies have underlined the lack of basic skills in the curriculum and textbooks. For this reason, it is thought to be necessary to reach the aim of the course, which is stated as the "prerequisite for learning, personal and social development and vocational skills in all other fields (MEB, 2018)" in the development of TC considering the aforementioned deficiencies.

Two of the other curricula examined in the study are LSC and SSC. While LSC is the most numerous and diverse curriculum with social and emotional skills, SSC is the curriculum with the least variety of skills. However, it was concluded that the rate of involving gains related to social and emotional skills in SSC is higher than in other curricula. The curriculum for these two courses includes also course-specific skills. Among these skills, skills close to social and emotional skills (critical thinking, empathy, self-management, communication, collaboration, social participation) determined by OECD are also included. Thus, empathy and social participation skills, which are among these skills, are among the prominent skills in LSC.

The purpose of the life sciences course is stated as the child's self-knowledge, understanding the natural events around him, getting to know his social environment and developing himself in this environment (Öztürk et al., 2007). Another course that allows individuals to better understand themselves and their environment is social studies (Akaydın & Kaya, 2015). Social studies is a primary education course (MEB, 2005) which is a continuation of the Life Science course (1st, 2nd and 3rd grades), where the concept of past, present and future is examined; aimed to make the child gain social personality; covers social sciences such as history, geography, sociology, psychology, philosophy, political science and law, and citizenship knowledge. For this reason, it is expected that the curriculum of life studies and social studies courses will complement each other and include basic skills that will help the

individual to know and adapt to the individual, the environment and the society in which they live. Considering the results obtained in the study on the social and emotional skills included in these skills, it is seen that both of the curricula are not in the desired competence to achieve the stated goals. Although empathy and social participation were among the skills that were stated to be similar to those determined by the OECD in the curriculum, it was also noteworthy that there were significant deficiencies in other skills. Accordingly, it can be concluded that the curriculums also contain some deficiencies in terms of the skills determined by MEB. In his study, Özmutlu (2020) examined the distribution of mental abilities in SSC and stated that there are forgotten skills as well as prominent skills in the curriculum. Öğreten (2017) concluded that the content of the textbooks is at a medium level to gain the basic skills in the SSC. Hayırsever (2010) found that social studies course, teacher guide and student workbooks have some deficiencies in terms of basic skills aimed to be acquired in the social studies curriculum. Öztürk (2019) concluded that first-grade textbooks should be revised to gain basic skills in the life science lesson curriculum. Gündoğan (2017) examined LSC in terms of social skills and determined that 37% of the gains in the curriculum met social skills. Akçay and Öztürk (2017) stated that different arrangements and practices should be made to gain basic skills to students in the curriculum based on some deficiencies for LSC. In his study, Barlas (2015) stated that teachers found the LSC to be generally cultivated in acquiring common and lesson-specific skills. In his study, Narin (2007) concluded that LSC is not completely sufficient in terms of basic skills. As seen in different studies, apart from a study based on teacher opinions (Barlas, 2015), there are some deficiencies in the skill-making process of current and previous life studies and social studies lesson curricula. Accordingly, considering the adaptation of the individual to the society it is in, using social skills in their relations with other individuals (Akkök, 1996), it becomes necessary to organize the curriculum of life studies and social studies courses, which have a very close purpose, to gain these skills.

The last two curricula examined in the study are SC and MC. It was determined that critical thinking and sociability skills were the prominent skills in SC and that the most diverse skills were included within the scope of this curriculum after LSC. It is seen that there is no place in MC that matches social and emotional skills. As it is known, science and mathematics courses are in the category of courses called numerical courses. In these lessons, it is usual to focus mainly on cognitive skills in terms of their scope, but it would be quite an erroneous

point of view to expect them to be developed in a completely exempt structure from social and emotional skills. Thus, when the curricula of the courses in question are examined, it is seen that the creative thinking and teamwork skills offered within the scope of life-specific life skills in SC directly coincide with the skills determined by the OECD, and through these skills, students' processes of accessing and using the information in science lessons are tried to be supported. The fact that the same point of view could not be reflected in the MC caused the curriculum to have a rather emotionally lacking structure while the cognitive aspect of the curriculum came to the fore. This makes MC a curriculum where student development is handled one way; It is an important obstacle for the achievement of the goal of "developing a positive attitude towards mathematics" which is among the objectives of the course. Considering the relationship between positive attitude towards the course and academic achievement, enriching the attainments in MC in terms of social and emotional skills is expected to contribute significantly to the cognitive skills expected of students. When the studies on the curricula are examined in the literature, Erduran and Kamer (2018) examined the science curriculum in terms of life skills and stated that there were significant deficiencies in it. In different studies on the analysis of skills in science education curriculum and textbooks (Yıldız and Tatar (2012), Kılıç et al. (2010), Dökme (2005), Temiz and Tan (2003)). affective domain was not taken into account by focusing on cognitive skills. Considering the studies related to MC, it was observed that in the study of Bulut (2015), it was concluded that some skills were not included in the books by examining the status of the basic skills in the primary school mathematics curriculum in the student workbooks. Apart from this, there is no study for skill analysis, but the studies that Demir and Budak (2016) and Yabaş and Altun (2010) increase self-efficacy, self-regulation, motivation, and metacognitive skills increase academic success in mathematics course, and support their results differently.

Social and emotional skills indicate the acquisition of important qualities related to the development of the person as a whole, both emotionally and academically, both in school life and out of school (Pasi, 2001). The acquisition of these skills from an early age is important for the individual to discover his/her own characteristics and competencies, to know the environment he lives in, to establish adequate and qualified relationships with the individuals in his social environment, in other words, to be able to grow up socially and emotionally. To provide all these features, the education received by the individual, apart from the environment in which he/she is and the people with whom it is in contact, also plays a

determining role. For this reason, it should be planned to acquire the skills and competencies in this field by considering the social and emotional development of the individual as of the first moment of learning.

Including social and emotional skills in school environments helps students to exhibit positive behaviors and increase their participation in the classroom (Henningham et al., 2009). This affects not only affective states and related behaviors, but also their predisposition to learning. So much so, when teachers poorly manage the social and emotional demands teaching by curricula; students' academic achievement and behavior both suffer (Schonert, 2017). In the opposite case, curricula that support social and emotional learning also improve academic achievement and positive behavior while reducing subjective distress and conduct problems (cited by Novak and the others, 2017).

In this study, some conclusions about the curriculum, which are the basic tools for the social and emotional skills to be acquired in a formal context, have been reached. Although the expression of 2030 was used for the social and emotional skills used in the analysis of teaching skills, as seen in the results of the study, it has been underlined that these skills should be included in the curricula since 2005. Therefore, the vast majority of these skills are not foreign and new skills for the curriculum developed by MEB. For all these reasons, it is considered that there is an important need to achieve the goal of training individuals with social competencies by moving away from the changing knowledge transfer understanding of the training curricula developed in 2018 and later, especially in the MC, and improving their social and emotional skills.

In the study, it has also been observed that studies focusing on the analysis of curricula in terms of skills focused mainly on cognitive skills. To increase the expected contribution of the results obtained in this study to the literature, it is recommended to increase the number of studies to examine different curricula in terms of various social and emotional skills.

Statements of ethics and conflict of interest

"I, as the Corresponding Author, declare and undertake that in the study titled as "*Analysis of Some of the Primary Education Curricula in Terms of International Social and Emotional*

Skills", scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation."

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Research Article

Mathematics Teacher Candidates' Conceptual Knowledge of the Concept of Limit in Single-Variable Functions[1],[2]

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Abstract

The aim of this study is to investigate teacher candidates' conceptual understanding of the concept of limit in single-variable functions. The study sample consisted of 30 students who were studying Primary School Mathematics Teaching at the Department of Mathematics and Science Education at a state university in Turkey and were enrolled in the Analysis I course in their second year. This study used a basic qualitative research design, and data were collected through open-ended questions and clinical interviews with focus students. The results revealed that the teacher candidates gave memorized answers to conceptual knowledge questions. The results showed that the teacher candidates' concept definitions were generally based on the right-left limit equation theorem and the dynamic form of the limit. However, the results of the clinical interviews indicated that teacher candidates avoided giving the formal definition of a limit.

Keywords: *Limit, single-variable functions, conceptual knowledge.*

[1] This article is derived from the Birgül Yıldız's Master Dissertation entitled " Investigation of Teeachers Candidates' Information of in One and Two Variable Functions on Limit and Continuity" , conducted under the supervision of Gonca İnceoğlu.
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Matematik Öğretmen Adaylarının Tek Değişkenli Fonksiyonların Limit Kavramına Yönelik Kavramsal Bilgileri

Öz

Bu araştırmanın amacı öğretmen adaylarının tek değişkenli fonksiyonların limit kavramına yönelik kavramsal anlamalarının incelenmesi üzerinedir. Araştırma, Türkiye' de bir devlet üniversitesi Matematik ve Fen Bilimleri Eğitimi Bölümü İlköğretim Matematik Öğretmenliği Programı ikinci sınıf Analiz 1 dersini alan otuz öğretmen adayının katılımı ile gerçekleştirilmiştir. Araştırmanın modeli temel nitel araştırma olup veri toplama araçları açık uçlu sorular ve odak öğrencilerle yapılan klinik görüşmeyi içermektedir. Araştırmadan elde edilen veriler incelendiğinde öğretmen adaylarının kavramsal bilgi içeren sorulara ezbere dayalı yanıtlar verdikleri görülmüştür. Sonuçlar, öğretmen adaylarının kavram tanımlarını genellikle sağ-sol limit eşitliği teoremine ve limitin dinamik formuna dayandırdığını gösterdi. Bununla birlikte, klinik görüşmelerin sonuçları, öğretmen adaylarının limitin formal tanımını vermekten kaçındıklarını göstermiştir.

Anahtar Sözcükler: *Limit, tek değişkenli fonsiyonlar, kavramsal bilgi.*

Introduction

When people learn new things, they construct this knowledge on their prior knowledge. Similarly, mathematical knowledge is built by adding to already existing knowledge. If new knowledge can be appropriately connected and merged with prior knowledge, then the understanding of that concept is constructed (Skemp, 1971). Learning takes place as soon as the connection occurs in mind. If the conceptual knowledge is like interconnected rings, each ring includes pieces of knowledge separately. As the number of interconnected rings increases, the set of rings is expanded, and the connected pieces of knowledge are enriched. Since each added ring will create more meaningful learning, the concept represented by the set of rings will create meaningfulness (Hiebert and Lefevre, 1986). The increase in conceptual knowledge occurs with the increase of the connections between pieces of knowledge.

Each symbol in the formal language of mathematics makes sense when aided by appropriate concepts (Schoenfeld, 1985). In the process of learning conceptual knowledge, the student is a problem solver who can use his or her creativity, intuition, and abilities efficiently in problem-solving and mathematical knowledge production. To this end, the conceptual learning dimension sees mathematics as a network of interconnected concepts,thoughts, and proposes that the student himself or herself constructs knowledge instead of memorizing and copying mathematical concepts and thoughts (Baki and Bell, 1997). In the context of Analysis course, Artigue (2000) states that the unifying role of the limit concept is more important than the role of solving problems, while Cornu (1991) defines the concept of limit as a concept that is located at the center of each subject of analysis.

Conceptual learning is a way to understand mathematics and science better, although it is not often seen in the existing system. We encounter two different solvers in the solution stage of mathematical problems: the master and the apprentice. While the master reaches the solution by applying conceptual knowledge in the solution of the problem, the apprentice investigates whether the problem is similar to the previously solved problems and tries to apply the solutions he or she can remember for the new problem. The conceptual learning view argues that mathematical knowledge can be transferred directly to the student by the teacher and that internalizing the correct mathematical knowledge can be ensured by the activities of the student

himself or herself (Baki, 1995; Cobb, 1986; Noss & Baki, 1996). Since the subjects in mathematics courses are not enriched with conceptual knowledge, rote-learning activities are used mostly instead of meaningful learning experiences. Many students are not aware of what concepts and mathematics at the heart of their operations actually mean. Learning mathematics does not mean memorizing ready knowledge and storing it into the mind. It means using this knowledge in problem-solving to reveal one's own thoughts. When the student starts to think mathematics together with the conceptual structure, his or her success also increases (Porter and Masingila, 2000). Conceptual knowledge involves mathematical concepts themselves and their mutual relationships. Since mathematical concepts are essentially relationships created in the human mind, a certain level of mental development must be achieved in order to acquire them.

Limit, which various concepts such as continuity, derivative, and integral are based on, is one of the most important and fundamental concepts of mathematics. The concept of limit is also critical because it is a mathematical concept where it is not possible for students to reach the result easily by using algebra and arithmetic methods (Cornu, 1991). Therefore, the concept of limit is considered as an indicator of the transition to advanced mathematical thinking (Tall, 1992).

Considerable research has been conducted on the concept of limit. While most studies focus on the difficulties experienced by students and the sources of these difficulties (Bezuidenhout, 2001; Cornu, 1991; Ferrini-Mundy & Graham, 1994; Monaghan, 1991; Sierpinska, 1987; Tall and Vinner, 1981), there are also studies about the process how the concept is learnt. (Cottrill, Dubinsky, Nichols, Schwingendorf, Thomas, & Vidakovic, 1996; Mamona-Downs, 2001; Przeniosla, 2004; Roh, 2007). Cornu (1991) and Tall and Vinner (1981) stated that students conceptualize the limit in two ways as informal (dynamic) and formal (static). The informal definition of the limit defined by Tall and Vinner (1981) as a dynamic form is based on " $x \rightarrow a \Rightarrow f(x) \rightarrow L$" or, in other words, "$x$ approaches a as $f(x)$ approaches L". The formal definition of the limit is expressed as "$\lim_{x \to a} f(x) = L \Leftrightarrow$ for every $\varepsilon > 0$, there exists a $\delta > 0$ such that $\ni |x - x_0| < \delta \Rightarrow |f(x) - L| < \varepsilon$" (Kabael,Barak & Özdaş,2015). We could suggest that students have difficulty in conceptualizing limits formally (Tall and Vinner, 1981), and they tend to interpret the formal definition of a limit as a formula (Przeniosla, 2004).

Some researchers state that students have difficulty in conceptualizing limits formally because of the quantifiers “for every” and “there exists” in the formal definition of limits (Cottrill et al., 1996; Tall and Vinner, 1981). Tall and Vinner (1981) argue that students cannot make sense of the quantifiers “for every” and “there exists” in the formal definition of limits, so they have difficulty in proving the existence of a limit. Williams (1991) states that students may tend to plot the function and substitute the point where the limit is investigated in the algebraic expression of the function to verify the limit of a function at a point. Cottrill et al. (1996) propose a cognitive model called genetic decomposition, which explains what it means to understand the definition of the concept of limit rather than describing the types of difficulties that students have. Szydlik, (2000), Tall and Vinner, (1981) and Williams (1991) state that students tend to conceptualize limits in the dynamic way. Williams (1991) and Szydlik (2000) suggest that students who define a limit in the dynamic way do this by investigating approximation of the images in the function of the points close to the point where the limit is investigated or by examining the approximations through the graph of the function.

Tall (1980) and Williams (1991) argue that the dynamic expression of a limit makes it difficult for students to conceptualize the formal definition. Tall (1980) also states that students understand the dynamic form of limits more easily and that students use the dynamic form of limits despite attempts to guide them through the formal conceptualization of limits during teaching. Przeniosla (2004), on the other hand, states that students give the relationships they establish for the concept of limit of a function as the definition of the limit of a function and that students cannot recognize the inconsistency between these definitions and the formal definition of a limit.

The difficulties that prevent students from conceptualizing limits have numerous sources. Sierpinska (1987) states that the difficulties experienced by students in the limiting process are closely related to students’ perception of the concept of infinite. In fact, infinity is a concept that students find it difficult to grasp (Cornu, 1991; Juter and Grevholm, 2006; Tall, 2001). Tall (1992) states that students can perceive the concept of infinity as a number.

Determining the conceptual knowledge of teacher candidates about the concept of limit of a single-variable function could shed light on the learning process about the concept of limit at

university level. Therefore, the aim of this study is to investigate the conceptual knowledge levels of teacher candidates about the concept of limit of a single-variable function.

Theoretical Framework

The term concept is defined as a set of words used to describe a certain concept (Tall and Vinner, 1981). The concept definition may be formal, as accepted by the mathematical authorities, or it may also be informal (dynamic), a subjective explanation of that concept by students (Kabael et al., 2015). Szydlik, (2000), Tall and Vinner, (1981) and Williams (1991) state that students tend to conceptualize limits in the dynamic way. Williams (1991) and Szydlik (2000) suggest that students who express a limit in the dynamic form do this by investigating approximation of the images in the function of the points close to the point in question or by examining the approximations through the graph of the function. Cottrill et al. (1996) and Tall and Vinner (1981) argue that the reason for students' difficulty in formally conceptualizing limits is the quantifiers "for every" and "there exists" in the formal definition of limits. Tall and Vinner (1981) further state that students cannot make sense of the quantifiers "for every" and "there exists" in the formal definition of limits, so they have difficulty in proving the existence of a limit.

Several factors cause the difficulties that prevent students' conceptual understanding of limits. Sierpinska (1987) states that the difficulties experienced by students in the limiting process are closely associated with students' perception of the concept of infinite. In fact, infinity is a concept that students find it difficult to comprehend (Cornu, 1991; Juter and Grevholm, 2006; Tall, 2001). Tall (1992) states that students might consider the concept of infinity as a number.

According to the results from a study on how 16/17-year-old learners' conceptualizations of real number, limit and infinity concepts progress over one year, learners' basic conceptualizations of infinity and limits barely change over a year (Monaghan, 1986). We could suggest that students have difficulty in formally conceptualizing limits (Tall and Vinner, 1981) and tend to interpret the formal definition of limits as a formula (Przeniosla, 2004). Some researchers state that students have difficulty in conceptualizing limits formally because of the quantifiers "for every" and "there exists" in the formal definition of limits (Cottrill et al., 1996; Tall and Vinner, 1981). Tall and Vinner (1981) argue that students cannot make sense of the

quantifiers “for every” and “there exists” in the formal definition of limits, so they have difficulty in proving the existence of a limit. One challenge is that students have difficulty in understanding the algebraic representation in the traditional ε – δ definition of limits (Cornu, 1991; Cottrill et al., 1996; Ervynck, 1981; Fernández, 2004).

Fernández (2004) states that students are confused about what are represented by ε and δ, the connections among variables in the definition, and the reason why $|x - c|$ has to be positive while $|f(x) - L|$ does not. In addition, evidence indicates that challenges students have in quantification also affect learners’ problems with the formal definition of limits (Cottrill et al., 1996; Dubinsky, Elterman, and Gong, 1988; Tall and Vinner, 1981). Research shows that students’ difficulties with limit definition are partly caused by the use of quantifiers (Cottrill et al., 1996; Dubinsky, Elterman, and Gong, 1988; Tall and Vinner, 1981). Various studies on the concept of limit investigate students’ misconceptions about limits. (Bezuidenhout, 2001, Davis and Vinner, 1986; Ferrini-Mundy and Graham, 1994; Monaghan, 1991; Tall and Vinner, 1981; Williams, 1991). However, only few of these studies address students’ understanding of the formal definition (Cornu, 1991; Cottrill et al., 1996; Ervynck, 1981; Fernández, 2004; Tall, 1992; Tall & Vinner, 1981; Vinner, 1991; Williams, 1991).

Investigating teacher candidates’ knowledge about the concept of limit could contribute to the efforts to determine the learning process regarding the concept of limit. Therefore, the purpose of this study is to investigate the conceptual understanding of teacher candidates about the definition of limit of a single-variable function. For this purpose, the study seeks answers to the following:

- Define the concept of limit of a single variable *f* function at a point.
- Show that $\lim_{x \to x_0} (f - g)(x) = L_1 - L_2$ if $\lim_{x \to x_0} f(x) = L_1$ and $\lim_{x \to x_0} g(x) = L_2$.

Method

The Research Model

The aim of this study was to investigate primary school mathematics teacher candidates’ conceptual knowledge of limit in single-variable functions. Data were collected, analyzed, and interpreted using a basic qualitative research approach, which is widely used in educational

research. In order to collect data, the teacher candidates were asked open-ended questions prepared by experts and reviewed by at least three experts.

Participants

The study sample consisted of 30 students who were studying Primary School Mathematics Teaching at the Department of Mathematics and Science Education at a state university in Turkey and were enrolled in the Analysis I course in their second year. The participants were selected according to their levels of achievement, as shown by their answers to the open-ended questions. A total of six students were selected for the study: two students were selected from each of the high, medium, and low achievement levels.The two students with a high level of achievement were coded as K1 and K2, respectively; the two students with a medium level of achievement were coded as K3 and K4, respectively; and the two students with a low level of achievement levels were coded as K5 and K6, respectively.

Data Collection Tools

As a part of the Analysis I course, the topic on limit in single-variable functions was discussed in detail. Following the relevant lesson, the teacher candidates were asked open-ended questions to see how they constructed the subject conceptually, and their answers to the open-ended questions were analyzed. The open-ended questions included conceptual knowledge questions about the concept of limit. The data needed to find answers to the sub-problems in the study were collected by clinical interviews with the focus students. All stages of this study were followed in accordance with research and publication ethics, and on 09.04.2018 ethical committee approval numbered 41452 was obtained from Anadolu University Ethics Committee.

The Research Process

As a part of Analysis I course, the topic on limit in single-variable functions was discussed in detail. Following the relevant lesson, the teacher candidates were asked open-ended questions to see how they constructed the subject conceptually, and their answers to the open-ended questions were analyzed. This study lasted 4 weeks and 24 hours in total. The open-ended

questions included conceptual knowledge questions about the concept of limit. The data needed to find answers to the sub-problems in the study were collected by clinical interviews with the focus students.

All stages of this study were followed in accordance with research and publication ethics, and on 09.04.2018 ethical committee approval numbered 41452 was obtained from Anadolu University Ethics Committee.

Analysis of Data

In this study, data were analyzed using the content analysis method. The main purpose of content analysis is to reach the concepts and relationships that can explain the collected data. The basic process in content analysis is to bring together similar data within the context of certain concepts and themes and present them to the reader in a clear and comprehensible way (Yıldırım and Şimşek, 2006). A content analysis generally involves four aspects: processing and coding qualitative research data obtained from documents, developing themes, categorizing codes and themes, and describing and interpreting the results. Therefore, the data obtained were classified into themes in terms of accuracy (i.e., accuracy of the participants' responses) and analyzed in the form of tables. The findings from the research are provided under the theme topics**.**

The components based on this classification are as follows:
Correct : An answer that includes all the components of the correct answer.
Partially Correct: An answer that does not include all the components of the correct answer.
Incorrect : An answer that includes irrelevant or inaccurate knowledge or that includes misconception or is irrational.

Those teacher candidates who were placed in the Formal Correct category responded to the question by giving the formal definition of the concept of limit: "$\lim_{x \to x_0} f(x) = L \Leftrightarrow for\ \forall \varepsilon > 0, there\ exists\ \exists \delta > 0\ such\ that\ |x - x_0| < \delta \Rightarrow |f(x) - L| < \varepsilon$". On the other hand, the teacher candidates who were placed in the Informal Correct category responded to the question by giving the following definition: "$x \to x_0 \Rightarrow f(x) \to L$" or, in other words, "$f(x)$ approaches L

as x approaches x_0". The teacher candidates who were placed in the Correct category for the concept of neighborhood responded to the question by giving the following expression "if (x) exists in ε neighborhood of point L when x exists in δ neighborhood point x_0, the limit of function f at point x_0 is L". The teacher candidates who were placed in Partially Correct category for the three categories did not teachers did not give all the components of the answers mentioned above. Some of these teacher candidates expressed quantifiers or variables incorrectly. Those candidates who did not use the quantifiers ∀, ∃ or who wrote random things instead of ∀ were placed in the Formal Partially Correct category.

Findings

The conceptual knowledge questions, which were prepared in order to investigate the participants' conceptual understanding of limit of single-variable functions, were analyzed in separate categories. The first question asked to the teacher candidates is as follows:
"Define the limit concept of a single-variable real-valued function".

The aim of the first question asked to teacher candidates was to examine their answers for the definition of limit at a certain point of a function in single-variable functions in terms of conceptual knowledge. The participants' responses were categorized as correct, partially correct and incorrect responses. Table 1 shows the frequency and percentage distributions of the teacher candidates' responses.

Table 1
Frequency and percentage distributions of the teacher candidates' responses about the definition of the concept of limit

	Frequency	Percentage (%)
Correct	6	20
Partially correct	13	43
Incorrect	11	37
Total	30	%100

Among the teacher candidates, 20% gave correct answers to the question about the limit concept in single-variable functions. For further analysis, the teacher candidates' responses

were examined in three sub-categories: formal definitions, informal definitions, and definitions using neighborhood concept.

Table 2
Categorization of the answers to the concept of limit

	Correct		Partially correct		Incorrect		Total
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	
Formal Definition	4	19	10	48	7	33	21
Informal Definition	2	17	3	25	7	58	12
Definition using neighbor-hood concept	2	18	2	18	7	64	11

Those teacher candidates who made a correct formal definition of the concept of limit used the sentence, "Let $y = f(x)$ function be defined in the neighborhood of pointx_0. L is the limit of f at the point x_0 if there exists the number ∃ δ > 0 so that $|f(x) - L| < \varepsilon$ when $|x - x_0| < \delta$ for the number ∀ ε > 0." For informal definitions, the teacher candidates made definitions by using their own sentences. Among the participants, 70% made formal definitions. In general, the participants preferred to make formal definitions, but only 19% of them were able to make correct formal definitions. It was also determined that they used quantifiers incompletely when making formal definitions.

Among the participants, 37% made a definition by referring to the concept of neighborhood. However, only 18% of the participants expressed the concept of the neighborhood correctly. Among all the participants, 7% of the teacher candidates preferred to use both formal and informal definitions.

In general, the participants were not able to clearly express the concepts and inter-conceptual relationships. This result is consistent with the findings of Baki's 1998 study. The teacher candidates were divided into two groups when making a formal definition of limit in single-variable functions: those who used quantifiers and those who did not. Next, the responses of those candidates who used quantifiers were grouped into three sub-categories: correct use,

partially correct use, and incorrect use. Table 3 shows the frequency and percentage distributions of the teacher candidates' responses.

Table 3.
Use of quantifiers in limit definition

Use of quantifiers in limit definition		Frequency	Percentage (%)
Use of Quantifiers	Correct use	10	%53
	Partially correct use	4	%21
	Incorrect use	5	%26

Out of the participants who used quantifiers when making a definition of the concept of limit, 53% used them correctly. One of the most noticeable errors of the participants while making a formal definition of the concept of limit was their frequent use of the expression, "For at least one ε". Some of the teacher candidates incorrectly stated the place of quantifiers in their definitions. The participants' incorrect use of quantifiers suggests that they did not master the subject.

Table 4.
The participants who did not use quantifiers in limit definition

	Frequency	Percentage (%)
Those who did not use quantifiers	8	27

Out of the participants, 27% did not prefer to use quantifiers. Instead, they defined the concept of limit using informal definitions.

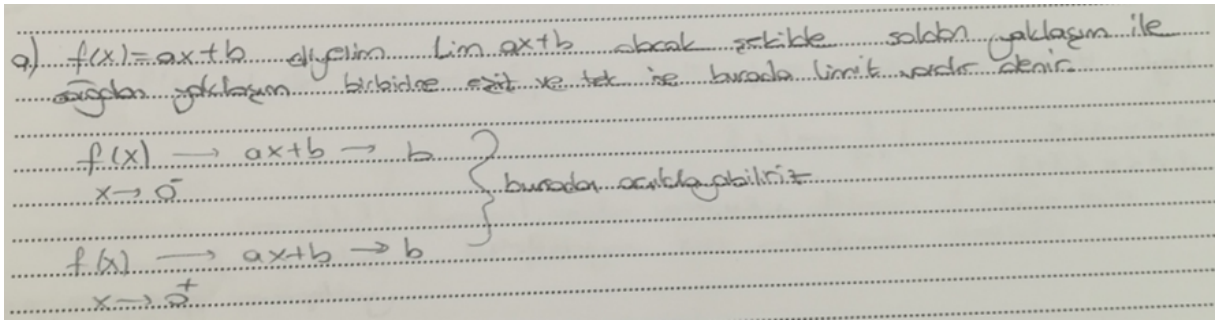

Figure 1. Example of a teacher candidate who made an informal definition

(English translation of Figure 1: Let f (x) = ax + b. Lim ax + b approach from the left approach is equal to the right if there is a limit.)

As can be seen in the answer given in the Figure 1, this teacher candidate tried to make a definition with her own sentences and came up with an informal definition. However, the candidate's notations were incorrect and incomplete. Figures 1 show examples of teacher candidates placed in the Informal Partially Correct category.

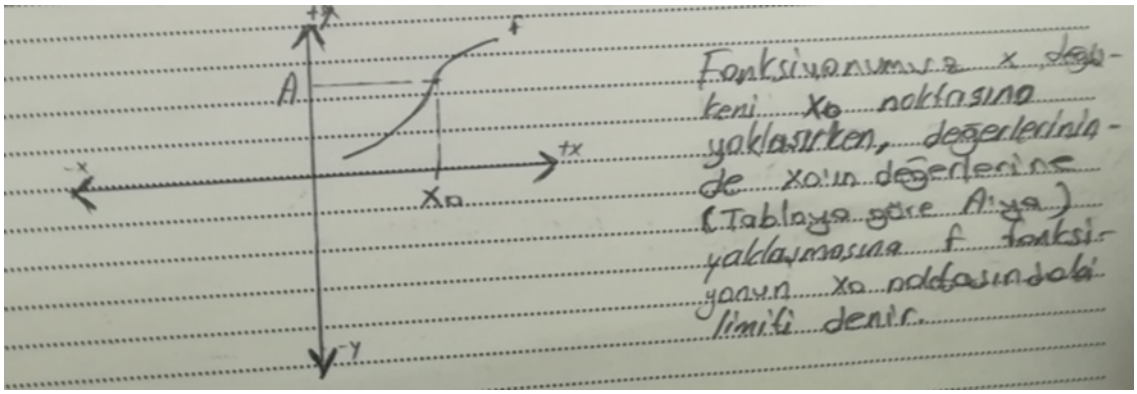

Figure 2. Example of a teacher candidate's response about limit definition

(English translation of Figure 2: When the variable x approaches the point x_0, the value of the function is approached to A according to the table. In this case, the limit is A)

The teacher candidate made an informal definition for the limit of the function. On the other hand, the candidate did not address the concept of neighborhood while interpreting the limit of the function in the analytic plane. This suggests that the teacher candidate did not have sufficient conceptual knowledge of the concept of limit. Figures 2 show examples of teacher candidates placed in the Informal Partially Correct category.

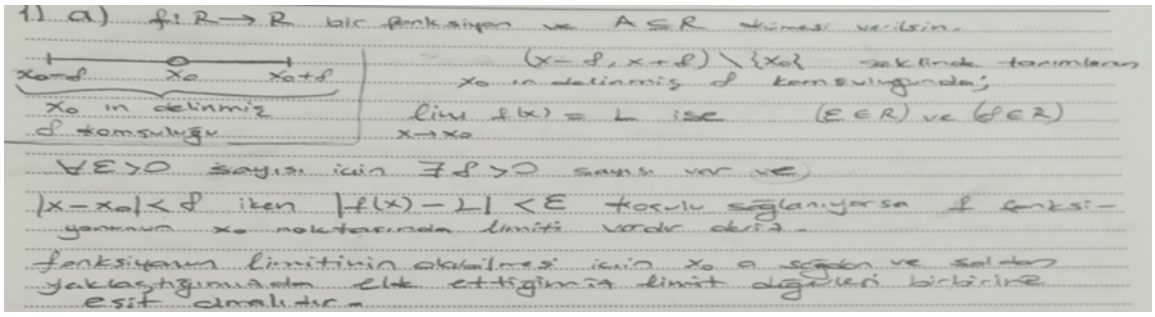

Figure 3. Example of a teacher candidate's expression of limit with the concept of deleted neighborhood

(English translation of Figure 3: If $\lim_{x \to x_0} f(x) = L$ in the perforated neighborhood defined in the form of point x_0 $(x - \delta, x + \delta) \setminus \{x_0\}$ $\forall \varepsilon > 0, there\ exists\ \exists \delta > 0\ such\ that\ |x - x_0| < \delta \Rightarrow |f(x) - L| < \varepsilon$. In addition, the right limit and the left limit must be equal for the limit of the function.)

Among the participants, 17% used the expression, "Let f be defined in the deleted neighborhood of x_0." The concept of limit becomes more explicable a relationship is established between the concept of neighborhood and the inequality $0 < |x - a| < \delta$ in the formal definition of limit (Kabael et all., 2015). When students do not make full sense of the concept of neighborhood, they tend to see the concept of limit as an abstract and difficult concept. This answer was considered in the Partially Correct category. The teacher candidate mentioned in the example shown in Figure 3 expressed the definition of a limit by means of both formal and informal and neighborhood concepts. This answer was considered in the Partially Correct category. This example clearly implies that the teacher candidate did not exactly know the formal definition and the meanings of quantifiers. That teacher candidates also incorrectly used the triangular inequality, which is an important property of absolute value. One of the reasons why the teacher candidates could not establish a relationship between the concept definition and the formal definition of the limit could be students' inability to meaningfully use the quantifiers in the formal definition (Cottrill et al., 1996; Tall and Vinner, 1981).

During the interviews with teacher candidates, the participants were asked what they understood by the concept of limit. The majority of the candidates considered the limit with the concept of convergence, as follows:

> *"A: What do you understand by the concept of limit in single-variable functions?*
> *K1 : Investigating the limit of an unknown at that point.*
> *K2 : The point at which a line can reach and converge is the limit.*
> *K3: We use it to see the range of a function defined by a given variable when approaching a certain point.*
> *K4: Assume that we want to take the limit of f(x). There is only one variable here. Here, we need to find out where the result approaches based on where x approaches.*
> *K5: It represents "convergence" for the limit of functions containing one variable.*
> *A: Can you explain the definition of convergence in detail?*
> *K5: I understand the result of this function converging a point.*
> *K6: The function depends on only one parameter. We're talking about convergence the function for a certain point. By approaching the function from the left and right, we can learn about the presence and absence of a limit."*

In order to reveal how the teacher candidates established a relationship between the informal definition of a limit or the right-left limit equation theorem and the formal definition of a limit when they defined a limit, they were asked to explain their definitions of the concept of limit.

The purpose of this attempt was also to investigate how the teacher candidates perceived the concepts of neighborhood and approach, how they established connections between the concepts of neighborhood and approach and between the concept of neighborhood and the inequalities "$|x - x_0| < \delta$" and "$|f(x) - L|<\varepsilon$" in the formal definition, and how they used the quantifiers in the formal definition. The interviewed teacher candidates frequently used the term "approach" when explaining what they understood by the concept of limit. However, they avoided giving the formal definition a limit. In other words, they preferred the informal definition to the formal definition of the concept of limit. When explaining what he understood by the concept of limit, a teacher candidate said, "We use it to see the range of image clusters of the function defined by a given variable when going to a certain point". We can conclude based on this statement that the teacher candidate, who attempted to define a limit informally, considered the limit as an approach. As a result, when the results of the interviews with the teacher candidates were considered as a whole, it was observed that the right-left limit equality theorem and the informal definition of a limit were more dominant in the teacher candidates' minds.

The second question asked to the candidates involved writing a proof:

"Let $\lim_{x\to x_0} f(x) = L_1$ and $\lim_{x\to x_0} g(x) = L_2$. Prove that $\lim_{x\to x_0} (f - g)(x) = L_1 - L_2$."

Table 5

Frequency and percentage distributions of responses to question 1/b

	Frequency	Percentage (%)
Correct	7	23
Partially correct	22	74
Incorrect	1	3
Total	30	%100

Among the teacher candidates, 23% gave correct answers to Part b of Question 1. This question addressed conceptual and procedural knowledge of the subject, and 74% of the candidates gave partially correct answers to the question. This result suggests that the candidates gave vague answers to the question.

Analysis of the teacher candidates' responses to Question 1/b shows that the participants used quantifiers incorrectly and incompletely. While the expression $\forall\varepsilon > 0$ should be used, the expression "arbitrary $\varepsilon > 0$" was preferred. This result suggests that the teacher candidates did not exactly know the formal definition and meaning of quantifiers.

This question asked the participants to show the result $\lim_{x\to x_0}(f-g)(x) = L_1 - L_2$ for $\lim_{x\to x_0} f(x) = L_1$ and $\lim_{x\to x_0} g(x) = L_2$. The responses to the sub-problem were divided into sub-categories for in-depth analysis of the problem. These responses were categorized as those who chose δ_1 against $\forall\varepsilon > 0$ for L_1, those who chose δ_2 against $\forall\varepsilon > 0$ for L_2, and those who chose $\min(\delta_1, \delta_2)$ for $L_1 - L_2$.

Table 6.

Selection of values corresponding to δ_1 and δ_2

	Frequency	Percentage (%)
Those who chose $\boldsymbol{L_1 \to \delta_1}$	24	80
Those who chose $\mathbf{L_2 \to \delta_2}$	24	80
Those who chose $\boldsymbol{L_1 - L_2 \to \min(\delta_1, \delta_2)}$	22	73

The percentages of those who chose δ_1 against $\forall\varepsilon > 0$ for L_1, those who chose δ_2 against $\forall\varepsilon > 0$ for L_2, and those who chose $\min(\delta_1, \delta_2)$ for $L_1 - L_2$ were 80%, 80% and 73%, respectively. Among those who chose δ_1 *and* δ_2, two participants did not choose $\min(\delta_1, \delta_2)$. Also, some of the participants who chose δ_1, δ_2 expressed the quantifiers incompletely.

The data obtained from the interviews with the K1, K2, K3, K4, K5,K6 coded students for the second question as follows:

> *"Assume that when we take A: $\boldsymbol{\varepsilon = 1}$ we can take $\boldsymbol{\delta_1 = \frac{1}{2}}$ for $\boldsymbol{f}$ and $\boldsymbol{\delta_2 = \frac{1}{3}}$ for $\boldsymbol{g}$. What value can we assign to $\boldsymbol{\delta}$ against $\boldsymbol{\varepsilon = 1}$ for $\boldsymbol{f - g}$ function?"*
> *K1: "We can take δ value as δ1- δ2 $= \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$."*
> *R: "Why?"*
> *K1: "This is what I remember by heart."*
> *K2:" It is δ1- δ2 $= \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$.*
> *R: "Why?*
> *K2: "Because we assign the same value to $\boldsymbol{\varepsilon}$."*
> *K3: "First of all, I would think I needed to know functions and come up with common solutions. But then I would think the formal definition would work for me and would say $\boldsymbol{\delta}$ =δ1- δ2 $= \frac{1}{6}$."*

K4:" $\boldsymbol{\delta} = \delta 1 - \delta 2 = \frac{\mathbf{1}}{\mathbf{6}}$"
R: "Why?"
K4: "Because I can say this by heart. Honestly, I don't know exactly why.
K5:" $\boldsymbol{\delta} = \delta 1 - \delta 2 = \frac{\mathbf{1}}{\mathbf{6}}$"
R: "Why $\frac{\mathbf{1}}{\mathbf{6}}$?"
K5: "Because the difference of the limits of individual functions is equal to the limit of the difference of functions."
K6:" I can break up f-g function as (f)-(g). If we assign $\delta 1 = \frac{\mathbf{1}}{\mathbf{2}}$ for f and $\delta 2 = \frac{\mathbf{1}}{\mathbf{3}}$ for g, we obtain $\boldsymbol{\delta} = \frac{\mathbf{1}}{\mathbf{6}}$."

All the teacher candidates participating in the interviews estimated the value δ in the proof of the proposition as $\delta = \delta_1 - \delta_2$. Because the proposition was expressed as "If $\lim_{x \to x_0} f(x) = L_1$ and $\lim_{x \to x_0} g(x) = L_2$, show that $\lim_{x \to x_0} (f - g)(x) = L_1 - L_2$", they estimated the value δ as $\delta = \delta_1 - \delta_2$. The teacher candidates K1, K2, K3, K4, K5 and K6 explained the reason for this:

K1: "I remembered this situation by heart."
K2: "Because we give $\boldsymbol{\varepsilon}$ the same value."
K3: "I would firstly assume that I needed to know the functions and find a joint solution. But then I would think that the formal definition would work for me and would say $\boldsymbol{\delta} = \delta 1 - \delta 2 = \frac{\mathbf{1}}{\mathbf{6}}$."
K4: "I say so because this is what I remember by heart. I do not know exactly why."
K5: "Because the difference of the limits of individual functions is equal to the limit of the difference of functions."
K6: "I can split the function f-g as (f)-(g). If I take $\delta 1 = \frac{\mathbf{1}}{\mathbf{2}}$ for f and $\delta 2 = \frac{\mathbf{1}}{\mathbf{3}}$ for g, the result will be $\boldsymbol{\delta} = \frac{\mathbf{1}}{\mathbf{6}}$."

None of the teacher candidates who participated in the interviews determined the value δ as $\delta = \min(\delta_1, \delta_2) = \frac{1}{3}$. They estimated the value δ based on the theorem statement. This result suggests that the teacher candidates gave answers by heart as they clearly stated.

Results and Discussion

This study investigated teacher candidates' conceptual understanding of the concept of limit in single-variable functions. The teacher candidates were administered a test consisting of open-ended questions, and six focus students selected among the participants were interviewed. The following findings were obtained as a result of the test and interviews.

For the first question, the teacher candidates were asked to define the limit concept of a real-valued single-variable function. It was found that 20% of the candidates made a correct definition the concept of limit. The answers of the candidates were further sub-categorized in order to obtain in-depth results. For further analysis, the teacher candidates' responses about the definition of the concept of limit were examined in three categories: formal definitions, informal definitions, and definitions using neighborhood concept. It was determined that 70% of the candidates preferred to make a formal definition, but only 19% of the candidates who made a formal definition answered the question correctly. The candidates who made a definition of limit were divided into two sub-groups: those who used quantifiers and those who did not use quantifiers. It was found that 53% of the candidates who made use of quantifiers used them correctly. One of the noticeable errors of the candidates in making a formal definition of limit was that they preferred the expression "arbitrary $\varepsilon > 0$" whereas the expression $\forall \varepsilon > 0$ should be used. It was also seen that the teacher candidates used the formal definition of limit and quantifiers without knowing what they actually meant. When teacher candidates were asked to define the concept of limit, they generally turned to the formal definition. When the data related to the sub-problems in the study were evaluated, it was found that the candidates used the quantifiers in the wrong place while using them in the formal definition, and during the interviews, they stated that they used quantifiers by memorization. The four different quantifier $\forall, \exists, \ni$ definitions used in the formal definition of limit (ε-δ) make it difficult to understand (Todorov, 2001). This is consistent with the data obtained from this study.

In part b of Question 1, the participants were asked to show the result $\lim_{x \to x_0} (f - g)(x) = L_1 - L_2$ for $\lim_{x \to x_0} f(x) = L_1$ and $\lim_{x \to x_0} g(x) = L_2$. Among the participants, 3% answered the question incorrectly. The participants were found to be successful in applying the formal definition of the limit. The responses to the sub-problem were divided into sub-categories for in-depth analysis of the problem. These responses were categorized as those who chose δ_1 against $\forall \varepsilon$ for L_1, those who chose δ_2 against $\forall \varepsilon$ for L_2, and those who chose $\min(\delta_1, \delta_2)$ for $L_1 - L_2$. The percentages of those who chose δ_1 against $\forall \varepsilon'$ for L_1 and those who chose δ_2 against $\forall \varepsilon$ for L_2 were 80%, whereas the percentage of those who chose $\min(\delta_1, \delta_2)$ for $L_1 - L_2$ was 73%. When the candidates' responses were examined, it was determined that one of their noticeable errors was their use of quantifiers in the wrong place.

Research suggests that students have difficulty in formal conceptualization of limits (Tall and Vinner, 1981) and tend to interpret the formal definition of a limit as a formula (Przeniosla, 2004). Establishing the relationship between the concept of neighborhood and the inequality $0 < |x - a| < \delta$ in the formal definition of a limit facilitates the comprehension of the concept of limit (Kabael et all., 2015). When students cannot grasp the concept of neighborhood, they tend to regard the concept of limit as an abstract and challenging concept. This result is supported by the study of Kabael et al. (2015). The informal definition of a limit was dominant in the concept definitions of the teacher candidates in this study, and this result was consistent with the results reported by Williams (1991) and Szydlik (2000).

The results showed that the teacher candidates' concept definitions were generally based on the right-left limit equation theorem and the dynamic form of the limit. However, the results of the clinical interviews showed that they avoided giving the formal definition of a limit.

The teacher candidates' inability to use the quantifiers in the formal definition in a meaningful manner, as stated in the literature (Cottrill et al., 1996; Tall and Vinner, 1981), prevented them from establishing a relationship between the concept definition and the formal definition of a limit. Another reason for this result could be the teacher candidates' difficulty in formal conceptualization of limits due to their inability to make connections between the inequalities "$|x - x_0| < \delta$" and "$|f(x) - L|$" in their knowledge of the concepts of approach and neighborhood and the formal definition. In fact, as shown by evidence, students have difficulty in formal conceptualization of limits (Tall and Vinner, 1981) and tend to interpret the formal definition of a limit as a formula (Przeniosla, 2004). As Tall and Vinner (1981) and Cottrill et al. (1996) suggest, the reason why the teacher candidates had difficulty in formal conceptualization of limits could be the presence of "for every" and "there exists" in the formal definition of a limit.

When investigating the limit of a function at a point, the teacher candidates described the approach of x by taking a neighborhood of the point where the limit was investigated and taking the points close to the point where the limit was investigated. In addition, they described the approach of (x) by taking images of x as points close to the limit value within a neighborhood of the limit value.

In order to find out what the teacher candidates understood by the term “approach”, the researcher questioned what they meant when they used the word “approach” during the interviews. Most of the teacher candidates indicated approaching to a point correctly as a point. Limit, which various concepts such as continuity, derivative and integral are based on, is one of the key and fundamental concepts of mathematics. Teaching of this concept is of great importance.

Statements on ethics and conflict of interest

“I, as the Corresponding Author, declare and undertake that in the study titled as “*Mathematics Teacher Candidates’ Conceptual Knowledge of the Concept of Limit in Single-Variable Functions”,* scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation.”

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Research Article

Opinions of Primary School Teachers in Relation to Effectiveness and Applicability of Design Skill Workshops[1]

Gülten Feryal Gündüz[2]

Abstract

General purpose of this research is to determine the opinions of primary school teachers on the effectiveness and applicability of the studies conducted in relation to Design Skills Workshops (TBA). The participants of the study, designed according to the phenomenology research model, are 20 teachers who work in one of the primary schools that are pilot in the use of TBAs. Research data were collected by using a semi-structured interview form. According to the findings, generally the teachers consider the use of TBAs in education as a positive development for the Turkish education system, but they think that it is difficult to apply them in all schools throughout the country. While almost all of the teachers consider that the training given by the Istanbul Provincial Directorate of National Education for the use of TBAs is insufficient, all of the teachers found the studies of the school administration for the use of TBAs sufficient. Teachers actively use all the workshops in the school, except for the wood, garden and animal care workshops, in almost all lessons. Teachers stated that the use of TBAs mostly enabled students to develop collaborative learning, creative thinking and hand skills. According to the teachers, the use of TBAs enables teachers to associate the lessons with each other more, to do more research and to prepare more detailed lesson plans while performing their teaching. According to the results, most of the teachers do not consider that TBAs are applicable throughout the country because of the crowded class sizes, the teachers' not having enough knowledge about using TBAs, and the physical conditions' not being sufficient. Among the proposals made by teachers regarding arrangements to be made in relation to TBAs before disseminating them throughout the country, having collaboration among teachers responsible from design skills workshops and among these teachers and class teachers comes at the forefront. Providing longer-term training for teachers on how TBAs should be used is another most recommended issue.

Keywords: *Design skills workshops, TBA, primary school teachers*

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İlkokul Öğretmenlerinin Tasarım Beceri Atölyelerinin Etkililiğine ve Uygulanabilirliğine Yönelik Görüşleri

Öz

Bu araştırmanın genel amacı ilkokul öğretmenlerinin Tasarım Beceri atölyeleri (TBA)'ne yönelik yapılan çalışmaların etkililiğine ve uygulanabilirliğine ilişkin görüşlerini belirlemektir. Araştırma fenomenoloji araştırma modeline göre desenlenmiştir. Araştırmanın katılımcılarını TBA'ların kullanılmasında pilot olan ilkokullardan birinde görev yapan 20 öğretmen oluşturmaktadır. Araştırma verileri yarı yapılandırılmış görüşme formu ile toplanmıştır. Araştırmadan elde edilen bulgulara göre genel olarak öğretmenler, eğitim-öğretimde TBA'ların kullanılmasını Türk eğitim sistemi adına olumlu bir gelişme olarak nitelendirmekte ancak ülke genelinde tüm okullarda uygulanabilirliğini zor bulmaktadırlar. Öğretmenlerin hemen hemen tamamı İstanbul İl Milli Eğitim Müdürlüğü tarafından TBA'ların kullanımına yönelik verilen eğitimleri yetersiz bulurken; öğretmenlerin tamamı okul idaresinin TBA'ların kullanımına yönelik yaptığı çalışmaları yeterli bulmuşlardır. Öğretmenler okuldaki ahşap ile bahçe ve hayvan bakım atölyeleri hariç diğer tüm atölyeleri aktif olarak hemen hemen tüm derslerde kullanmaktadırlar. Öğretmenler, TBA'ların kullanımının öğrencilerin en fazla işbirlikli öğrenme, yaratıcı düşünme ve el becerilerinin gelişmesini sağladığını belirtmişlerdir. Öğretmenlere göre, TBA'ların kullanımı öğretmenlerin öğretimi gerçekleştirirken dersleri birbiri ile daha fazla ilişkilendirmelerini, daha fazla araştırma yapmalarını ve daha detaylı ders planları hazırlamalarını sağlamaktadır. Araştırma sonuçlarına göre öğretmenlerin büyük bir çoğunluğu TBA'ları ülke genelinde uygulanabilir bulmamaktadırlar. Uygulanabilir olmamasına yönelik öğretmenler tarafından en fazla belirtilen nedenler ise sınıf mevcutlarının kalabalık olması, öğretmenlerin TBA'ları kullanma konusunda yeterli bilgiye sahip olmamaları ve fiziki koşulların yeterli olmamasıdır. Araştırmada öğretmenlerin ülke geneline yaygınlaştırılmadan önce TBA'larla ilgili yapılabilecek düzenlemelere ilişkin önerilerinin başında tasarım beceri atölyelerinden sorumlu öğretmenlerin ve bu öğretmenler ile sınıf öğretmenleri arasında işbirliğinin olması yer almaktadır. TBA'ların nasıl kullanılması gerektiği ile ilgili öğretmenlere daha uzun süreli eğitimler verilmesi de en fazla önerilen konulardan bir diğeridir.

Anahtar Sözcükler: *Tasarım beceri atölyeleri, TBA, İlkokul öğretmenleri*

Introduction

Education is in direct and reciprocal interaction with other social institutions such as family, religion, politics, economy and law. In other words, it is an important complement to the social structure. Therefore, all developments and changes experienced in a country, both locally and globally, closely affect and concern the education system of that country. In the literature, especially in the information age we are in, it is stated that education is the key to basic transformation and change and one of the most important factors in measuring the development level of countries. (Maroun, Samman, Moujaes & Abouchakra, 2014, transmitted by Doğan, 2019; Özcan, 2011). Countries that are aware of this make serious investments in education systems in order not to lag behind changes and developments and to meet the educational needs of individuals and their societies in line with these changes. Reform studies for education systems are carried out at times and under conditions deemed to be necessary and many improvement, regulatory and development steps are taken in relation to education to increase the quality of education.

In Turkey these development and improvement studies are mostly carried out by the Ministry of National Education (MEB), which is the main political actor of the Turkish education system and puts its own policies into practice through various executive mechanisms. In this direction, the basic policy documents that shape the future studies and regulations in the Turkish education system can be defined as 2019 Presidential Annual Program, 66th Government Program, Medium Term Program, New Economic Program, EU Acquis Alignment Program, MEB 2023 Education Vision, Ministry of National Education Strategic Plan (2019-2023), 19th National Education Council Decisions, Life in the EU context Learning Strategy Document and Action Plan (European Commision Eurydice, 2020). When these documents, the decisions taken and the practices are examined, it is seen that many important innovations have been made in the Turkish education system, especially in recent years. Among these, the practice of contract teaching, the FATİH project to ensure equal opportunities in education, the arrival of the 4 + 4 + 4 education system, the development of the national competencies framework for determining the student profile of the new century, the updating of the teaching programs, the establishment of Istanbul teacher academies and parent academies come at the forefront (Altın & Kalelioğlu, 2015; Boz & Yıldırım, 2017; Hamarat, 2019). With all these innovations, it is aimed to increase the quality and features of the education system, to provide students with the knowledge, skills and competencies of the

21st century, to adapt them to the innovations brought by globalization and the information age, while at the same time ensuring that they have the cultural and social values of the society they live in.

One of the important innovations made by the Ministry of National Education bearing the quality of educational reform in the education system is the step taken under the name of "2023 Education Vision". Vision is defined as a set of statements that include the goals and objectives of the organization for the future, which it wants to succeed, achieve and become (Sabuncuoğlu & Gök, 2008). According to another definition, it is the reference point that an organization planning for change takes as a basis to initiate and realize this change (Ülgen & Mirze, 2010). It can be said that a more clear and comprehensive definition was made by Cemaloğlu (2018). According to Cemaloğlu (2018), the vision is to determine the place you want to be in the future, to determine the place you want to reach, to draw a picture of the future, to set goals for the future. Ertürk (2020) and Kouzes and Posner (2012) emphasize that vision is an indispensable element for the development of systems, based on the need for a system to see the future and make the necessary preparations for this future in order to survive and succeed. Otherwise, they state that it will be difficult for it to survive in a competitive environment among other systems. Based on the definition and importance of the vision, it is possible to say that the 2023 Education Vision, which was shared with the public by the Ministry of National Education on October 23, 2018, includes important goals and important decisions taken regarding the future of the Turkish education system. With the announcement of the 2023 Education Vision document, all parties concerned with education in Turkey were surrounded with a new excitement about the organizational objectives, whereas all segments of the society shared this excitement at the same time. The reason for this is that the problems that have been expected to be solved for many years were addressed with the vision document and the forward moves of an institution such as the leading educational institution of the national social institutions concerned everyone (Abdullah, 2018; Uyan, 2018). Although the special emphasis on Turkish culture and national values has a traditional aspect in the document, the modern aspect of the plan supporting innovation and development is also highlighted (Akgün, Yılmaz & Seferoğlu, 2011; Sever, Baldan, Tuğlu, Kabaoğlu & Hamzaj, 2018). The basic policy of the 2023 Education Vision document is based on the necessity of seeing the basic starting point of the educational institution as the individual's self-knowledge and recognition. In this context, when children, parents and teachers get to know themselves and those around them, there is an opportunity to develop together. (Ministry of National

Education, 2018).

The 2023 Education Vision document includes the changes, innovations and transformations planned to be realized in all education levels and almost all areas of the Turkish education system (Ministry of National Education, 2018). In the document, measurement and evaluation, development and management of human resources, financing of schools, inspection and corporate guidance services, guidance and psychological counselling, special education, special talent, foreign language education, digital content and skill-supported transformation in learning processes, early childhood, basic education, goals in secondary education, vocational and technical education, special education and lifelong learning have been determined and the activities planned in line with these targets are explained (Ministry of National Education, 2018). The planned transformation in achieving the goals includes a three-year phasing. Design, simulation, pioneering pilots and partial implementation of innovations were carried out in the 2018-2019 academic year. In the 2019-2020 academic year, country-scale piloting and the implementation of the actions whose design has been completed started to be carried out. In the 2020-2021 academic year, it is aimed to implement all of the actions listed under the main objectives and to make impact analysis of some actions.

One of the innovations stated to be realized in the field of basic education in the document is Design-Skill Workshops (TBA). With these workshops, it is aimed to restructure primary and secondary schools in terms of development, to enable innovative practices and to develop children's interests, abilities and temperaments (Ministry of National Education, 2018). TBA is a learning environment where students are presented with opportunities and tools to express themselves creatively (antakya.meb.gov.tr, 2020), where students can spend time to think, design and produce and experience the process of creation (Ministry of National Education, 2018). It is stated that designing, making and producing will come to the forefront in these workshops rather than knowing, and these workshops will help the child to get to know himself, his profession and his environment. At the same time, it is stated that they will be organized as concrete spaces for the acquisition of problem solving, critical thinking, productivity, teamwork and multi-literacy skills required for the age we live in (Ministry of National Education, 2018). TBAs have been evaluated with a focus on 21st century skills, higher education fields and science, arts, culture, sports and life skills, and 11 workshop models have emerged. There are science, technology, mathematical engineering and software

and design workshops in the field of science; visual arts, wood and metal and music workshops in the field of art; and drama and language and critical thinking workshops in the field of culture. The sports area is divided into indoor sports and outdoor sports. In the living area, there are life skills, garden and animal care workshops (antakya.meb.gov.tr, 2020). The conditions required for each workshop to be established have been explained by the Ministry of National Education. Although many conditions are mentioned in these specifications, one of the most important is the requirement that there should be at least 48 m^2 class size area for each workshop. Apart from these specifications for each workshop, there is minimum number of workshops that a school must open in order to become a TBA school. For this, TBA schools are expected to have at least one workshop in science, arts, sports, culture and life fields. Workshops in the fields of science, arts and culture are required to be in closed areas. If there is a place in the garden to meet the sports area, outdoor sports can be preferred instead of indoor sports. If there is an area to be cultivated in the schoolyard to meet the living space, a nature and animal care workshop can be done instead of one relating with life skills. Thus, TBA can be built with at least 3 closed areas for schools with a closed space shortage (istmem.meb.gov.tr, 2020). Due to the Covid-19 pandemic process, there are some schools that have started using TBAs as of the 2018-2019 academic year, although there have been problems in pilot applications with the transition of schools affiliated to Ministry of National Education, to distance education in March 2020.

In the realization of the 2023 Education Vision, the teacher is defined as the main actor who builds the curriculum by taking into account the individual differences and learning needs of the children, who will make the student (ore) become jewelry and who will guide him (Ministry of Education, 2018). For this reason, in order for the reform studies carried out in the education system to achieve its purpose, they must be adopted by teachers and the changes must be believed in (Barton & Walker, 2017; Kepes, 2018; O'Sullivan, 2016). Ertürk (2020) also states that a vision created can be as strong as it is accepted and shared by the employees of the institution. Baltacı and Coşkun (2019) also stated that due to the fact that many projects that the Ministry of National Education tried to carry out in the past were not internalized by teachers, negativities such as not being able to implement these projects or not obtaining the desired efficiency from the projects have come out. On the other hand, Duran and Kurt (2019) stated that no matter how advanced the course materials used in the education process and the integration of these materials with technology are, it will not be possible from them to become more important than the teacher who is the guide of education and they have stated

that no technological device can provide interaction between teacher and student. Although there are a small number of studies (Baltacı & Coşkun, 2019; Duran & Kurt, 2019) that take teachers' opinions about the 2023 Education Vision in general in the literature, it is seen that these studies constituted of opinions received in the planning stage before the educational vision was implemented. In the literature, no research has been found that examines teachers' views regarding the design skill workshops, which is one of the objectives of the 2023 Education Vision, during both the planning of the vision and the pilot implementation of TBAs. In this context, it is thought that this research will be a pioneering study and the results of the research will guide researchers in opening new fields of study on the subject. However, it is thought that determining how teachers perceive the educational reform practices that are targeted and piloted will contribute to educational scientists and education politicians in revealing the problems encountered in practice and what kind of improvement studies should be done before disseminating them throughout the country. Based on these importance and necessity situations, the general purpose of this study is to determine the opinions of primary school teachers on the effectiveness and applicability of the studies on design skill workshops. In line with this general purpose, answers to the following questions have been searched for:

According to the elementary school teachers,

1. What is the purpose of design skill workshops?
2. What is the adequacy of the training given by the Istanbul Directorate of National Education for the use of TBAs?
3. What is the adequacy of the studies carried out by the school administration for the use of TBAs?
4. What are the TBA workshops they actively use?
5. What are the courses they actively use TBA workshops?
6. What is the effect of the use of TBAs on the competencies of students?
7. What kind of change does the use of TBAs cause in relation to the teachers' competencies?
8. What are the applicability status and reasons of TBAs?
9. What kind of regulations should be made regarding TBAs before they are disseminated throughout the country?

Method

The research was designed according to phenomenology research model, which is one of the qualitative research methods. In phenomenology, it is studied on phenomena regarding which there is awareness but relating with which there isn't detailed information. These phenomena can be experiences, perceptions, orientations, concepts and situations. (Yıldırım & Şimşek, 2011). Phenomenology focuses on experiences based on individual differences, and it analyzes and compares them (Patton, 2014). 2023 With the implementation of TBAs included in the Education Vision in pilot schools, some of their applications have become known to teachers, but the particular about how they should be used in full sense has turned into a complex phenomenon over time. For this reason, TBAs have been considered as a phenomenon that needs to be investigated, and the phenomenology model has been used in their in-depth investigation and description.

Study Group

The participants of the study are teachers working in a primary school in the district of Küçükçekmece, Istanbul, which is one of the pilot schools in the use of TBAs. Purposeful sampling method was used in the selection of teachers, whereas in the selection of teachers, their participation in the TBA training conducted by the Istanbul Directorate of National Education and actively using TBAs were taken into consideration. Creswell (2014) stated that it would be sufficient to have a sample size between 3-10 in phenomenological studies conducted with purposeful sampling method. The working group of this research consists of 20 classroom teachers. The characteristics of the participants are shown in Table 1.

Table 1.
Personal characteristics of teachers participating in the research

Teachers (Codes	Gender	Age	Service period (year)	Level of class thought	Usage period of TBAs
T1	Female	33	9	3.class	8 months
T2	Male	34	14	3.class	4 months
T3	Female	35	14	2.class	8 months
T4	Female	49	27	2.class	8 months
T5	Female	45	23	2.class	8 months
T6	Female	40	18	1.class	2 months
T7	Female	46	24	1.class	2 months
T8	Male	34	10	1.class	2 months
T9	Female	45	21	4.class	8 months
T10	Female	42	19	3.class	8 months
T11	Female	40	20	2.class	4 months
T12	Female	46	22	3.class	8 months
T13	Female	46	24	3.class	8 months
T14	Female	44	21	4.class	8 months
T15	Female	56	24	2.class	4 months
T16	Male	37	14	3.class	8 months
T17	Female	37	13	2.class	4 months
T18	Female	26	2	2.class	4 months
T19	Female	34	10	4.class	8 months
T20	Female	65	41	4.class	8 months

Participants were coded as T1, T2 .... T19, T20. As seen in Table 1, 17 of the teachers are women; 3 of them are men. Participation in the research is on a voluntary basis. As can be seen from the characteristics of the participants, female teachers were more eager to participate in the study. Half of the participants have a service term of 20 years or more. Eight teachers' seniority is between 10-19 years and seniority of two teachers is under 10 years. The age of the teachers varies between 25-65. Seven teachers are 2nd class teachers, six teachers are 3rd class teachers, four teachers are primary school 4th class teachers, and three teachers are 1st class teachers. The active use of TBAs of teachers varies according to the level of class where they teach. While determining the active use of teachers, the period from the first use of TBAs to the closure of schools on March 15, 2020 due to the Covid-19 pandemic process was taken into account. Primary school 3rd and 4th class teachers used them for 8 months, primary school 2nd class teachers used them for 4 months, first class teachers, on the other hand, only actively used them for approximately two months of the second term of the 2019-2020 academic year (the period before schools were closed). The amount of weekly use of the teachers within these periods was determined together with the school principal. Accordingly, teachers of the same class (such as primary school 2nd class teachers) can use the workshops they want once a week (about 6 hours). On Friday, the last day of the week, teachers whose

weekly workshops are incomplete or who want to do new work can use any workshop regardless of their class level. The branch teachers come together to determine which course and which workshops they will use on which course and learning, under the guidance of the head of the branch, and prepare TBA lesson plans suitable for interdisciplinary teaching by associating the outcomes of the courses with the workshops they have determined. The lesson plans prepared are submitted for the approval of the school administration and they are implemented if they are considered to be suitable by the principal.

The ethical committee approval numbered 2020.33 was obtained from İstanbul Kültür University Ethics Committee on 20.05.2020

Data Collection Tool

In the study, a semi-structured interview form developed by the researcher was used to determine the opinions of primary school teachers about TBA. Before giving its final form to the interview form, with the purpose of achieving internal and external validity, the form was submitted for examination of two academicians working at education programs and education main department branch at education faculty, one academician working at measurement and evaluation main department branch and one academician working at computer and instructional technologies with the aim to get expert opinions. In line with the opinions and suggestions of the experts, two questions in the form were reviewed in terms of clarity and supporting questions were added to a question regarding the effectiveness of TBAs. A pilot application of the corrected form was carried out with 4 class teachers working in 1st and 4th classes of primary school. As a result of the pilot application, it was seen that there were no questions that were not understood by the teachers and it was concluded that the interview form could be used. The interview form consists of 10 questions in total. Two questions are about the personal characteristics of the participants and eight questions are about their views on TBAs. Interviews with teachers were held in the months of April-May in 2019-2020 academic years. In this process, as schools were closed due to the Covid-19 epidemic, interviews were conducted via videoconference. Determination of the technological tool used in the realization of the videoconference is left to the participants' request. More than half of teachers preferred videophone calls, whereas others preferred to use Internet teams or zoom program. The shortest interview is 17 minutes; the longest interview lasted 49 minutes. The total duration of the interviews with all teachers is 9 hours and 44 minutes.

Collection and Analysis of Data

Descriptive analysis was used in the analysis of the interviews. Descriptive analysis allows to summarize and interpret data according to previously determined themes for data resolution (Yıldırım & Şimşek, 2011). First of all, a thematic framework for coding was created by considering the questions in the interview form and the sub-purpose questions of the research. The themes and codes accessed are supported by quotations that are deemed important in the text. The identified findings were explained in relation to the research questions. MAXQDA 2020 program was used to analyze the data.

Validity and Reliability

In determining validity and reliability, the concepts of credibility, transferability, consistency and verifiability suggested by Mills (2003) were taken into consideration. Preliminary interviews were held with the participants to ensure persuasiveness in the study and expert opinions were received during the development of data collection tools and presentation of the findings. To ensure transferability and to be useful for similar researches, the whole process of the research has been explained in detail starting from the development of research data collection tools to data collection techniques and from the analysis of the data obtained to the presentation of the findings. Interviews were conducted with more participants than the number deemed sufficient for purposeful sampling. In order to ensure consistency, while developing data collection tool, analysis were realized and findings were submitted, in order to determine whether the researcher has the same opinion or not and whether they would use the same methods if they were carrying out the same research or not, opinions of experts conducting studies in same and similar areas were obtained. For verification, it was ensured that nearly 50% of the research data were analyzed by an expert independent of the research and to determine the consensus between the researcher and the independent expert, calculations (consensus / consensus + disagreement * 100) for determining the coefficient of concordance of Miles, Huberman and Saldana (2014) were performed. It is stated that the consistency coefficient should be at least 70% (Miles, Huberman & Saldan, 2014). Neuendorf (2002) states that the perfect fit is 90% and above. In this research, the conformity obtained from the consensus among experts is 92%.

Findings

Purpose questions have been considered in presenting the research findings. Teachers' opinions on the effectiveness and applicability of design skill workshops were gathered under nine main themes. These themes are shown in Table 2.

Table 2
Themes obtained from interviews conducted with primary school teachers

Themes	
1.	Purpose of design skill workshops
2.	Studies of the school administration on TBAs
3.	Reasons for the insufficiency of TBA trainings of Ministry of National Education
4.	Used design skill workshops
5.	Lessons using design skill workshops
6.	Developing competencies of students with the use of TBA
7.	Contribution of TBA use to teacher competencies
8.	Reasons why TBAs are not applicable
9.	Suggestions for applicability of TBAs

Opinions of Primary School Teachers on the Purpose of the Design Skill Workshops

The sub-themes of providing an authentic learning environment, making learning enjoyable, enabling students to discover their talents and skills, ensuring permanent learning and active learning were obtained from the views of primary school teachers regarding the purpose of design skill workshops. These themes and teachers' frequencies for each of these themes are shown in Figure 1.

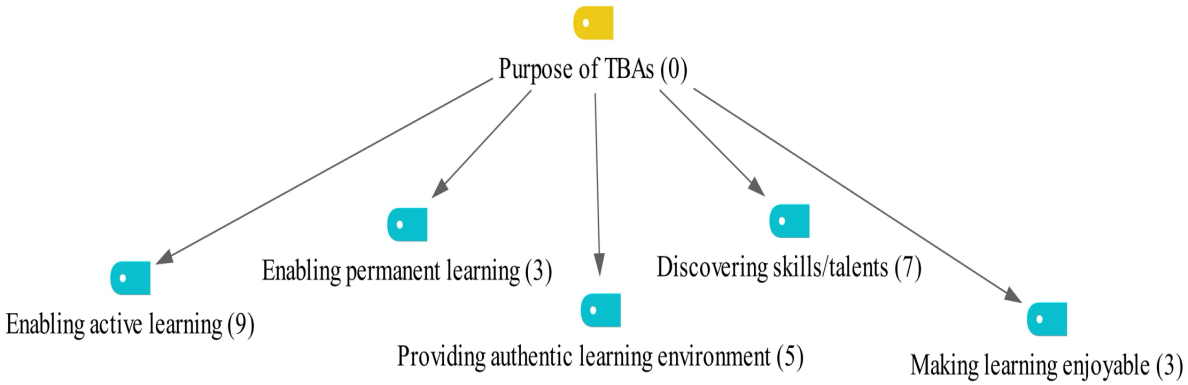

Figure 1. Purposes of design skill workshops

As seen in Figure 1, about half of the teachers stated that the purpose of the design skill workshops was related with providing learning environments where students can express themselves more actively. Some of the teachers' thoughts about the TBAs' providing active participation opportunity for students are as follows:

> *".... The teacher was telling and telling in the classroom and only after a while the child could come to the forefront, but in these workshops the child became more prominent, so I think he becomes more active in education and teaching process." (T_11)*

> *"Since the workshops are different environments in terms of their use, I think it is aimed for them to receive more effective and active training in those environments." (T_20)*

To enable students to discover their abilities / skills (N = 7) and to provide authentic learning environments (N = 5) come after ensuring active learning, respectively. Some of the teachers' views on these themes are as follows:

> *"...It is related with learning about their different development areas and achieving different gains, that is, it is a completely skill-based lesson, I think it was made to see their skills because it is not done in the classroom, the name is the workshop in the first place." (T_8)*

> *"Its purpose is to guide students in different directions to bring out their different abilities, that is, to make them aware of their own abilities." (T_10)*

> *"Workshops can be carried out to enable them to know the world they live in. It enables them to experience the real world, so to speak, such as collecting their bed, cooking, being with animals..." (T_18)*

Three teachers, on the other hand, stated that TBAs also aimed to ensure permanent learning and to make learning enjoyable. The views of each teacher regarding these thoughts are as follows:

> *"How I would say it is that in order to reinforce the lessons better, just like words fly and writings remain, what happens here is that children's learning becomes more permanent." (T_3)*

> *"...To make it more enjoyable in a more beautifully crafted environment. Lesson does not only take place in the classroom and we can see that it could be done outside the class and that they are enjoying it so much." (T_16)*

Primary School Teachers' Opinions on the Adequacy of the Education Provided by the Istanbul Directorate of National Education (MEM) for the Use of TBAs

While a teacher stated that he was not sure whether the training given by Istanbul MEM for the use of TBAs was sufficient or not, two teachers stated that they found it to be partially sufficient. The majority of the teachers (N = 17) did not consider that the trainings given were sufficient. Teachers were asked why they found it partially adequate or inadequate. Based on the responses of the teachers, the insufficiency of the trainings given by Istanbul MEM was divided into two sub-themes: the timing and duration of the training and the content of the training. The codes for these sub-themes and the frequencies of each code are shown in Figure 2.

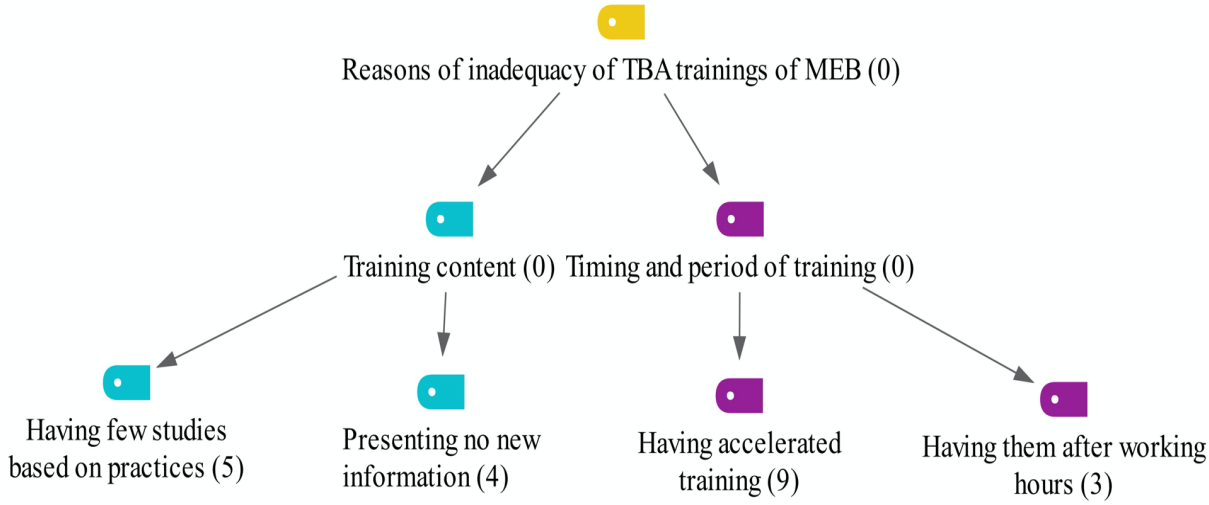

Figure 2. Reasons why TBA training provided by National Education Directorate are considered to be insufficient

As seen in Figure 2, more than half of the teachers stated that they found the training insufficient due to the time of the training was given or the duration of the training. Nine teachers stated that they could not get efficiency due to trainings' being provided rapidly in a very short time, and three teachers stated that they could not get efficiency from the trainings given after working hours. Some of the teachers' views are as follows:

> *"In the trainings, one day was allocated for each workshop, and that was constituted of two hours a day, which was not enough. Maybe our teachers could not convey many things they knew to us due to time limitation. It happened in a restricted, compressed way." (T_6)*

> *"Before the training, I was in class for six hours. There is a kids club for two hours. Thereupon, the training was very heavy, then we could not fully concentrate on the trainings." (T_5)*

As seen in Figure 2, almost half of the teachers stated that they did not find the education given to be adequate due to the insufficient content of the education. Five teachers stated that the trainings provided are mostly based on theoretical knowledge and that there is little or no application-oriented studies. All of the four teachers stated that they were not provided with new information in the training being given. They stated that the information in the content was the information they knew before. Some of the teachers' views are as follows:

> *"I am in favor of having the training not only explained to us but also applied, but that was not the case ... "(T_9)*

> *"I could not learn new information, it was almost the same with the trainings we had before. It was usually what we actually knew." (T_14).*

Primary School Teachers' Opinions on the Adequacy of the Studies Carried Out by the School Administration for the Use of TBAs

Another important factor in the effectiveness of the design skill workshops in schools is the work done by the school administration on this subject. In order for a school to be a pilot school in the use of TBAs, there is a number of workshops required to be opened and the school administration is entirely responsible for the establishment of these workshops. The Directorate of National Education or the Ministry does not provide any financial aid to pilot schools. All of the teachers found the studies of the school administration for the use of TBAs sufficient and some of them even stated that they think they are overworking. The opinions of the teachers about the studies of the school administration towards TBAs are grouped under the sub-themes of communicating with teachers and organizing the learning environments. The codes for these sub-themes and the frequencies of each code are shown in Figure 3.

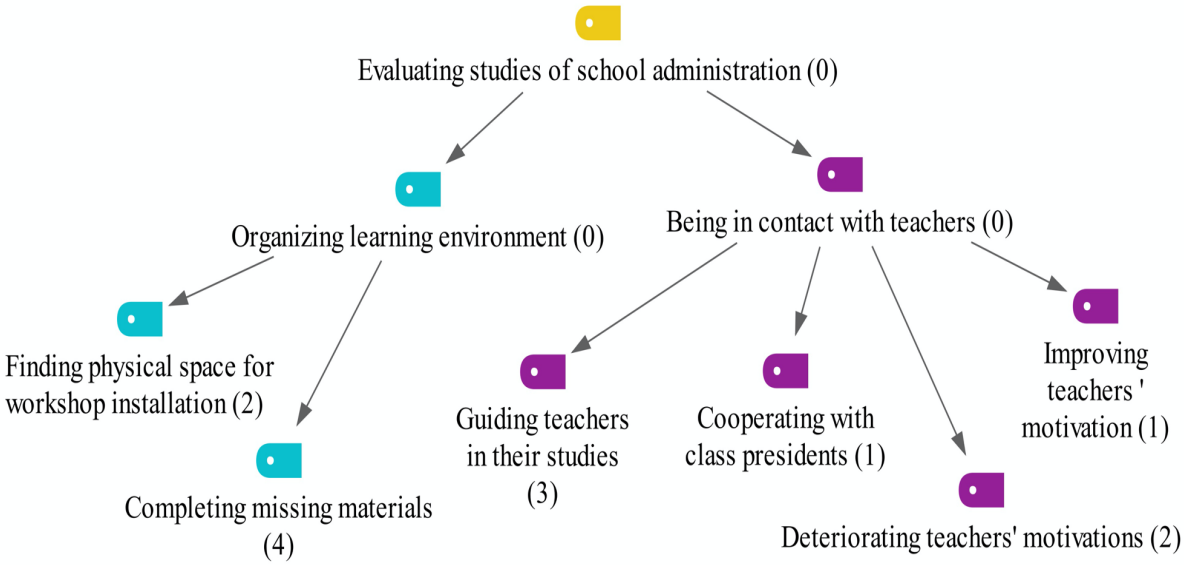

Figure 3. Studies conducted by school administration in relation to TBAs

As seen in Figure 3, a teacher stated that the school administration cooperates with the head of the class on how TBAs should be used. Three teachers stated that they were guiding them in all matters related to the use of TBAs. A teacher stated that the school administration's continuous communication with teachers regarding the use of TBAs and employing teachers in this direction positively affected their motivation. Two teachers mentioned that this situation had the opposite effect on them and decreased their motivation. Some of the teachers' views are as follows:

> *"Our manager was very diligent in TBAs as in every subject. He made the planning very well, and even he researched and pioneered us in what we had to do. (T_20)*

> *"It was newly opened, we had difficulties before, but the principal motivated us as he was in constant communication and was working." (T_3)*

> *"In other words, he forced us to work hard as he was working hard. Making it compulsory bothered me a lot and his constantly asking for new plans and products, obviously affected my motivation negatively." (T_14)*

As seen in Figure 3, two teachers stated that the school administration worked hard to create suitable physical spaces in the school for the establishment of workshops. They stated that they put in a lot of effort to turn the unused and idle school departments and classes into workshops. Four teachers, on the other hand, stated that all workshop tools and equipment needed in the established design skill workshops were prepared by the school administration.

They said that if there are any deficiencies, they were corrected immediately. Some of the teachers' views are as follows:

> *"Our principal arranged a place for workshops at the school by forcing all possibilities ... "(T_20)*

> *"..Manager says that if there is anything deficient, we must say it. For example, when I was dealing with rhythm work at the opening, I had obtained maracas from somewhere. He told me that we had hurried a lot and that he would buy all missing items in the music workshop." (T_2)*

Design Skill Workshops (TBA) Actively Used by Primary School Teachers

In order for a school to be a pilot school, it must have at least four workshops, each of which is in the fields of life, culture, sports, arts and science, as much as possible. Figure 4 shows the workshops opened in the schools subject to the research and the frequency of these workshops used by teachers.

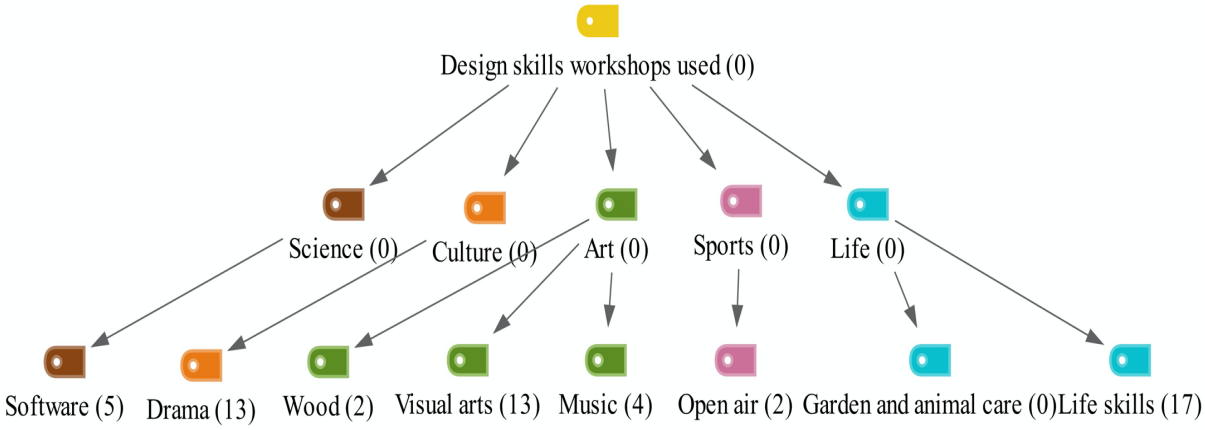

Figure 4. Design skill workshops used by teachers

As seen in Figure 4, the workshops that more than half of the teachers stated they used the most were life skills, drama and visual arts workshops. In addition to these workshops, five teachers stated that they used software workshop; four teachers stated that they used music workshop and two teachers stated that they used open air workshop. One of the teachers who used these workshops expressed his views as follows:

> *"We used the drama workshop, we used life skills, visual arts, we used software coding. In other words, we used almost all the workshops in our school within our plans, and visited them one by one." (T_9)*

Although the school where the study was conducted has a garden and animal care and wood

workshop, it is stated that the garden and animal care workshop was not used by any teacher. It was observed that the wooden workshop was used by two teachers. The reason why the animal care workshop is not used is that the weather is cold or the children can always see it when they have a break. The reason for not using the wooden workshop was stated as teachers' not finding this workshop suitable for primary school students but their considering them to be dangerous. A teacher's views on the wooden workshop are as follows:

> *"To be honest, we did not like the wooden workshop very much. It is both small in place and very dangerous. The principal tried to persuade us about this, but the teacher knows a little about his students. The dangerous environment there made us feel tense. Maybe 4th class may use it but as being 2nd class, I don't think we should use it." (T_16).*

Courses Actively Used by Primary School Teachers in TBA

Primary school teachers were also asked about the courses in which they actively used the design skill workshops. The lessons that teachers use TBAs are divided into two sub-themes as basic lessons and art-sports lessons. In Figure 5, the codes belonging to these sub-themes and the frequencies of each code are shown.

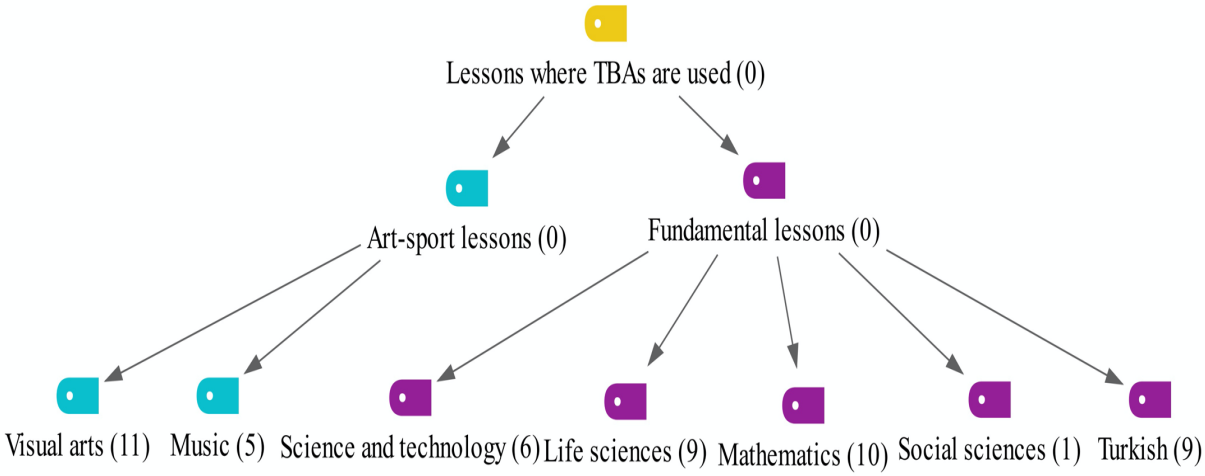

Figure 5. Lessons in which teachers use TBA

As seen in Figure 5, teachers actively use the design skill workshops both in basic lessons and in arts-sports lessons. The subjects used mostly by nearly half of the teachers are visual arts, life sciences Turkish and mathematics. Six teachers stated they used them in science and technology lessons and five teachers stated that they used them in music lessons. Only one teacher said that he used it in social sciences lesson. Some of the teachers' views regarding the courses in which TBA workshops used are as follows:

"We used them a lot in life studies lesson and visual arts lesson. Here, we used the drama workshop a lot in Turkish lessons. We used life skills workshop a lot in science class as well....." (T_15)

"We used it in most lessons, for example, in math class. I used music workshop in life studies lesson and I used drama workshop in Science and Turkish lessons. You know, we used them by associating them with almost all of our lessons." (T_17).

Primary School Teachers 'Opinions on the Effect of the Use of TBAs on Students' Competencies

The teachers were asked which competencies of the students were developed by the use of TBAs. Based on teachers' opinions, these competencies are grouped under psychomotor, affective and cognitive sub-themes. In Figure 6, the codes under the sub-themes and the frequencies of each code are shown.

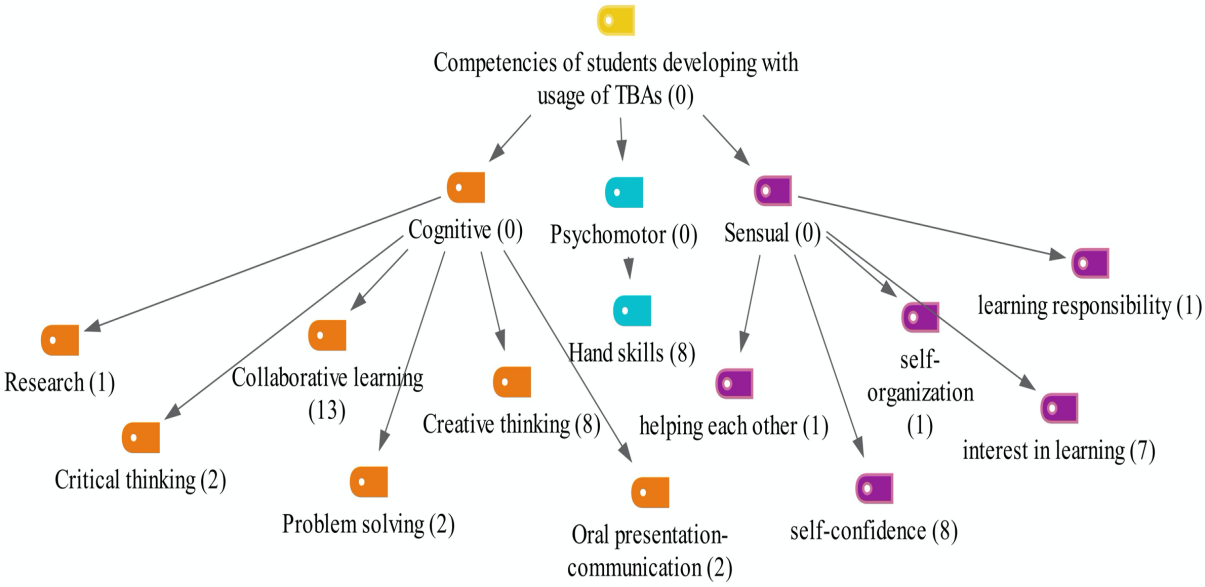

Figure 6. Competencies of students developed with the use of TBA

As seen in Figure 6, most of the teachers stated that PCAs developed the most cooperative learning skills of students. While T_6, being one of the teachers, stated that "it has increased the cooperation tremendously ..... they got used to it over time"; T_9 stated that "they have learned to work together".

Eight teachers stated that TBAs also contribute to the development of creative thinking and hand skills of students. Some of the teachers' views are as follows:

> *"Skills to look at different ways are developing. You know, it is very diverse and there is not just one. They each made different bird nests out of wood and many creative different products emerged. Product created on their own emerged. For example, let me tell you what my teacher Necla did. She made different bird nests from wood, they painted them, and the hand skills of the children also improved...." (T_7)*

> *`` ... They designed a playground with the materials we gave them and their creative thinking skills improved in visual arts and they created a new, unique product.." (T_9)*

Regarding other student characteristics that teachers most often express, it is stated that the use of TBA increases students' self-confidence and interest in learning. The statements of some of the teachers who expressed their opinions in this direction are as follows:

> *"As their skills emerged, for example, their self-confidence increased. They said that if they want, they can do it." (T_17)*

> *"... Let me tell you that when children use the workshops, they participate in these activities in a more enjoyable, happier and more caring way." (T_18)*

Two teachers stated that the use of TBAs improve students' oral presentation and communication, critical thinking and problem solving skills and one teacher stated that they developed their skills of helping each other, taking responsibility for learning, self-regulation and research. The statements of some of the teachers who expressed their opinions in this direction are as follows:

> *"....They were able to express themselves more comfortably, when I observed their relations with each other, their relations between each other became cordial, their sharing increased, and they became capable of expressing themselves more easily...." (T_17)*

> *"...I think it develops the sense of responsibility over time. In the life skills workshop or in other workshops, they started to pay attention to each other's responsibilities as it was related with the cooperation of bringing and preparing the appropriate materials for the event on time." (T_13)*

Primary School Teachers' Views on the Change Caused by the Use of TBAs In Terms of Their Competencies

Teachers were asked how the use of TBAs causes a change in the competencies of teachers as well as the competencies that students gain. Based on teachers' opinions, these changes are grouped under sub-themes of implementation skills, planning skills, and affective characteristics. In Figure 7, the codes under each sub-theme and the frequencies of these

codes are shown.

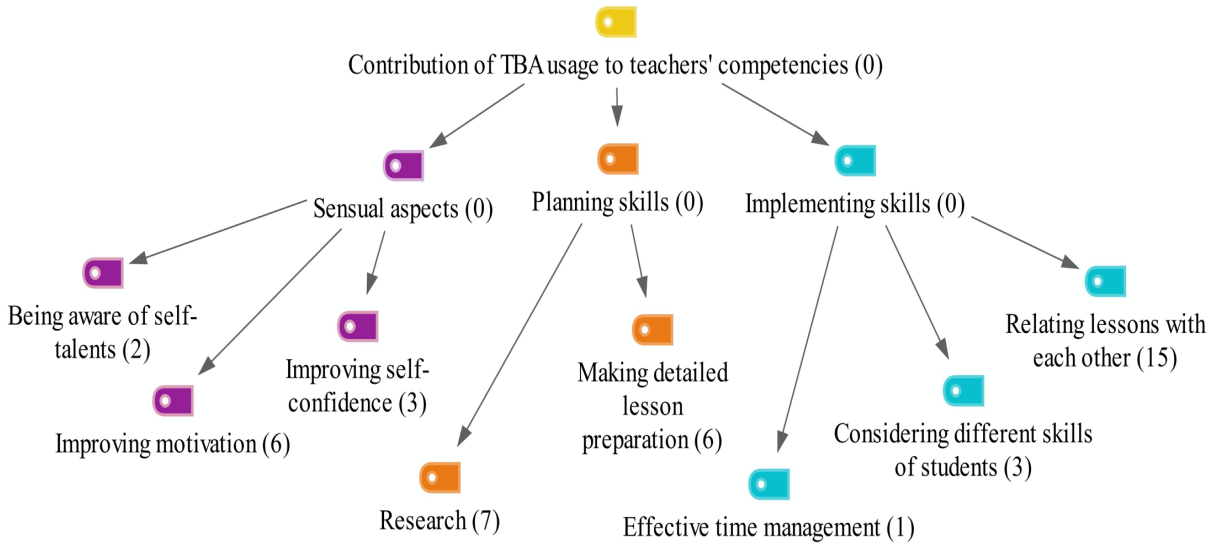

Figure 7. Changes occurring in competencies of teachers with the use of TBA

As can be seen in Figure 7, teachers stated that the biggest change in their education-teaching competencies with the use of TBAs was to associate the lessons with each other. Seven teachers stated that they did more research to find out with which activities they could correlated TBAs in relation to their lessons. Similarly, six teachers stated that they prepared their lesson plans in more detail. The affective feature that was most frequently mentioned by teachers was that they stated that the use of TBAs positively affected children's learning and happiness, so they were also more motivated. Some of the teachers' views are as follows:

> *"I can say that it awakened us about associating the lessons. Okay, we were doing it in our lessons, but we were not doing it correctly and always, but we are more knowledgeable about this interdisciplinary association ... "(T_12)*

> *"... before I go to the workshop, I sit down and prepare a detailed plan. I sit down and have a serious work and do research on how to plan activities ... "(T_11)*

> *"....Seeing that the children are happy also motivates you. It increases your desire to conduct lessons more effectively." (T_8)*

A teacher stated that he used time more effectively because he was able to associate different lessons with each other in his lessons using TBAs. Three teachers stated that thanks to the use of TBAs, they have the opportunity to see the different abilities / competencies that their students have and that they take these different characteristics of the students into account while performing their lessons. Two of the teachers stated that thanks to TBAs, they

discovered some abilities they had never noticed before. Three teachers stated that as they saw that they could do different activities with the use of TBAs, their self-confidence increased. Some of the teachers' views are as follows:

> *"...You can actually see what the children are doing together there, you discover their different abilities. Accordingly, I organized different activities for them in the free activity class." (T_10)*

> *"...You know, I'm not such a very safe, very social teacher getting involved in everything. .... When I knew nothing about drama like my students, I investigated. When there is a role now, I am directing them. My self-esteem improved to attend contests. At the weekends and at times I have opportunity, I come to the school to deal with decor and I make research..." (T_4)*

Primary School Teachers' Opinions on the Applicability of TBAs and Its Reasons

Teachers were asked to explain whether they find TBAs applicable in the current education system, along with their reasons. Nearly half of the teachers have stated that when they considered conditions of their schools, they thought that TBAs were partially applicable to their schools. On the other hand, all of the teachers stated that it is not possible to apply design skills workshops in all schools across the country. The teachers also explained their opinions on the inapplicability of TBAs by considering the problems they encountered while using TBAs. The opinions of teachers regarding the reasons for their inapplicability were grouped under five sub-themes: problems stemming from the general structure of the education system, problems arising from the curriculum, problems arising from student characteristics, problems arising from the learning environment, and problems arising from teachers. In Figure 8, the codes under each sub-theme and the frequencies of these codes are shown.

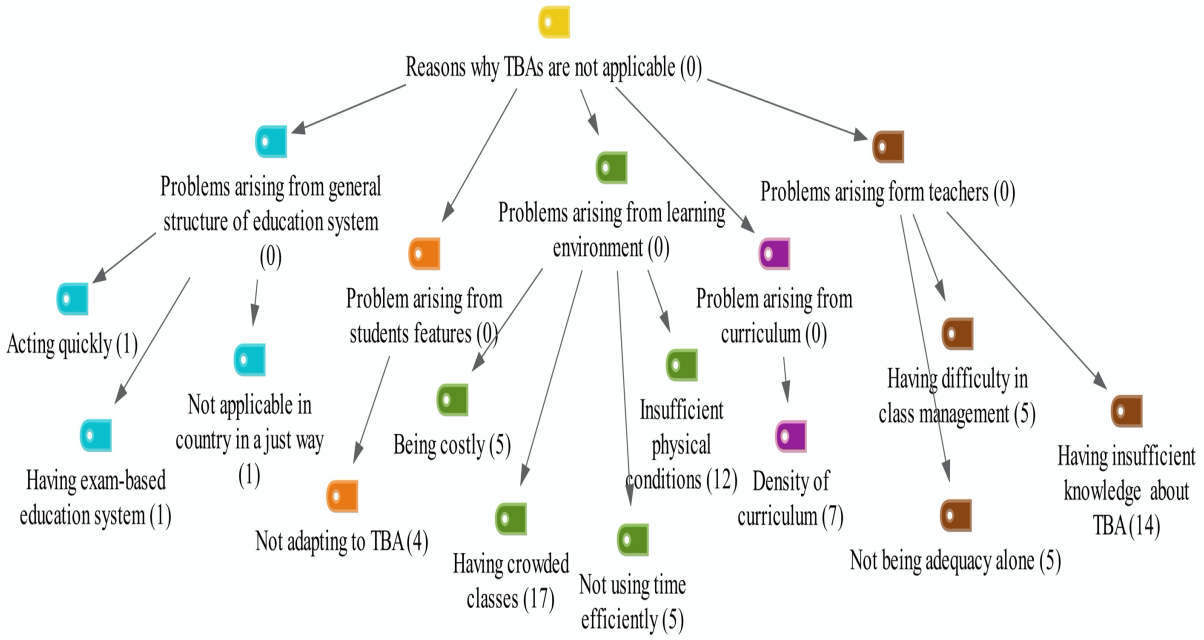

Figure 8. Reasons why TBAs are not applicable throughout the country

As seen in Figure 8, the most important reason why almost all of the teachers (N = 17) do not find the design skill workshops applicable in all schools is the crowded class sizes. This problem is followed by the opinions that teachers do not have enough knowledge about using TBAs (N = 14) and physical conditions are not sufficient (N = 12). Some of the teachers' views are as follows:

> *"Class sizes are crowded. So when we look at our district, I don't know if there are ten places that can use the workshops, but it is really hard to apply under these conditions." (T_10).*

> *"I think the workshops and classes should not be mutual. Since there are minor students, the noise is too much, the workshops should be in a separate place. But physical conditions are not enough for this." (T_5)*

> *"... I mean, I wouldn't say for every workshop but our knowledge is insufficient for some workshops. For example, our knowledge is not enough for a music workshop and a painting workshop." (T_2)*

Seven teachers stated that the use of TBAs hinders the training of the program content due to the intensive curriculum. Four teachers stated that the students could not adapt to the use of the workshops. Five teachers stated that they did not find the workshops feasible due to the inefficient use of lesson time depending on their causing difficulty in relation to class management, their being costly, their being small, or inadequacy of their placement within the

school. Opinions of some of the teachers are as follows:

> *"...As being the 4th class, our curriculum is very intense, we cannot catch up the curriculum, especially if you try to work in such workshops with continuous activity, it will not be cought up at all.." (T_14)*

> *"... There is confusion, there is noise, there is a separate problem until the students are seated, it is very difficult to have no one to help the teacher, I do not know how it would be applied across the country.." (T_12)*

> *"...Some workshops need to be prepared before the classroom teacher arrives or gathered after we leave. If the class teacher does this, 40 minutes will be lost from lesson hours. Servants also cannot keep up. There should be a teacher who takes responsibility for each workshop, and make it ready before the classroom teacher comes..."(T_19)*

One teacher stated that it cannot be established in all schools in the country and this will seriously affect the equality of opportunity in education. A teacher also stated that he did not find such workshops feasible in a country with an exam-based education system. One teacher stated that if it would be hurried to start using these workshops and to disseminate pilot applications before the problems to be encountered are fully resolved, their effective applicability throughout the country would be negatively affected. Opinion of one teacher is as follows:

> *"...After all, to be realistic, the main goal of everyone who deliberately sends their children to schools is central exams. Passage exams, university exams, then job entrance exams ... now it is not very applicable in a system preparing for central exams. " (T_13)*

Primary School Teachers' Opinions on the Arrangements That Can Be Made About TBAs Before They Are Spread Throughout the Country

The opinions of teachers regarding the issues that should be taken into consideration in the development of TBAs before they are disseminated throughout the country and making them ready for practice are grouped under five sub-themes, namely, the implementation of TBA training by expanding it, providing the opportunity to cooperate with teachers, conducting evaluation studies, making learning environments suitable and organizing education programs. In Figure 9, the codes under each sub-theme and the frequencies of these codes are shown.

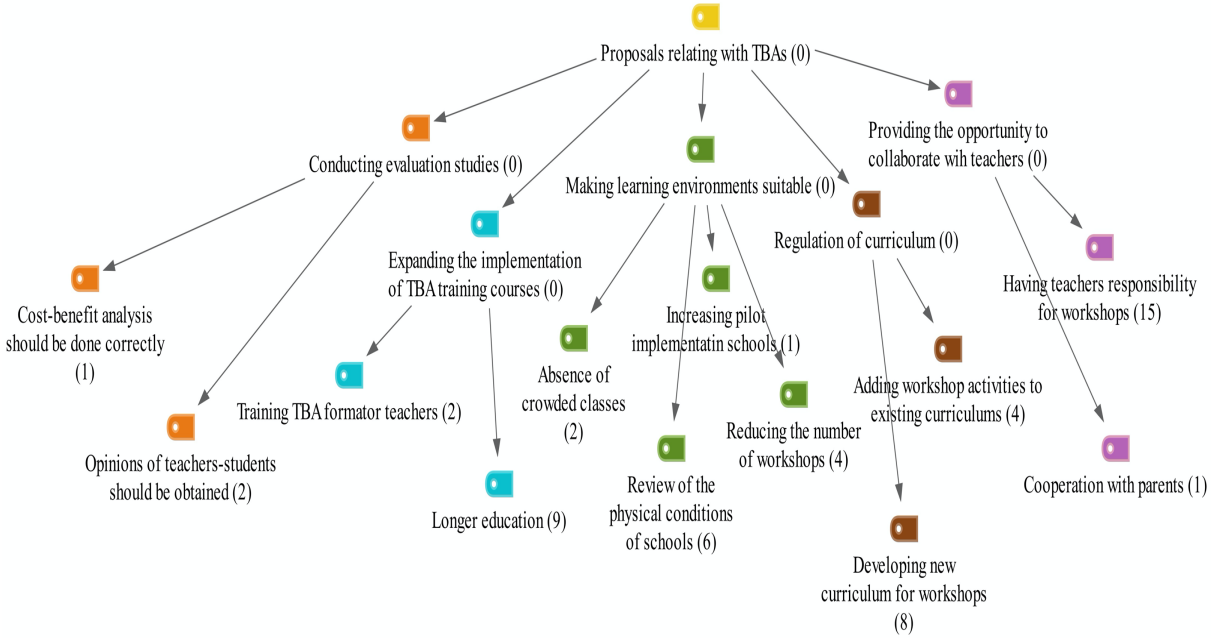

Figure 9. Proposals relating with arrangements/applications that can be made in relation to TBAs

As it can be seen in Figure 9, among the studies proposed to be realized by teachers in relation to TBAs before disseminating them throughout the country, availability of teachers responsible from workshops apart from classroom teachers (N=15) and having long-period training for teachers in relation to how design skill workshops should be used, come at the forefront (N=9). Two of these teachers expressing their opinions have added that training to be provided to teachers should be given by instructors who have provided previous training about how TBAs should be used. Opinions of some of the teachers are as follows:

> *"....The second alternative is to have a teacher responsible for each workshop. I think that if that teacher works on the workshop one day in the week, meaning that if he works on what kind of activities can be done in that workshop, which lessons can be taught in what way, then it will be a guide for the teachers who will use those workshops." (T_9)*

> *"A more adequate training can be given to teachers. Both theoretical and practical training can be provided in a longer period.." (T_15)*

Eight teachers made separate teaching programs for TBAs. All four teachers emphasized that there is no need for separate programs, but the necessity of preparing activities for how TBAs should be used in association with existing programs have been emphasize by these teachers. Some of the teachers' views are as follows:

> *"...Not all benefits of our programs are suitable for TBAs. Since it is not suitable, we cannot implement everything there. Achievements and programs need to be tailored to*

these workshops." (T_7)

In relation to learning environments, six teachers stated that physical conditions of schools should be reviewed in terms of their suitability to TBAs, four teachers stated that at the first opening, not too many workshops should be opened for teachers to adapt, and two teachers stated that the classes should not be crowded classes One teacher said that more pilot schools should be opened in order to see what kind of results have been achieved in practice. Some of the teachers' views are as follows:

"...Infrastructure is very important. When there is infrastructure, there is nothing teachers can not achieve." (T_10)

"At the first opening, seven workshops were opened in our school. Then two more were added. Frankly, I find this too unnecessary at first. At the beginning, we should have four or five of them, we should try to use them fully, to enrich it first.." (T_6)

Evaluation of the studies in pilot schools where TBAs are being used is also among the practices suggested by teachers. When the opinions of teachers and students who participated in TBA applications in two teachers pilot schools were taken, one of the teachers stated that the cost-benefit analysis should be done correctly before they are spread throughout the country. A teacher's opinion on this subject is as follows:

"...We have a lot of schools in our country, and a lot of students. Continuity of this is also very important before it is generalized. How long the workshops can be used properly, believe me, the coding workshop was opened, and the materials are now finished. There were 21 Arduino boxes over time, 11 of these materials remained. Therefore, an accurate cost-benefit analysis should be done.." (T_7)

Discussion

In this study, it was aimed to determine the teachers' opinions on the effectiveness and applicability of the design skill workshops within the scope of the 2023 Education Vision. The findings obtained from the research show that teachers generally regard the use of design skills workshops in education as a positive development for the Turkish education system. This finding obtained is similar to the findings of the studies (Doğan, 2019; Duran & Kurt, 2019; Ertürk, 2020; Koç & Ünal, 2018) in which teachers' opinions were determined regarding the 2023 Education Vision, which includes the innovation of using TBAs. Ertürk (2020) states that 2023 Education Vision Document is considered positively as it brings up a new horizon in relation to education institutions throughout Turkey and as a new perspective

is created and a hope comes out for the solution of problems relating with education institutions that are present for years. However, according to another finding obtained from the study, teachers stated that although they welcome TBAs in schools, they find it difficult to apply TBAs in all schools throughout the country. In similar studies, teachers generally welcome the innovations made in the Turkish education system positively, but do not find these innovations convincing in terms of applicability (Doğan, 2019; Koç & Ünal, 2018).

According to the opinions of the teachers participating in the research, the aims of TBAs are to provide active learning, to provide an authentic learning environment, to make learning enjoyable, to enable students to discover their talents / skills and to ensure permanent learning. These goals expressed by teachers are similar to the goals expressed in both the Ministry of Education's (2018) 2023 education vision document and the studies on the 2023 education vision (Düşkün, Arık & Aydagül, 2018; Ertürk, 2020). It is possible to see that these expressions, which are stated as the purpose of TBAs by teachers, are also included in the learning objectives and contents of the 2017 and 2019 curriculums prepared within the framework of the 2023 education vision. In researches being conducted (Kaymakçı & Turan, 2019; Koç & Ünal, 2018), it is mentioned that these teaching programs are skills, abilities and interest-based, emphasis on practice and student-centered. As a result of the realization of all these goals stated by the teachers, it can be said that it is possible to raise happy children, which is expressed as one of the most important goals of TBA. Düşkün, Arık and Aydagül (2018) also stated that the most important emphasis in the 2023 Education Vision document is “happy children”. They stated that the well-being approach of the child was adopted, emphasizing the well-being and happiness of the child in the document.

Almost all of the teachers found the training given by the Istanbul Provincial Directorate of National Education for the use of TBAs inadequate. As the reasons for the inadequacy of education, they showed that the timing of the training was not correct, the duration was insufficient, the transfer of theoretical information rather than the implementation, and the information presented was not detailed and new information about TBAs. It can be said that these findings obtained from the study are similar to the findings of the study (Güney, 2018; Doğan, 2009; Ülker, 2009), in which teachers' opinions were taken for the evaluation of in-service training in the literature. The results of Ülker's (2009) study based on teachers’ opinions show that teachers are reluctant to participate if the participants' opinions are not taken in the timing of the in-service training activities, if the staff responsible for the

presentation of these activities are insufficient and if information that can be used in these activities is not given in practice. Güney (2018) found that not changing the content of in-service training programs, repeatedly repeating the same topics, and not producing content suitable for teachers 'needs or expectations negatively affected teachers' satisfaction with in-service training programs.

In other words, the studies of the school administration have an important share in the effective use and applicability of TBAs by teachers. All of the teachers found the studies of the school administration for the use of TBAs sufficient. According to the findings obtained, the school administration guided the teachers about the use of TBAs, cooperated with them continuously, prepared all kinds of physical spaces and materials required for the establishment and continuity of the workshops; when there are deficiencies in these, it has completed. The teachers stated that these studies carried out by the school administration also increased their motivation to use PCAs. In the literature, the results of the research (Gaziler, 2017; Özdemir, Kartal & Yirci, 2014; Şentürk, 2006; Tulga, 2019) that examine the behaviours of school principals that increase teachers' motivation coincide with the findings obtained from this study. In these studies, it was stated that especially the school administration's appreciation of teachers 'opinions, helping them solve the problems they encounter and cooperating with them increased teachers' motivation. Ülgen and Mirze (2010) also state that the communication between employees must be very good in order for the employees of the institution to share the same corporate vision. It emphasizes that when working together and decisions are taken for its development, the vision will be a roadmap that will keep society members together and mentally guide them to the same future and motivate them (Ülgen & Mirze, 2010). In the study, two teachers stated that the school administration works too much and expects teachers to work continuously, to produce new activities and products related to PCAs negatively affects their motivation and they are reluctant to participate in the studies. Kayaduman, Sırakaya and Seferoğlu (2011) also state that teachers do not actively participate in many projects on the grounds that it will create a workload for them, and they have difficulty in fulfilling the intensive working obligations required by the projects.

It can be said that the findings obtained regarding, which workshops teachers used in the school and in which lessons they used are informative about both the effectiveness and applicability of TBAs. According to the findings, teachers actively use all the workshops in

almost all classes except two workshops in the school. From the interviews with the teachers, it was found that they based on the interdisciplinary teaching approach while using the design skill workshops. Most of the teachers defined interdisciplinary teaching as associating basic courses with arts-sports lessons. It can be said that teachers' use of interdisciplinary teaching and their perception and knowledge about how this teaching approach should be influenced in the use of TBAs in many of the lessons in close amounts. Another question that was sought to be answered in the research was which competencies of the students were developed by the use of TBAs. According to the findings, TBAs provide students with the most development of cooperative learning, creative thinking and hand skills. It can be said that providing students with a different learning environment from the classroom environment and using course materials that enable students to produce new products by using their skills are effective in the development of creative thinking and hand skills. In the development of students' cooperative learning skills, it may be that the majority of teachers had group work-based activities in workshops to use time more efficiently. According to the findings of the research, teachers stated that seeing students produce skills-based products in these workshops and doing collaborative work increased their self-confidence and interest in learning. This finding obtained from the research is similar to the findings of the research in the literature (Ceran Aydın, 2010; Genç & Şahin, 2015; Gümüş & Buluç, 2007; Köşterelioğlu, 2014; Meder, 2014). In these studies, it was concluded that with collaborative learning, students enjoy learning more, their interest in learning increases, they like the lesson more, they do not need much help and do not have difficulties in their studies with this approach, and their self-confidence that they can achieve the lesson has increased. Düşkün, Arık and Aydagül (2018) also state that the design-skill workshops to be established in schools throughout the country will be effective in the development and empowerment of children in accordance with their interests and abilities. According to the findings of the research, helping each other, taking responsibility for learning, self-regulation and research; Oral presentation and communication, critical thinking and problem solving skills are also among the skills developed by TBAs. According to the opinions of teachers, an important reason why TBAs are effective in the development of these skills is that students can participate more actively, perform authentic learning, learn by doing and living, in other words, they offer more student-centered learning environments compared to the classroom environment. In his research, Hamarat (2019) emphasizes the importance of presenting real-life environments to students, realizing activity-based learning, enabling students to do vital activities, and realizing the learning environment in a comfortable, flexible and creative atmosphere in the development

of these skills, which can also be called as 21st century skills.

According to the findings obtained from the research, TBAs enable teachers to associate the lessons with each other more, do more research, prepare more detailed lesson plans and effective time management while performing their teaching. It can be said that teachers' use of interdisciplinary teaching and STEM approaches while teaching the lessons in workshops is effective in the development of these competencies or in their more use. The teachers stated that they became aware of their own skills with the use of TBA and their motivation and self-confidence increased accordingly. Teachers stated that another important factor that increases their motivation in the use of TBAs is to see the success of students, their participation in the lesson and their happiness. These findings obtained from the present study are consistent with the results of the research in the literature (Emiroğlu, 2017; Köse, Taş, Küçükçene & Karataş, 2018). In these studies, which are based on the opinions of teachers and administrators, students' active participation and success are among the external motivations that motivate teachers the most. It was concluded that teachers' own achievements are also an important intrinsic motivation.

According to the results of the research, most of the teachers do not find the design skill workshops applicable across the country. This finding obtained from the research is similar to the findings of the studies (Koç & Ünal, 2018; Doğan, 2019) on the education vision of 2023, in which the implementation of TBAs is also included. The reasons most frequently stated by the teachers for not being applicable are the crowded class sizes, the teachers not having enough knowledge about using TBAs and the physical conditions are not sufficient. It is possible to say that the crowded class sizes and the insufficient physical conditions of the schools are one of the problems of the Turkish education system. Studies conducted (Beldağ & Yaylacı, 2014; Doğan, 2019; Duran & Kurt, 2019; Gündüz & Can, 2011; Kartal, 2013; Sağır, 2015; Yılmaz & Altınkurt, 2011) also support this. Duran and Kurt (2019) also stated that the necessary infrastructure support should be provided for the establishment of design and skill workshops. The teachers who participated in the study stated that the small workshops and the necessity of continuous practice-based studies made it difficult for teachers to manage their classroom and time together with the large class sizes. The results of the studies in the literature (Celep, 2002; Çınar, 2004; Güven & Karslı, 2014; Yaman, 2006; Yaman, 2010) also show that there is a negative relationship between teachers' classroom and time management and crowded classes. In crowded classrooms, the subject contents cannot be

given in full, educational technologies cannot be used effectively, teachers' motivation decreases, classroom management becomes difficult and causes waste of time (Çınar, 2004; Yaman, 2006). One of the important findings of the research in the context of the obstacles to the applicability of TBAs is that teachers see themselves inadequate especially in the use of some workshops that require expertise. It can be said that this finding complements each other with the teachers' finding that the education provided by the Provincial National Education is insufficient, which is another finding of the study. The findings of the studies in the literature (Boyacı, Kılıç & Şahin, 2017; Kocabaş, 2000; Pietra, Cruz & Bidner, 2010; Şirinkal, Şirinkal, Çalışkan & Kalkan, 2006) also coincide with the findings obtained from this study. In these studies, it is emphasized that classroom teachers do not have sufficient knowledge and equipment in lessons that bring a different ability such as music, visual arts, physical education and sports. Some of the teachers do not find TBAs applicable, especially in primary school 4th grades, in terms of the intensity of the curriculum. It can be said that these opinions of teachers coincide with the findings of other studies (Kalaycı & Yıldırım, 2019; Taş & Minaz, 2019), which are stated to be more comprehensive, developed and intense than the curriculum of previous years in the 2017 and 2019 primary school programs in the literature. According to research findings, another reason why teachers do not find PCAs applicable is that they are costly and schools cannot afford such a cost in the long run. As stated before, in order for a school to become a TBA school in the current pilot application, the school administration must establish at least four workshops with the school's own financial means. On the other hand, besides the financial expenses for the establishment of the workshops, the financial compensation of the deficiencies / wear and tear that occurs over time is also made by the school's own facilities in order to ensure their continuity. This finding obtained from the research is based on the opinions of teachers / school administrators regarding the 2023 education vision. The study revealing the insufficiency of the school budget (Ertürk, 2020; Hoşgörür & Arslan, 2014; Kartal, 2019; Özer, Demirtaş & Ateş, 2015) overlaps with the findings. In these studies, the fact that the school does not have its own budget and that the educational contributions provided from the state budget cannot be reflected to the schools are considered as an important problem in education. Kartal (2019) also states that in a situation where the resources transferred to the school and the resources to finance the school are scarce, qualified and complete education and training cannot be provided in accordance with the requirements of the age. On the other hand, one of the issues addressed in the 2023 education vision has been financing. Within the framework of this vision, MEB has developed a number of strategies to solve the financing problem of schools. It is aimed to give

a school development budget based on the school development plan, to make positive discrimination to schools with unsuitable conditions, to encourage and increase donations. (antakya.meb.gov.tr, 2020). Another reason why TBAs are not applicable according to teachers is the thought that equal opportunity cannot be achieved in education. This is also stated in the findings of the studies (Baltacı & Coşkun, 2019; Duran & Kurt, 2019), in which teachers' views on the 2023 education vision were determined. One of the obstacles that teachers see in front of the applicability of TBAs is the central examination system in the education system. They stated that TBAs are based on the design and skill competencies of the students, so they do not comply with the exam system, which measures the cognitive skill levels of the students and is seen as the most important / vital element of the education of parents and students. In the literature, it is possible to come across the findings of the research (Gül & Gül, 2015; Örücü, 2014; Sağır, 2015; Yılmaz & Altınkurt, 2011) which states that competition / test focused is an important problem in the Turkish education system. Gül and Gül (2015) have stated that students in Turkey have the opportunity to get education after going through a difficult race and that these exams are perceived by teachers and parents as saving their lives.

In the research, the primary suggestion of the teachers regarding the arrangements that can be made about TBAs before they are disseminated throughout the country is the collaboration between teachers responsible for design skills workshops and these teachers and classroom teachers. Providing longer-term trainings for teachers on how to use design skill workshops has been another most recommended topic. Studies in the literature (Akpınar & Aydın, 2007; Ergin, Akseki & Deniz, 2012) also emphasize the importance of informing administrators and teachers on these issues and systematically organizing in-service training whenever an innovation or development study is carried out in the field of education. According to the findings obtained from the research, the physical conditions of the schools should be in accordance with the TBAs, a separate teaching program should be made for TBAs or the activities that can be used in TBAs should be included in the current curriculum. These findings obtained also overlap with the research results in the literature. In his study, where he determined the views of administrators and teachers regarding the 2023 Education Vision document, Doğan (2018) states that administrators and teachers expect changes in the course hours and curriculum.

For the effectiveness and applicability of TBAs, it can be said that activities such as showing examples of the studies conducted in pilot schools with online applications, creating and discussing forms can be effective during the works of providing teachers with face-to-face training. It is thought that having a curriculum with TBA activities that can be done in different courses will automatically help to eliminate some problems that the teacher expresses. Establishing a balance between program intensity and the use of TBAs will provide the solution of problems such as ensuring time management, fully realizing interdisciplinary association, and reaching guiding lesson plans. This research is limited to the opinions of teachers working in a primary school. It can be said that designing a study similar to this study according to a qualitative model with a sample of more teachers from different schools taking into account the maximum diversity will reduce this limitation relatively. However, it is thought that conducting quantitative studies with a larger sample group, including other education stakeholders such as students, parents and administrators, will be effective in increasing the generalizability and validity of the findings.

Statements of ethics and conflict of interest

"I, as the Corresponding Author, declare and undertake that in the study titled as *"Opinions of Elementary School Teachers in Relation to Effectiveness and Applicability of Design Skill Workshops"*, scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation."

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Research Article

Primary School Teacher Candidates' Experiences Regarding Problem-Based Stem Applications[1,2]

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Abstract

In this study, it was aimed to reveal how primary school teacher candidates who were educated in the primary school teaching program experienced the problem-based STEM application performed in Science and Technology Teaching (STT) I and which skills they employed in the process**.** The research was carried out with a case study, one of the qualitative research approaches. Easily accessible sampling metho was used to identify participants. In this context, 41 primary school teacher candidates who were studying in their third year in the classroom teaching program at the education faculty of a university and taking the STT I course participated. The research data were collected through semi-structured interviews and observations. Descriptive analysis technique was used to analyze the data in the study. The interviews and the data obtained from the recorded videos about the STEM activity that the primary school teacher candidates conducted within the scope of the STT I course, "The Studies of Primary School Teacher Candidates in the STEM Implementation Process", "The Skills and Affective Characteristics of Primary School Candidates Employed in the STEM Implementation Process", "Primary School Candidates' Opinions on the STEM Implementation Process ”under the themes in the form of findings. As a result of the research, it was seen that the teacher candidates both followed the engineering design steps and used interdisciplinary skills within the scope of an engineering design task presented in a real life context.

Key words: *STEM, primary school teacher candidates, case study*

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Sınıf Öğretmeni Adaylarının Probleme Dayalı STEM Uygulamalarına Yönelik Deneyimleri

Öz

Bu araştırmada, sınıf öğretmeni adaylarının Fen ve Teknoloji Öğretimi I dersinde gerçekleştirilen probleme dayalı STEM uygulamasını nasıl deneyimledikleri ve süreç içinde hangi becerileri kullandıklarının ortaya koyulması amaçlanmıştır. Araştırma nitel araştırma yaklaşımlarından durum çalışması ile gerçekleştirilmiştir. Bu araştırmada nitel çalışmalarda sıklıkla kullanılan yöntemlerden kolay ulaşılabilir örnekleme kullanılmıştır. Bu kapsamda bir üniversitenin eğitim fakültesinde sınıf öğretmenliği programında üçüncü sınıfında öğrenim gören ve Fen ve Teknoloji öğretimi dersini alan 41 sınıf öğretmeni adayı katılmıştır. Araştırmanın verileri, yarı yapılandırılmış görüşme ve gözlem yolu ile toplanmıştır. Araştırmada verilerin çözümlenmesinde betimsel analiz tekniği kullanılmıştır. Sınıf öğretmeni adaylarının Fen ve Teknoloji Öğretimi I dersi kapsamında yaptıkları STEM etkinliği ile ilgili gerçekleştirilen görüşmeler ve kaydedilen videolardan ulaşılan veriler, *"Sınıf Öğretmeni Adaylarının STEM Uygulama Sürecinde Yaptıkları Çalışmalar", "STEM Uygulama Sürecinde Sınıf Öğretmeni Adaylarının Kullandıkları Beceriler ve Duyuşsal Özellikler", "STEM Uygulama Sürecine İlişkin Sınıf Öğretmeni Adaylarının Görüşleri"* temaları altında bulgular biçiminde sunulmuştur. Araştırma sonucunda, öğretmen adaylarının gerçek yaşam bağlamında sunulan bir mühendislik tasarım görevi kapsamında gerek mühendislik tasarım basamaklarını takip ettiklerini gerekse de disiplinler arası becerileri kullandıkları görülmüştür.

Anahtar Sözcük: *STEM, sınıf öğretmeni adayı, durum çalışması*

Introduction

One of the most effective reforms carried out to meet the expectations of the 21st century societies is the inclusion of STEM education in curricula at all levels. Disciplines such as science, mathematics, and social studies are included in primary school curricula. It is possible to say that students can acquire the skills required by the information society by integrating different disciplines such as engineering and technology into their curriculum. In this way, students use the knowledge and skills of different disciplines together to solve the problems they encounter in life. Integration of different disciplines with education enables students to perceive how different disciplines relate to each other in real life and to make what has been learnt more meaningful. Interdisciplinary approaches positively affect students' conceptual learning, interests and motivations. Interdisciplinary approaches positively affect students' conceptual learning, interests and motivation.

Among the educational reforms based on the idea of integrating disciplines, the most recent one is STEM Education movement. STEM consists of the abbreviation of the initials of the words science, technology, engineering and mathematics. This approach, which is based on the integration of science, mathematics, technology and engineering with education, basically requires the integration of engineering into K-12 classes (Guzey, Harwell, Moreno, Peralta, & Moore, 2017). On the other hand, the fact that engineering design practices are new for most educators is one of the factors which make it difficult to apply engineering and STEM effectively to the classroom (Guzey et al., 2017).

Within the scope of STEM education reform, it is emphasized that all students studying at K-12 level have experience in research and finding solutions to problems encountered in the real world and that these experiences start as early as possible (National Science Board [NSB], 2010). Therefore, it is important for teachers and prospective teachers, especially at primary school level, to have professional development opportunities for STEM-oriented teaching (MacFarlane, 2016). Although STEM education approach is a current global reform, its future, especially in primary schools, is limited by teachers' capacity to be successful in this new paradigm (Avery & Reeve, 2013).

It is argued that the inclusion of engineering design experiences in STEM curricula may improve and contextualize young students' understanding of various engineering roles in

society, thereby helping to improve achievement, motivation, and problem solving (Brophy et al. 2008; English & King, 2015; Stohlmann et al. 2012). Primary school classrooms provide a powerful environment to lay the foundations for STEM practice and learning. Therefore, it is inevitable to investigate how teachers can be better supported when conceptualizing integrated STEM education and incorporating engineering-based STEM experiences into primary school classrooms. The lack of teachers who are competent to apply the STEM approach in their classrooms is further compounded by the fact that many teachers are not trained to promote interest and success in science and mathematics (Jeffrey, McCollough, & Moore, 2015). This situation is much more pronounced for primary school teachers who have received general education rather than specialization in a specific field (Adams et al., 2014). Future teachers who have not developed a STEM identity may enter the field of education with anxiety, insecurity and negative attitudes towards STEM subjects (Adams et al., 2014). This may affect the teacher's choice to teach these subjects, his attitudes about STEM subjects, or determine how he will teach in the future (Adams et al., 2014; Jeffrey et al., 2015). Therefore, primary school teachers' acquisition of the necessary competencies with rich and applied experiences in STEM education in the pre-service period will ensure that this educational approach can be applied in classrooms.

21st century skills include skills such as creativity, critical thinking, collaborative working, problem solving, initiative, self-management, and leadership. These skills are included in the curriculum of different countries (Anagün, Atalay, Kılıç, & Yaşar, 2016). In Turkey, although it is not explicitly called 21st century skills, the listed skills above exist in national curriculum. For example, the skills such as observing, measuring, classifying, recording data, testing hypotheses, using data and creating models, analytical thinking, decision making, creative thinking, entrepreneurship, communication, teamwork, innovative thinking are included under the titles of scientific process skills, life skills, and engineering design skills in the Science Curriculum (Ministry of National Education [MoNE], 2018). These skills overlap with those included in the 21st century skills. Therefore, primary school teachers knowing and performing STEM activities in their Science instruction can help students acquire 21st century skills.

It was recommended by the National Science Board (2010) that all K-12 students get the opportunities to explore real-world discoveries. At secondary level, achieving this seems more natural and feasible than at the primary level. For this reason, it is emphasized that primary school teachers' having pre-service and in-service professional development opportunities plays a key role in the success of STEM approach in learning environments (MacFarlane, 2016).

Moore et al. (2014) argued within the STEM framework that they developed at the primary school level that STEM-oriented teaching processes should be presented in an interesting real-life context where students can learn from failure and gain problem-solving skills. The most fundamental point in the STEM curriculum in order to present the real-life context to students in an interdisciplinary lway in our age is engineering design. Engineering design in the STEM approach gives students the opportunity to integrate disciplines in a variety of contexts (Moore et al., 2014). The engineering process will enable students to engage with real world contexts and problems specific to engineering (Estapa & Tank, 2017). However, the integration of engineering design emerges as a challenge, especially for primary school teachers. This difficulty results from the fact that primary school teachers are often unprepared or have limited content knowledge about STEM and the engineering process (Banilower et al., 2013; Estapa & Tank, 2017).

This study aims to reveal how primary school teacher candidates studying in the primary school teaching program experienced the problem-based STEM implementation performed in the Science and Technology Teaching I course and which skills they employed in the process. In this context, it is aimed that students find a solution to a socioscientific issue determined in the STEM activity through engineering design processes, thus enabling the realization of experiences in the context of real life.

Method

This study, which was conducted to determine what the experiences of primary school teacher candidates during the STEM activity process presented in the context of real life in Science and Technology Teaching I course, was carried out with a case study, which is one of the qualitative research approaches. In a case study, the case may be an activity, an event or a problem. A case is a series of events which reflect the time when a problem or activities occur. Case studies cover in-depth examinations of events, phenomena, people, groups or institutions defined as the case. Case studies are used to investigate a current phenomenon in a real-life context and to determine the patterns between the case and the context in depth in cases where clear lines cannot be determined between the case and the context (Yin, 2014). In this study, STEM practice in Science and Technology Teaching I is a case. As it included an-depth examination of how this practice was carried out and what the opinions of primary school teacher candidates were regarding the subject, a study design was adopted in the study.

Participants

In qualitative research, sampling affects the quality of the study and the findings. Therefore, in qualitative research, sampling is created to provide rich and detailed information (Baş & Akturan, 2017, p.225). Convenience sampling, which is one of the sampling methods used in qualitative studies, was used in this study. The basic understanding in this sampling method is to determine the participants with sufficient richness and content from the population that is close to hand (Yıldırım & Şimşek, 2011). In this study, the study group was selected in accordance with the fact that the participants were primary teacher candidates who did not have previous experience with STEM education. In this context, 41 primary school teacher candidates, who were studying in their third grade in primary school teaching program at the education faculty of a university and taking Science and Technology teaching course participated. 36 of primary school teacher candidates participating in the study are female and 5 are male. The age range of primary school teacher candidates participating in the study is between the ages of 20 and 22.

The ethical committee permission is not required in this study since the data were gathered before 2020.

The Practice Process

The research process consists of a four-week practice within the scope of Science and Technology Teaching I course. In the first week, the STEM implementation was introduced to primary school teacher candidates, and primary school teacher candidates were informed about the plan to be followed in the process. Then, they were divided into six groups. Within the scope of STEM, the duty of the groups was to build nests in order to protect pelican eggs from negative situations. Primary school teacher candidates carried out a design process by first drawing the nests they designed on paper. The groups came together during the class to design their nests, provided the necessary materials for their nests and formed their nests. In the final week, the groups presented their nests to other friends and researchers. The researchers evaluated the nests built by the groups within the framework of criteria such as maximum suitable conditions, naturalness of the materials used in nesting, cost and durability.

Data Collection Tools

In this study, which aims to reveal how STEM implementation is carried out in Science and Technology Teaching I course in primary school teaching program and what the experiences of primary school teacher candidates regarding STEM implementation are, the data were collected through semi-structured interviews and observations. Observation is a method used to describe the behavior occurring in any environment or institution in detail (Yıldırım & Şimşek, 2011). The primary purposes of the data obtained through observation are to describe the observed event, the activities which took place in the event, the people participating in these activities and what was observed from the perspective of the observees (Patton, 2002/2014). In this study, primary school teacher candidates used observation to describe how the STEM activity they performed within the scope of Science and Technology Teaching I course was realized. In this process, the camera was positioned in the classroom in order for primary school teacher candidates to get used to the camera in the first week of the practice, and no video recording was done. Also, the first week observation process was not included in the analysis. Then, during the implementation, observations were made with a video camera. Every week, Science and Technology Teaching I course was devoted to STEM activities during the implementation. In this process, primary school teacher candidates came together with their groups and worked to solve the problem given to them within the scope of STEM.

At the end of the practices, semi-structured interviews were conducted with a total of twelve primary school teacher candidates, consisting of two volunteers from each group 8 of primary school teacher candidates participating in the interview are female students and 4 are male. An interview is defined as a mutual and interactive communication process based on asking and answering questions, conducted for a predetermined and serious purpose (Stewart & Cash, 1985; cited in Yıldırım & Şimşek, 2011). In this study, among interview types, semi-structured interview was used to reveal the experiences and opinions of primary school teacher candidates about the STEM activity. Within the scope of the study, firstly the literature was scanned and a semi-structured interview form including interview questions was prepared. During the development phase of the semi-structured interview form, expert opinions (a faculty member in the department of primary school teaching, a faculty member with STEM training and a primary school teacher candidate) were obtained, thereby making the interview form suitable for research purposes. In order to determine the functionality of the questions in the semi-

structured interview form, a pre-interview was made with a primary school teacher candidate. Pre-test interviews were excluded from the scope of the research.

Data Analysis

Descriptive analysis technique was used to analyze the data in the study. The data obtained in descriptive analysis are summarized and interpreted according to previously determined themes. Direct quotations are used to reflect the views of the interviewed or observed individuals in a striking way (Yıldırım & Şimşek, 2011). In order to answer the first research question, “primary school teacher candidates’ practices in STEM processes, the stages of planning, designing, testing, developing and presenting STEM's implementation process were determined as the themes. The data about the second research question, “the skills and affective characteristics employed by primary school teacher candidates”, was analyzed based on the skills under the heading "field-specific skills " and “the values” in the Science curriculum.

Validity and Reliability

Some precautions were taken by the researchers to ensure the validity and reliability of this study. The measures taken are shown in Table 1 below.

Table 1.

Tools used to ensure validity and reliability in the study

Validity	Internal Validity	Taking expert opinion
		Participant confirmation
		Direct quote
		Long-term interaction
		Supporting with images
		Preliminary interview
	External Validity	Explanation of the data collection tool and process
		Explanation of the data analysis process
		Explaining the characteristics of the participants
		Description of the participants' practice process
		Purposeful sampling

Reliability	Internal Reliability	Prevention of data loss by using a voice recorder and a camera Presentation of the findings without comment
	External Reliability	Checking the consistency within the data Check list

In order to ensure the reliability and validity of the study, the opinions of the experts for the semi-structured interview form in the study were taken before the implementation, a pre-interview was made to understand whether the interview questions were understandable and this interview was not included in the study. In addition, interviews were held in the meeting room at the times and dates determined by primary school teacher candidates. During the interview, primary school teacher candidates were asked to confirm the answers of the participants regarding each question by repeating them. The data obtained through interviews and observations were transferred to the computer and themes were formed. A checklist was created under the formed themes by writing down the skills employed by primary school teacher candidates, the activities they performed during the STEM implementation stages (planning, designing, testing, developing and presenting) through the videos and audio recording watched independently by each researcher. Then, the researchers came together and compared the checklists, wacthed the videos again if there was a conflict, the audio recording transcripts were examined and a consensus was reached. To prevent loss of data, audio recordings and video cameras were used.

Results

The data obtained from the interviews conducted by primary school teacher candidates within the scope of the Science and Technology Teaching I course and the recorded videos are given as results under the themes of *"The Studies of Primary school teacher candidates in the STEM Implementation Process", "The Skills and Affective Characteristics Primary school teacher candidates Employed in the STEM Implementation Process", "Primary school teacher candidates' Views on the STEM Implementation Process".*

Findings Regarding the Practices of Primary school teacher candidates in the STEM Implementation Process

Table 2 shows the practices of primary school teacher candidates at the stages of the STEM implementation process.

Table 2.

Practices of primary school teacher candidates in the STEM implementation process

Stages of the STEM Implementation Process.	Actions performed by primary school teacher candidates
Planning	Identifying the problem Drafting / Drawing Research Deciding (size, materials to be used)
Designing	Considering the criteria Sourcing the materials Making it three-dimensional
Testing	Testing Recognizing the mistakes
Development and Presentation	Making changes (of the material used, of size) Giving a Presentation

At the beginning of the practice process, primary school teacher candidates were divided into groups to carry out their work after they were informed about STEM practices. Afterwards, the research problem was shared with primary school teacher candidates. The research problem is to build a nest in accordance with certain criteria (strength, natural materials and natural appearance, pretection- preservation of temperature, protection from rain, etc., ability to carry optimum (ideal) number of eggs, cost- easy to find, cheap material) in order to protect pelican eggs from adverse conditions.

The groups drew the draft plans by doing research for the research problem before the design process. They aimed to have knowledge about the subject by reaching the information about

how real pelican nests look like along with general information about pelicans. S1, one of primary school teacher candidates, described this research process as follows:

> *We got to know the problem first. Then we developed a hypothesis as required. We did a lot of research on the internet. How should the pelicans' nest be? How many eggs do pelicans make a year? After getting the answers to the questions, we reached a decision about our nest. First of all, we made our draft plan by considering the criteria suggested by our teacher, such as being aesthetical and being economical. After preparing our plan, we talked as a group about how it should be during the project phase. We wrote down the materials depending on the research we did on the internet. S1*

Primary school teacher candidates stated that they determined the problem in the planning stage of STEM practices, prepared a draft, did research and decided on subjects such as size and materials to be used. Therefore, it can be stated that design groups formed their plans before starting the design stage in STEM practices and realized their designs within the framework of this plan. As quoted below, it was seen that the participants made a joint decision by planning how to realize their designs in line with the criteria and limitations in this process:

> *It should have been natural, I objected to a few of my friends because it lost some of its naturalness. They especially told to use thread. They told us to use cotton. I wanted a little more naturalness there. That's why we completely used trees. We used ivy and tree branches which could be bent and twisted and wrapped it without using any thread or anything, without disturbing its naturalness. S1*

During the design stage, it was observed that primary school teacher candidates provided the materials and made their nests by taking the criteria into account. This is reflected in the in-group conversations as follows:

> *S12: Our lid is here.*
> *S13: Then let's create cavities suitable for the volume of the egg. Let's cut it twice and then we close the lid.*
> *S14: Let's add different features to the outside. Whether it is for heat insulation or other features, we will make an image with leaves or something. Thus, when hatched, the chick will feel at home.*
> *S11: A cozy home (Group 2, Video recording, 15.03 p., 14.10).*

In another example dialogue, one of the groups preferred to use materials such as straw and broom in order to add an environmentally friendly feature to their designs:

> *S22: Let’s make it in the form of a basket.*

S24: Let's combine them in this way now.
S25: Considering that it is a little wider
S26: Let's expand it.
S22: We will surround the edges with brooms.
S29: If we could find straw, we would make it from straw, but since we cannot find straw, we will make it from broom (Group 4, Video recording, 23.12 p., 14.10).

Although the same research problem and criteria were given to each group during the design process, it was observed that there were differences in the materials used by the groups. Among these materials, it was observed that there were natural materials such as leaves and bushes as well as artificial materials such as foam and styrofoam. Primary school teacher candidates strongly used the design criteria in justifying the materials they used. For example, they stated that they used artificial materials such as plastic and styrofoam to design a more sheltered and sturdy nest, while they expressed that they used materials such as leaves and shrubs to meet the environmentally friendly criteria.

In the testing stage of the nest designed by Group 1, when the nest built by the group members fell to the ground, all of the eggs in the nest were broken. Although the group members stated that they considered all the criteria, the eggs in the nest were broken during the test phase. The nest built by the members of Group 1 before and after testing is shown in Figure 1:

Figure 1. *Test stage of the nest designed by the members of group 1*

As seen in Figure 1, natural materials were used in the nest designed by Group 1. However, when the nest fell to the ground, it was scattered and the eggs were broken. Group 2 members, on the other hand, designed their nests with artificial materials without considering the naturalness criteria and stated that they aimed to make the nest strong and long-lasting. Even so, the eggs in the nest cracked during the test phase despite the efforts of the group members. After the test phase, while the group members were justifying their decisions, they stated that using natural materials would cause the nests to be less durable and short-lived, and therefore they did not make their choices accordingly.

The test phase of the nest made by the members of Group 2 is as follows:

S8: How high should I throw it?
A: Over your height
S11: Go, throw it
A: Yes, but what's the problem here?
S8: One has cracked
S9: All three of them have cracked, Madam.
A: What condition did you not meet here?
S8: This gap actually closes like this
A: No. We are talking about the material inside.
S11: What's it? What?
A: We said natural material
S8: But Madam it will rot, natural materials will have a short life span.
S13: Biodegradable materials might be used.
S8: Okay, but it won't last long, it will be used for one year or two years. (Group 2, Video recording, 18.23 p., 28.10)

The nest built by the members of Group 2 before and after testing is shown in Figure 2:

Figure 2. *Test stage of the nest designed by the members of group 2*

As seen in Figure 2, group 2 members used sponge and styrofoam box in the nest they designed to protect the pelican eggs. Eggs in the nest made of artificial materials cracked during the test phase.

The eggs in the nest made by the members of group 4 did not fall to the ground and did not break or crack in the first attempt during the test phase. However, group members stated that the nest was not protected. Group members tested their nest again. In the second attempt, the eggs came out of the nest and were broken. Group 4 members also stated that they would raise the nest a little more. Therefore, they realized their mistakes by stating that they would raise the nest a little more in order to make the nest they built more sturdy and protected. This group used natural materials in the nest they designed. However, the eggs in the nest were broken during the test phase. This is seen in the video recording as follows:

S24: Go, throw
S22: Yes. One, two, three
The researcher: Not broken.

S25: It is not broken Madam.It is natural.
S27: These are the most natural materials, but it will be broken, yes, why is it not broken?
Ö29: Madam, hmm. We don't have enough of these. We'll go up a little higher, we'll add layers Madam
A: Have you boiled the eggs?
S27: No Madam, let's try again
S26: We've just bought it
S22: Madam, it was not broken after all. Moreover it does not have a natural sponge
S29: We'll make duplex Madam.
A: OK, do it. Let's throw it again.
S27: No, Madam. We did it already.
The researcher*:* Okay, let's try it again. Now we will not give any points. Or yes, just throw it up. *Up up, go.*
S23: Oh, it is broken Madam.
S24: It has cracked Madam, it has
S26: The rest inside is not broken.
A: But look, it doesn't stay inside, it goes out.
S29: We'll raise the edges.
The researcher*: Well, OK rasie them (Group 4, Video recording, 12.23 p., 28. 10).*

Pre-post versions of the nest made by the members of Group 4 during the test phase are shown in Figure 3.

Figure 3. Test Stage of the Nest Designed by the Members of Group 4

The groups tested the nests they designed during the testing stage by throwing them from a certain height. The purpose of testing the nests was to reveal the strength, safety and stability of the nests designed by the groups. During the testing stage, the nests designed by some groups were observed to be unsound and to disperse when thrown from a height, while the nests designed by some other groups were found to be sound when they fell to the ground. As it was the testing stage, the groups tested the nests they designed. In addition, the groups realized their mistakes about why the sturdy nests were not sound. Later, the groups developed their nests and presented their final versions in the classroom.

During the development and presentation stages, groups which designed the nests that either disintegrated during the testing stage or whose eggs were broken in their nests developed their nests. At this stage of development, the groups either made adjustments in the nests they designed or designed a nest better suited to the criteria. At this stage, the groups redesigned their nests by using more natural materials or changed the basic characteristics (e.g. height) of their previous nests. In the presentation stage, they retested the nests they organized or redesigned in the classroom. Other teacher candidates in the classroom evaluated the groups according to the criteria and made comments on the designs. For example, the nest designed by the members of Group 2 was made up of artificial materials and the eggs in the nest cracked during the testing stage. In the development and presentation stage, the members of Group 2 designed a different nest, presented it in the classroom and tested it again, thereby testing the nest's strength and protection. This is reflected in the video recording as follows:

The researcher: Are you the ones who made sponge last week?
S12: Yes Madam.
The researcher*: Hah,* look where you've come from this week, it meets the criteria.
S10: Madam, the eggs are normally visible but when thrown, they came on top.
The researcher*: OK*
S8: Madam, we focused entirely on pine trees.
S1: There were two or three broken pine trees, we took them and wrapped them there, there was such a thing.
The researcher*: Then you made this nest out of sponge. How do you keep the heat?*
S13: The heat? It is very stuffy in there, I mean there are three very large pine tree things in it, three large pine branches, that is, a very large pine branch. Umm, there was one branch left, wasn't there?
S29: It also smells pine.
S10: Exactly, its body.
S11: There's that big branch, its body, we used all of them except those big branches. I mean, it was completely stuffy, there was nothing left to take from the pine tree, I think we put thin leaves on it lastly.
S27: What did you throw?
S11: Thin leaves and such…
S14: We threw the last remaining pine leaves on it.
S9: For the image, we also sewed them on those edges, here it is made entirely of pine for more shelter.
The researcher: Well done, thanks for your efforts (Group 2, Video recording, 02.39 p., 4.11).

As understood from the conversations of the group 2 members with the researcher and other classmates in the development and presentation stage, the group members designed the nest

made of natural materials in the development stage instead of the nest made of artificial materials in the testing stage. In the presentation stage, they presented the redesigned nest to the researchers and their classmates. They told their friends how they built the nest and what the materials they used in their new designs were. Group 2 members used natural materials in the nest they designed as they indicated. In addition, when they tested the nest again in the presentation, the nest did not scatter and the eggs did not break. The researchers and other primary school teacher candidates generally gave positive comments about the new nest. Figure 4 shows the nest designed by the members of group 2 in the testing stage and the newly designed nest in the development and presentation stages.

Figure 4. *Pre-post versions of the nest designed by the members of group 2*

As seen in Figure 4, group 2 members tested the nest made of artificial materials during the testing stage. However, the eggs in the nest were broken during the testing stage. During the development stage, group members designed a new home. They presented the newly-designed nest at the presentation stage. It was observed that the re-designed nest by the members of Group 2 was more protected and sturdy than the previous nest. During the testing stage, the nest designed by the members of the Group 1 was dispersed and the eggs in the nest were broken. During the development and presentation stage, group members tested the nest they redesigned and presented it to their classmates. During the presentation, they also emphasized the low cost of their nest. This is reflected in the video recording as follows:

S1: Madam, our cost is very low.
S2: Madam, we spent one lira
S5: We only spent one lira
The researcher: OK, now tell me. Are there eggs in it?
S7: Yes, Madam.
The researcher: How many eggs were broken last week?
S3: Two were broken because they fell from the edge.
Th researcher: Now let's throw them (The student throws two nests) (Group 1, Video recording, 02.52 p., 4. 11).

During the development and presentation stage, the members of group 1 made the previously dispersed nest more sturdy and its surroundings higher. Therefore, when hrown again, the rearranged nest did not disperse and the eggs did not break. One of the group members, S1, shared this process with her classmates and the researchers during the presentation stage as in the following:

> *S1: Later in that class, we learned about pelicans, how many eggs they have, how they live in the environment, then we talked about the design of artificial pelican nests, we drew a plan, in mathematical modeling, our design here was completely made of natural materials, well... as it is seen, it kept really well and we believe that the actual egg temperature will remain constant. We spent a budget of one lira.*
> *Madam, I live in the village, I brought wool etc, I brought hay etc. Let's talk abour the materials Madam, cones, straw, wool, cotton, a small amount of bird feathers, Madam, pieces of wood, tree branches, ivy*
> *Researcher: You haven't plucked the birds, have you?*
> *S1: No, Madam, we picked up those which fell (Group 1, Video recording, 05.27 p., 4.11).*

As understood from the conversations of S1 with the researcher, the members of group 1made changes on their previous nests. The group members reinforced the nest by making it higher and used natural materials. Pre-post versions of the nest of the nest designed by the members of Group 1 are shown in Figure 5.

Figure 5. *Pre-post versions of the nest designed by the members of group 1*

As seen in Figure 5, the nest designed by the members of Group 1 was dispersed during the test stage and its eggs were broken. In the development and delivery stage, the group members made the nest higher and more sturdy, which made the nest sheltered. In the last stage, when the nest was thrown from a height, the eggs in the nest were not broken. In the development and presentation stage, Group 6 designed a nest by taking different criteria from the other groups into consideration. They shared the nest they designed with their classmates during the

development and presentation stage. The nest designed by the members of Group 6 is shown in Figure 6.

Figure 6. *The nest designed by the members of group 6*

As seen in Figure 6, the members of group 6 designed their nests using natural materials such as melon and orange peels, unlike the other groups. They used the melon as the nest and placed the eggs inside the melon. They added a parachute to the nest. This parachute allows the nest to land without any damage if it falls from a high place. During the development and delivery stage, although the group members threw their nests from the fourth floor, the nest landed firmly on the ground thanks to the parachute.

During the development and presentation stages, the groups presented the final versions of the nests they designed to their other friends and the researchers in the classroom. At this stage, some groups redesigned the nests that fell apart or whose eggs were broken during the testing stage. Some groups did not redesign their nests but only changed the height. A few groups made no changes to their nests which did not fall apart or whose eggs did not break during the testing stage. During the presentation stage, they only explained how they designed their nests and tested them.

Primary school teacher candidates generally followed the design stages in the practice process. These stages are planning, design, testing, development and presentation. In groups, primary school teacher candidates planned and designed their nests, and tested them to check the strength and protection of the nests. In the development and presentation stages, they either redesigned or changed the shape of the nests which were dispersed or the eggs of which were broken during the testing stage.

Findings Regarding the Skills and Affective Characteristics Employed by Primary School Teacher Candidates in the STEM Practices Process

Findings regarding the skills and affective characteristics employed by primary school teacher candidates in the STEM practices process are given in Table 3.

Table 3.
Skills and affective characteristics employed by primary school teacher candidates in the STEM practices process

Skills and Affective Characteristics	Behaviors-Actions-Applications	
Scientific process skills	Conducting research	
	Using the data and building models	
	Changing and controlling the variables	
Life Skills	Communication and Teamwork	
	Decision Making	
	Creativity	
Affective Outcomes	Responsibility	Fulfilling the given task
		Doing job-share
	Value	Valuing the Technology-Society-Environment relationship

As seen in Table 3, it was revealed that primary school teacher candidates used their scientific process and life skills at the stages of planning, designing, testing, developing and presenting during the STEM practices process. It may also be suggested that affective characteristics such as responsibility and value are revealed. During thepractice process, primary school teacher candidates used their skills of conducting research, using the data and building models, changing and controlling the variables within the scope of scientific process skills. Primary school teacher candidates generally preferred to conduct research at the beginning of the process. These studies focused on the general characteristics and breeding behaviors of pelicans. For example, a primary school teacher candidate S34 expressed this as follows:

> *We did research about pelicans. For example, I had never seen a pelican. Some of my friends had not, either. We researched them first. We did research on them. For example, I did not know how many eggs they laid a year. Some of us said that they would lay 6, some of us said 1. I learned that they actually laid 2 or 3 eggs. We investigated how their nests were, what the physical size of a pelican was, how theşr nests should be, in what places they lived. It needed to be natural when moving on to the construction stage. We investigated such things as "how is natural material, what does a pelican use?" S34*

Primary school teacher candidates stated that they did research on the research problem given to them before the planning stage of the design. It may be stated that the purpose of the research was to find the answers to such questions as "what are the features of a pelican nest? how many eggs should there be in a pelican nest?".

Primary school teacher candidates also stated that they used appropriate materials to build the nest according to the criteria given to them. It may be suggested that by perceiving the ideal nest criteria they obtained through research as data, they used different materials and formed models to make nests in accordance with the criteria. Thus, it can be said that primary school teacher candidates employed their skills of using data and creating models within the scope of scientific process skills in STEM practices. This is revealed in the following statements of the teacher candidate, S39:

> *"For example, it had to be natural. That's why we made it from natural materials. It would be different if we used unnatural artificial materials. For example, what we used was articial, we put cotton in between just because the wool was not adequate. It needed to be low in cost. The natural materials we used were those we could find on land in winter. This also had an impact. For example, it was natural but not common, which was also important. Then sturdiness was also important. For example, when a bird builds its nest, it does not fall easily despite the wind. What we constructed had to to have a certain weight so that it would not fall. But it didn't have to be too heavy. These affected a lot. We did it by taking these risks." S39*

It may be said that primary school teacher candidates employed their ability to change and control the variables within the scope of scientific process skills in the design process. For example, S7, one of the primary school teacher candidates stated that they tested the nest they built as a group in the testing stage and that they developed the nest as higher in size because they saw that the egg in the nest fell to the ground, and therefore the eggs in the nest did not fall off during the presentation stage and expressed his ideas as in the following:

> *... Then we bought eggs in the testing stage. We put the eggs inside. There was no problem in the basket, in the nest when we threw it onto the ground. But the egg jumped and fell to the ground. The edges were supposed to be a little higher. Then we said "let's add layers." We did it again, which our teacher had already suggested. We added layers again. We tested the eggs again in the presentation stage after that. Nothing happened this time. In the presentation, everyone said that it was beautiful. S7*

As understood from the words of primary school teacher candidates, it was seen that they learned about pelicans and pelican nests during the planning stage, they chose their materials and designed their nests by taking the criteria given into account during the design stage, and they threw their nests from a certain height to test the sturdiness of their nests and whether they protected their eggs during the testing stage. In addition, the groups whose nests were not sturdy during the testing stage or whose eggs were broken in the nest changed the size of the nests. Therefore, it can be inferred that primary school teacher candidates employed their skills of conducting research, using the data and creating models, changing and controlling the variables within the scope of scientific process skills while they were planning, designing, testing, developing and presenting their nests.

Primary school teacher candidates stated that they employed life skills as well as scientific process skills. One of these life skills was decision-making. For example, the teacher candidate, S18 expressed his opinions as follows and stated that they decided how many eggs there should be in the nest and the materials to be used in the nest before designing the nest.

> *We looked at the pelican's characteristics, the number of its eggs, the size of its egg, and examined their natural nests. Thus, we decided to use straws. Since we found the optimum number of eggs between 1 and 6, we decided to make space for 6 eggs. Later, we decided on styrofoam to keep its temperature well, of course, styrofoam is not natural, but it keeps its temperature constant. S18*

In addition to decision making skills, it was observed that the participants used their skills of collaboration and teamwork. For example, the teacher candidate S20 expressed his opinion as follows and stated that they divided the tasks in group work, took the opinions of the group members while designing the nest and that they built the nest together.

> *We shared the work load. We went together to pick up the branches. We took the branches we found outside and brought them to our house. Then we chopped that big pine branch into pieces together. We laid the table cloth on the floor. Then we put them together around that table cloth. Then we tested ideas for bringing the ends*

together. It didn't work, we took it to pieces. We did it again. We did it completely with my group friends. S20

During thepractice process, the group members shared the work load in group work and fulfilled the task assigned to them. S8, one of primary school teacher candidates, said, *"In this process, as we worked in cooperation with our friends, we took the responsibilities to work by sharing the workload."* S38 said *"We shared the work load while bringing the materials. For example, I live in a district of Eskişehir. Because it is easier for me to reach natural materials, I brought sheep wool and straw. Our friends who stayed in the dormitoy brought wood pieces and leaves. Then, while we were working on the presentation, we shared the wok load, too. We also shared the work during the production stage. We shared the tasks according to what everyone could do and whatever they were confident in according to their abilities"* and stated that they shared the work load in group work and fulfilled the task assigned to them. It may be suggested that group members took responsibility and work ed in harmony with each other.

In addition, although all groups were given the same research problem and criteria, the pelican nests designed and built by each group appeared to be different. Figure 7 shows the photographs of pelican nests built by the groups.

Figure 7. *Pelican nest samples made by the group members*

As seen in the photos, although the criteria for the pelican nest were the same, different designs were made by the group members. Therefore, it is possible to deduce that primary school teacher candidates employed their creativity skills. The results from the reportings of primary school teacher candidates appear to show that these teachers recognized the contribution of science studies and of the relationship among technology, society, environment and daily life. They also made judgments about how important this relationship was for them. For example, the teacher candidate S1 revealed how important it was to take action on behalf of the society and the environment with the following statements

.

> *First of all, when we did this practice, I really liked doing something for the society and contributing to the nature myself, I really did. We left that nest to nature with our friends. We placed it on a tree somewhere nearby in order for an animal to come and use it.To give an example, this emphasized that we should be individuals who are really beneficial to the society. S1*

The pre- service teacher S22 also emphasized how valuable it was to find a solution to an environmental problem and the importance of their experience in revealing the relationship between science-technology-society-environment.

> *Now, we always cover it in our classes. Combining science with other social fields, especially in the field of science-technology-society-environment. For example, the lecture is normally delivered. There you teach this, you equip the student with knowledge by giving the exact definitions and descriptions of the concepts such as electrical circuit etc. but the student does not know. It just lives for that class. But I realized something. We did something like this. We created a solution by reflecting a problem in nature to our lesson. I think this is a good thing. In terms of improving ourselves, when I studied that part in science-technology-society-environment, it mentioned that teachers were inadequate in this regard, while teaching children. But we had an experience with that. Science-technology-society-environment, we can pick a problem in nature for children and bring it into our classes. We can teach it in connection with science. This is a beautiful thing. S22*

Results and Discussion

Within the scope of this case study, it was aimed to reveal how primary school teacher candidates experienced the STEM practices in Science and Technology Teaching I course and the skills which they employed in this process. Within the scope of the study, the data were obtained through semi-structured interviews and observations based on video recordings. The data obtained from the interviews and the recorded videos about the STEM activity which primary school teacher candidates conducted within the scope of Science and Technology Teaching I course, are presented in the form of findings under the themes *"The experiences of primary school teacher candidates in the STEM practices process"* and *"The skills and affective characteristics employed by primary school teacher candidates in the STEM practices process"*. The data obtained within the scope of the research showed that primary school teacher candidates both followed the engineering design steps and used interdisciplinary skills within the scope of an engineering design task presented in a real-life context. Moore et al. (2014) emphasized the importance of engineering design processes offered to students in the STEM

education approach, and Estapa and Tank (2017) stressed the importance of real-life context specific to engineering in acquiring knowledge and skills. The data obtained within the scope of this study also showed that primary school teacher candidates displayed interdisciplinary skills such as scientific process skills and life skills such as creativity and teamwork in the process. Therefore, it was seen that the STEM activity, structured around a socioscientific issue presented to teacher candidates, gave them an opportunity to demonstrate the skills and competencies which they aim for their students to acquire.

It is suggested that the activities carried out in pre-service and in-service teacher training should be in a structure in which students can experience, their learning outcomes are clearly defined, and teachers participate actively in the learner role (Guskey & Sook Yun, 2009). In addition, it is underlined that these practices should be carefully adapted to certain content, process and context elements (Guskey & Sook Yun, 2009). The process structured within the scope of this study was arranged in a way which was appropriate for the classroom level of primary school teacher candidates, which determined the learning outcomes, and in which primary school teacher candidates played an active role as the learner. Primary school teacher candidates demonstrated the behaviors and skills that students are expected to acquire in the process. Therefore, primary school teacher candidates demonstrated the behaviors and skills which students were expected to acquire in the process.

Since STEM is included in secondary school science curriculum and classroom practices, but not at the same level at primary school level, the teachers may not be sufficiently familiar especially at primary school level. Hence, teaching practices for STEM education should give participants time to try new practices, get feedback about their teaching, and reflect on these new practices (National Staff Development Council, 2001). Research shows that professional development focusing on science content and how children learn is important in changing teaching practices (Cohen & Hill, 1998; Fennema et al., 1996). Accordingly, the fact that thepractice process carried out within the scope of the research was content-oriented andpractice-oriented made it possible for primary school teacher candidates to exhibit the behaviours required by STEM in general and by engineering design steps in particular. The findings of the study regarding the participants' practices in the STEM-based instruction showed that primary school teacher candidates followed the engineering design steps and revealed the key behaviors aimed to be displayed in these steps. In addition, primary school

teacher candidates not only followed the engineering design steps, but also had the opportunity to notice and exhibit the behaviours they were expected to show within these steps.

One of the strongest criticisms STEM education-oriented teaching processes receive is that concepts such as values, morality and ethics, which have an important place in science education, stay in the background (Zeidler, Herman, Clough, Olson, Kahn, & Newton, 2016). A similar criticism is that the acquisition of basic scientific knowledge and skills is ignored due to the effort to include different disciplines (Karahan, 2018). When the findings obtained through the study were examined, it was seen that primary school teacher candidates gained basic scientific skills such as scientific process skills and certain values especially through the relationship between the human and the environment. Therefore, it is suggested that the STEM practices should be presented in the context of real life and structured in line with learning outcomes as the reason for this.

Considering the results of the study, suggestions have emerged for both teachers and teacher educators. The inclusion of standart-based and skill-oriented activities in pre-service and in-service teacher education has a critical importance for prospective teachers to gain the necessary competencies. Therefore, activities that participants can implement directly in their classrooms and put themselves in the role of learners should be considered in the process of designing pre-service and in-service professional development programs. In addition, it is important for the practitioners from all grade levels to follow the STEM teaching processes that are developed based on real life problems in order to help students acquire critical skills.

Statements of ethics and conflict of interest

"I, as the Corresponding Author, declare and undertake that in the study titled as *"Primary School Teacher Candidates' Experiences Regarding Problem-Based STEM Applications"*, scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation. "

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Review Article

The Implementation of Educational Projects in Social-action-based Learning[1]

Ahmet Acar[2]

Abstract

CEFR (Common European Framework of Reference for Languages) sets the goal of training social actors in language teaching, which implies a shift from the communication paradigm to the social action paradigm or from training successful communicators, who are involved in exchange of information in contact situations, to training social actors, who can live together harmoniously and act together effectively in their multilingual and multicultural societies, but the same CEFR does not elaborate on how to realize this rupture in and/or outside the classroom. This paper proposes that there are two ways of training social actors: mini-projects, which can be employed by language textbooks or curricula, and educational projects, in which the students are involved as autonomously as possible in their design, implementation, and evaluation. The paper focuses on the distinctive characteristics of educational projects which differentiate them from the communicative tasks and then presents the stages of the application of educational projects in social-action-based learning (the action-oriented approach).

Keywords: *CEFR, social-action-based learning, communicative tasks, educational projects*

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Sosyal-eylem-odaklı Öğrenmede Eğitimsel Projelerin Uygulaması

Öz

ADOÇP (Avrupa Dilleri Ortak Çerçeve Programı), iletişimsel paradigmadan sosyal eylem paradigmasına veya iletişim durumlarında bilgi alışverişinde bulunan başarılı iletişimcilerin eğitiminden, birlikte uyum içinde yaşayabilen ve etkili bir şekilde çalışabilen sosyal aktörlerin eğitimine geçişi işaret eden dil öğretiminde sosyal aktörlerin eğitimi hefedini koymaktadır ancak aynı ADOÇP bu kırılmanın sınıf içinde ve/veya dışında nasıl gerçekleştirileceğini ayrıntıları ile incelememektedir. Bu makale sosyal aktörleri eğitmenin iki yolu olduğunu önermektedir: Dil ders kitaplarında veya müfredatlarda kullanılabilecek mini-projeler, ve öğrencilerin tasarım, uygulama ve değerlendirmelerinde mümkün olduğunca özerk bir şekilde yer aldığı eğitimsel projeler. Bu makale, eğitimsel projelerin kendilerini iletişimsel görevlerden ayıran ayırt edici özelliklerine odaklanmakta ve daha sonra sosyal-eylem-odaklı öğrenmede (eylem-odaklı yaklaşım) eğitimsel projelerin uygulama aşamalarını sunmaktadır.

Anahtar Sözcükler: *ADOÇP, sosyal-eylem-odaklı öğrenme, iletişimsel görevler, eğitimsel projeler*

Introduction

The action-oriented approach is referred to as social-action-based learning (SABL) throughout this article to indicate the rupture between the communicative approach (both in its weak and strong versions) and social-action-based learning (the action-oriented approach) since the action referred to by SABL is social action and not speech acts of the communicative approach.

The Council of Europe attempted to initiate two paradigm changes in language learning goals set for the European citizens. The first paradigm change emerged with the first Threshold Level document 'The Threshold Level in a European-Unit/Credit System for Modern Language Learning by Adults' as was developed by Van Ek (1975) for the Council of Europe to prepare the European citizens for a short term contact with the natives of the target language, mainly in touristic visits. As a result, the communicative approach was developed to meet this goal, the goal of developing learners' communicative skills to enable them to carry out successful communication with the people of the foreign language. In this paradigm, the criterion of success became the successful exchange of information in these interactions. In short, the goal was to train successful communicators as Van Ek (1975, p. 2) states in the foreword of this document:

> *"Nevertheless, by far the largest single group of learners, everywhere, consists of people who want to prepare themselves, in a general way, to be able to communicate socially on straightforward everyday matters with people from other countries who come their way, and to be able to get around and lead a reasonably normal social life when they visit another country. This is not simply a matter of buying bread and milk and toothpaste and getting repairs carried out to a car. People want to be able to make contact with each other as people, to exchange information and opinions, talk about experiences, likes and dislikes, to explore our similarities and differences, the unity in diversity of our complicated and crowded continent".*

The second paradigm change as reflected by the action-oriented approach introduced by CEFR (2001) and its companion volume (2018) emerged as a result of an increased economic and social integration process among the European countries beginning in the 2000s. This continued integration process resulted in setting a new language learning goal for the European citizens by the Council of Europe, that of not only communicating with the natives of the target language in touristic visits but also of living and working together with foreigners from different linguistic and cultural backgrounds. In short, the goal was to train social actors. This new goal, however, is not even noticed by some researchers, who cite the Council of Europe in their

articles. Demirezen (2011), who wrote "The Foundations of the Communicative Approach and Three of Its Applications" at a time when the Council of Europe had already initiated the second paradigm change with this goal in CEFR (2001), still displayed a commitment to the communication paradigm. This language learning goal, that of training social actors, however, has a broader educational goal than that of the communicative approach, namely, educating democratic citizens of Europe, who can live and work together in their democratic society. CEFR companion volume (2018, p. 26) indicates this as

> *"the Council of Europe's Committee of Ministers recommends the 'use of the CEFR as a tool for coherent, transparent and effective plurilingual education in such a way as to promote democratic citizenship, social cohesion and intercultural dialogue'* (CM/Rec(2008)7)".

The Characteristics of Action in CLT and SABL

Van Ek (1975, p. 9) outlines the characteristics of the target learners for which the Threshold Level document was developed as follows:

> "1. they will be temporary visitors to the foreign country (especially tourists);
>
> 2. they will have temporary contacts with foreigners in their own country;
>
> 3. their contacts with foreign-language speakers will, on the whole, be of a superficial, non-professional type;
>
> 4. they will primarily need only a basic level of command of the foreign language".

Thus, the objectives described in the Threshold level take as their basis one reference objective: to be able to communicate with foreigners in a foreign language; one reference situation: tourist trip; and one reference action, which is language interaction (speaking with the other) (Puren, 2014a, 2014b, 2014c). The objectives are written as what the learners will be able to do with the foreign language in such initial and short-term contact situations. Thus, learners of English will be able to communicate with foreigners they meet for the first time in short term contact situations through acts of speech. This reference objective (to be able to communicate), reference situation (tourist trip), and reference action (language interaction) specify the fundamental characteristics of the communicative approach or what Puren (2020, p. 16) calls the 'genes' or 'fundamental characteristics' of the communicative approach as shown in table 1.

Table 1
Genetic analysis of the communicative approach

Genetic analysis of the communicative approach		
Genes	Definition	Genetic markers in textbooks
1. The inchoative	The action is considered at its beginning	- Dialogues always start at the beginning. - Students learn how to greet someone and then say goodbye for the first time.
2. The perfective	The action ends completely.	Dialogues always end at the end.
3. The punctual	The action lasts for a short time.	- In the dialogues, it is always the same people in the same place speaking on the same topic of conversation in the same limited time. - The characters rent a hotel room much more often than an apartment. They never buy an apartment or a house.
4. The individual	The exchange is between one person and another.	The reference group for the activities is the minimum group for interaction: the group of two; the interaction is actually inter-individual.

Table 1 indicates the characteristics of interaction in contact situations of touristic visits, which are reflected in the Threshold Level document and the communicative approach. What the table explains is that during such a contact situation in another culture or meeting a foreigner in one's home culture, a person meets a new person for the first time and starts a dialogue (the inchoative), this meeting and the dialogue do not last long (the punctual), the person leaves the newly met person at the end of the dialogue (the perfective) and the communication generally occurs between two people (the individual). These genetic characteristics of the communicative approach are also reflected in the dialogues of communicative textbooks as table 1 shows: Dialogues always start at the beginning (the inchoative) and end at the end (the perfective). The dialogues occur in a limited time (the punctual). The reference group for the activities is the minimum group for interaction: the group of two (the individual).

Threshold Level document along with the development of Hymes' (1972) communicative competence contributed to the development of the communicative approach, in which the tools for realizing the objectives in the Threshold Level document are simulations, role-plays, and various communicative activities rather than uncontextualized grammatical exercises.

After the Threshold Level document, the Council of Europe developed CEFR (2001) and CEFRCV (2018), which do not aim to train learners for linguistic action (speech acts) for short-term encounters (e.g. touristic visits) but set the goal of training learners as social actors, who can live together harmoniously and work together effectively in a multilingual and multicultural society. The approach presented in these two documents, the action-oriented approach, however, is sometimes still misinterpreted as the communicative approach or task-based language teaching.

Yeni-Palabıyık & Daloğlu's (2016) study titled "English language teachers' implementation of curriculum with action-oriented approach in Turkish primary education", for example, ignores the fact that the 2013 Turkish ELT curriculum for primary and secondary schools claims to be based on the action-oriented approach but the curriculum has nothing to do with the action-oriented approach as can be seen easily in the quote from the curriculum below:

> *"As no single language teaching methodology was seen as flexible enough to meet the needs of learners at various stages and to address a wide range of learning styles, an eclectic mix of instructional techniques has been adopted, drawing on an action-oriented approach in order to allow learners to experience English as a means of communication, rather than focusing on the language as a topic of study".* (p.II)

The authors of the curriculum misinterpret the action-oriented approach as having the goal of allowing learners to experience English as a means of communication, which is a communicative objective rather than action-oriented. Indeed, the authors of the 2013 ELT curriculum state, in one of their publications about the development of this curriculum, that

> *"the newly developed curriculum, in accordance with the principles of Communicative Language Teaching and the CEFR, gives primacy to spoken language in grades two through four, with the main emphasis on the development of oral-aural skills"* (Kırkgöz, Çelik & Arıkan, 2016, p. 1207).

The misinterpretation of the action-oriented approach as communicative language teaching by the developers of the 2013 ELT curriculum is observed in this quote, which Yeni-Palabıyık & Daloğlu (2016) fail to observe. Besides, Zorba & Arıkan (2016) state elsewhere that "Task-based learning has a significant place in the CEFR. In fact, the action-oriented approach that the CEFR adopted is based on tasks" (p. 18).

The authors of the CEFR companion volume (CEFRCV, 2018), Piccardo & North (2019), in their recent book "The action-oriented approach: A Dynamic Vision of Language Education" state (contrary to Kırkgöz, Çelik & Arıkan, 2016; Zorba & Arıkan, 2016; Yeni-Palabıyık & Daloğlu, 2016) that

> *"This book has therefore sought to theorise the underpinnings of the AoA and to explain why, as for example Bourguignon (2006), Puren (2002, 2009) and Richer (2009) argue, the AoA cannot be seen as synonymous with TBLT, as is sometimes assumed"*. (p. 276)

In fact, Puren (2002, 2004, 2006, 2014b), long before the authors of the CEFRCV, as they already acknowledge, indicated that the action-oriented approach could not be equated with either the communicative approach or task-based language teaching since the characteristics of action in the CLT and TBLT were quite different from those of social-action-based learning (the action-oriented approach). Recently, Puren (2020), once again, draws attention to the rupture between the communicative approach and SABL, which is seen in table 2 below:

Table 2
Genetic analysis of social-action-based learning (SABL)

	Genetic Analysis of Social-Action-Based Learning	
Genes of the CA	Genes of SABL	Most of the social work we do...
the inchoative	the repetitive	... are repeated more or less identically throughout the day, week, month or even year;
the punctual	the durative	...have a certain duration, or at least are part of the duration;
the perfective	the imperfective	... do not end completely (they are always subject to being resumed and/or extended later) ;
the individual	the collective	... are carried out collectively, or in relation to others, or at least taking into account the actions of others.

As seen in the table, the characteristics of social action that the social actors are involved in are different from the characteristics of speech action (threshold level document and CLT) that the learners as communicators are involved in. The characteristics of social actions, which the social actors display both in their mini-society (the classroom) and/or the outside society, are

repetitive, durative, imperfective, and collective. While the simulated situations of communicative use are abundantly employed by the communicative approach to train learners as communicators, in SABL, social action situations are necessary to train learners as social actors, and educational projects are the best models of social action for the social actors since they allow the social actors (learners) not only to live together but also to act together in and/or outside their mini-society (the classroom). In fact, this rupture can also be observed in the following quote from the CEFR (p. 9):

> *"The approach adopted here, generally speaking, is an action-oriented one in so far as it views users and learners of a language primarily as 'social agents', i.e. members of society who have tasks (not exclusively language-related) to accomplish in a given set of circumstances, in a specific environment and within a particular field of action. While acts of speech occur within language activities, these activities form part of a wider social context, which alone is able to give them their full meaning. We speak of 'tasks' in so far as the actions are performed by one or more individuals strategically using their own specific competences to achieve a given result".*

As Puren (2006, 2011) already indicated the implications of this quote, while the communicative approach views the classroom as an artificial environment (hence the use of simulations to bring the outside world into the classroom to allow the learners to communicate in the classroom as if they were in the outside society) and hence the students are just learners, social-action-based learning (the action-oriented approach) views the users and learners of a language as social actors and thus the classroom is no longer an artificial environment but a real mini-society, where the social actors (learners) act together (social action) as real citizens to give a product or display a performance. While the communicative approach focuses on language tasks, preferably communicative tasks since communicative interactions involve language, in social-action-based learning, tasks are not only linguistic (e.g. creating a product). The action targeted in the communicative approach is speech action, which is an act on the other, but in social-action-based learning, speech actions are meaningful only in relation to social action, which is an act with the other (acting together). It is, thus, the social actions which are the reference actions of the action-oriented approach (hence the use of the term social-action-based learning in this article), which means communication is put at the service of social action. In the communicative approach, however, communication is both the means and the goal. Thus, the correct interpretation of this short passage from the CEFR is enough to understand the rupture between the communicative approach (as well as task-based learning)

and social-action-based learning (the action-oriented approach). This rupture is never observed in both the 2013 and 2018 ELT curricula of Turkey, which are dominated by the communicative approach (though both are eclectic) as the developers of the 2013 curriculum also clearly state:

> *"To accomplish this, the program was designed to encompass a communicative approach to language teaching, highlighting the forms and lexis of English in real-life contexts in order to create relevance in learners' daily lives".* (Kırkgöz, Çelik, Arıkan & 2016, p. 1205)

This is a statement that is the opposite of the claim made in the title of the article by Yeni-Palabıyık & Daloğlu (2016) "English language teachers' implementation of curriculum with action-oriented approach in Turkish primary education".

What made Zorba & Arıkan (2016, p. 18) claim, incorrectly, that "Task-based learning has a significant place in the CEFR. In fact, the action-oriented approach that the CEFR adopted is based on tasks" is that the authors of the CEFR use the term "task" but they define the task differently from the proponents of task-based learning that of Nunan (1989), Estaire and Zanon (1994), Willis (1996), Ellis (2003). The task is defined, in the CEFR, in terms of action: "any purposeful action considered by an individual as necessary in order to achieve a given result in the context of a problem to be solved, an obligation to fulfill or an objective to be achieved" (p. 10). CEFR can be criticized by employing the term "task", which misleads some researchers (e.g. Zorba & Arıkan, 2016) to think that it is task-based learning. Insisting on the use of the term "task" to indicate a new orientation (the action-oriented approach) as different from task-based learning is thus not so appropriate. Puren (2004, 2009, 2014a, 2014b, 2019b), in this respect, is right to differentiate between task and project (as well as mini-project) and to propose mini-projects and educational projects as two possible implementations of social-action-based learning (the action-oriented approach) in and/or outside the language classes. These two terminologies are helpful to mark the departure from the communicative approach as well as task-based learning and they also represent the real nature of social action as different from communicative action. The picture is clearer as regards making the difference between tasks of task-based learning, and mini-projects and educational projects of social-action-based learning (the action-oriented approach) as shown in table 3 outlined by Puren (2014b) below:

Table 3
Analysis grid of the different current types of implementation of the action in foreign language textbooks

Action Perspective			
Task-based language teaching (communicative tasks) ⟺	Weak Version (action tasks) ⟺	Strong Version (mini-projects) ⟺	Strongest Version (project pedagogy)

Acar (2020a, 2020b) gave sample mini-projects as can be employed by language textbooks and the next section of this article explains how educational projects can be implemented beyond any textbook or curriculum since projects in SABL can not be limited by the time frame of the textbook or curriculum, nor can they be imposed on the social actors (learners) by an outside authority (teacher, textbook or curriculum).

Educational Projects in Social-action-based Learning

To Puren (2009), in the implementation of social-action-based learning (the action-oriented approach) in terms of project pedagogy, "all student activities are organized according to 'educational projects' which have a real (and not simulated) dimension and which they design and conduct themselves with the help of the teacher" (p. 126). Puren (2014b) illustrates the differences between communicative tasks and educational projects as shown in table 4 below:

Table 4
Communicative tasks and educational projects

Task-based language teaching (communicative tasks)	The action-oriented approach (educational projects)
1. The act of reference is the communicative task: it involves managing communication situations through language interaction, the main issue being the exchange of information. The characteristics of this action are those of the tourist trip: the inchoative, the punctual, the perfective and the individual.	The act of reference is social action. The characteristics of this action are, contrary to those of the tourist trip, the repetitive, the durative, the imperfective and the collective. The action is of the order of complex: relevant to the process, requiring metacognition and feedback ("project management").
2. Tasks are predetermined by the teacher/textbook.	Actions are chosen and designed by the learners (with the help and under the control of the teacher) at the beginning of the project. Learners plan and organize their own work.
3. Competencies are defined and worked in terms of language activities (listening, reading, spoken interaction, spoken production, writing), speech acts (acting on the other by language) and language action (pragmatic competence).	Competence is defined and worked primarily as a complex ability to act, requiring, in particular, the articulation and combination of different language activities.

4. The reference company is the external foreign company (e.g. France for French as a foreign language learners)	Learners are considered as such as full-fledged social actors, engaged with teaching in a project (teaching-learning). Homology between class and external society is instituted in the very organization of the class: Council, presidents, and secretaries of meetings, persons in charge (of the mail, the library, a group, a workshop,...).
5. The tasks are done in simulation.	The actions are real: inter-school correspondence, class newspaper (printed in the classroom print shop, and distributed outside), presentations, debates, exhibitions, dossiers, leaflets,...
6. We only target a language objective: communicative competence.	We also aim to achieve an educational goal: the training of a real citizen as a social actor autonomous and supportive, critical and responsible, in a democratic society.
7. The linguistic objectives of each unit/ didactic sequence are defined first in terms of communication situations and/or in terms of notional-functional content	Projects are not limited by the time frame of the unit or the didactic sequence, nor are guided upstream by predetermined language objectives. They are negotiated with the teacher, who integrates the language objectives into his/her own criteria.
8. The cultural objectives are the meta cultural (knowledge), and intercultural (usually in the narrow sense of intercultural comparison) components of cultural competence.	The privileged cultural component is the co-cultural component: the ability to adopt/adapt a culture of collective action in the classroom/in external societies/professional circles. All components of cultural competence are likely to be mobilized.
9. Language and cultural content are entirely predetermined by the teacher/textbook. The task(s) is (are) conceived as opportunities for reuse of these contents. The variations in language and cultural content worked are within the chosen theme.	The language and cultural contents are introduced according to the actions and worked in relation to these actions.
10. Communication is both the goal and the means: model dialogues are used; information management stops when the communication is successful.	Communication is a means at the service of action: no dialogue or another document model of production. The communicative objective is integrated into the objective of informational competence (i.e. the ability of a social actor to act on and through information), the management of the information integrating post- and pre-communicative activities.
11. Priority is given to interindividual interactions: the reference group is the group of two.	The reference groups (or the large group) are "project groups", where all the decisions are made and where all the activities concerning the project(s) are carried out. The organization in groups and sub-groups is instituted in the class according to the types of activity: production teams workshops, working groups. The "large group" dimension is instituted in the "Council", place of mediation and collective bargaining.

12. The tasks remain entirely managed and operated within each group. The large group may be used as public during the performance of the simulated scene.	Individual work is systematically encouraged and facilitated in parallel with group activities: self-correcting lexicon, reading, writing files. This individual dimension is also established: Personal work plans
13. The documents are all provided to learners.	13. All documents are searched for and selected by the learners themselves. The learners' productions are considered as documents in their own right, which can be integrated into the documentation and/or used in a collective way (the free texts of the students are linked in albums available in the "Library of class") or individually (work of a student on the text of a letter he received from his correspondent).
14. The documents are treated as a priority according to the language activity concerned (“support logic").	Documents are treated primarily as resources for action ("documentation logic"). All "documentary logics" are likely to be implemented.
15. The use of L1 is avoided.	15. L1 is introduced when it helps to carry out the action (e. g. part of the documentation in L1) or to project it in the learners' society(ies) (e.g. L1 translation of the final production and dissemination in the learners' country). Activities related to language mediation are planned.
16. The evaluation is mainly done on the individual productions of the learners.	The evaluation takes into account not only the work done ("product" dimension), but also the realization of the work (the "process" dimension).
17. The evaluation criteria are communicative (e. g. in the CEFR: linguistic, sociolinguistic, pragmatic).	The evaluation criteria specific to social action are added as priorities: the success of the action and the "professional" quality of the production.

Table 4 shows the differences between the characteristics of communicative tasks and educational projects. The most striking characteristics of educational projects in social-action-based learning (the action-oriented approach) are that the actions are chosen and designed by the learners (with the help and under the control of the teacher), thus, they can not be imposed on the social actors (learners) by the teacher, textbook or curriculum; and there is a preference for real action rather than simulated actions as in the communicative approach both in its weak (threshold level document) and strong versions (task-based learning). As to the implementation of educational projects in and/or outside the classroom, Puren (2019a) presents these stages of a project in figure 1 as follows:

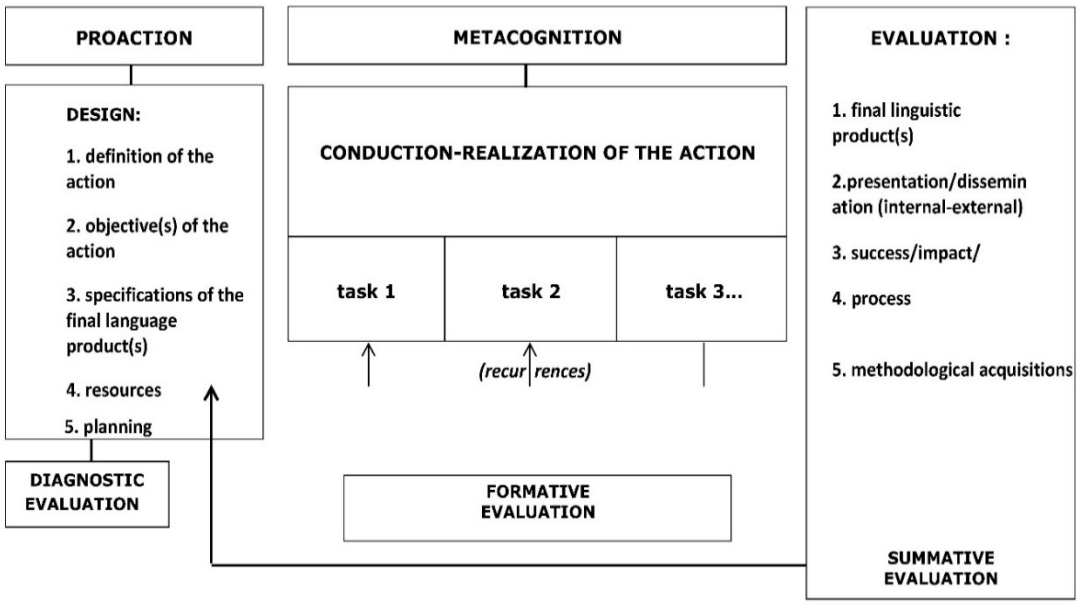

Figure 1. *The stages of a project*

As illustrated in figüre 1, there are different cognitive operations and fundamental activities carried out in a project. According to Puren (2017, p. 3)

> *"Proaction is a cognitive operation concerning the future action: the pupils project their future global action with their partial actions (or "tasks": T1, T2...) and project themselves into it, mentally examining them not from the present - i.e. at the beginning of the project, at the time of the proaction - but retrospectively from the end of the project - i.e. at the time of the final evaluation".*

At the beginning of the project, the students will ask, collectively, questions and provide answers: What will we have achieved at the end of our project? What resources will we have needed? What successive tasks should we have performed? How will we be organized? What difficulties might we have encountered? How could we have overcome them? On what criteria of success would we have guided ourselves? (Puren, 2017). This is a kind of brainstorming, but it must lead to immediate decisions in terms of designing the action to be carried out. Thus, proaction is the cognitive operation which corresponds to the design stage of a project and it determines the precise definition of the action, the objectives of the action, the specification of the final linguistic product(s), the resources needed for realizing the action, and the planning (specifying the different intermediate tasks and organization of responsibilities allocated to each learner during the project and their succession, the stages of intermediate tasks). Evaluation of a project does not only take place at the end of the project but begins in the design of the project.

This is not, then, the evaluation of the students' success because, in the final evaluation of a project, the success of the action is the main criterion, but the evaluation of the available knowledge and resources. It aims to answer the questions: What do we need to know and master and what resources do we need before starting our project? and what should we have known and mastered to succeed in our project? (Puren, 2017).

The second cognitive operation carried out by the students is metacognition, which is operating at the implementation phase of the project. In a metacognitive activity, the students can think together about how to carry out the intermediate tasks effectively during the implementation stage. Thus, metacognition is not another stage of a project but just a cognitive operation used in the second stage of a project (implementation).

In the implementation stage of the project, students carry out intermediate tasks they distributed among themselves in the design stage. Like the design stage of the project, in the implementation stage, each intermediate task is put to evaluation (this time formative) as to how they will be performed, are performed, or have been performed (in a recursive process). This evaluation serves to monitor the intermediate tasks for possible remediation through activity monitoring form.

The last stage of the project covers evaluation, which is basically summative. It is also retrospective in that it enables the learners to review the whole stages of the project and forward-looking since it gives students experience for future projects as Puren (2017, p. 6) argues:

> *"The final evaluation of a project is a summative evaluation, but it is also retrospective in that it feeds the metacognition applied to the entire realized project in such a way as to critically review the design, implementation and evaluations of the project. It is also forward-looking: its summative and retrospective perspectives are intended to draw lessons for future projects".*

The traditional lesson design follows the paths of presentation-practice-production (PPP). With task-based language teaching, this design is reformulated as pre-task, task, and post-task, though it is a matter of debate among task-based methodologists what these stages should include (e.g. Prabhu, 1987; Nunan, 1989; Willis, 1996; Shekan, 1996; Ellis, 2003). In the implementation of SABL in terms of project pedagogy, the path to follow is design-implementation-evaluation, and there are cognitive operations like proaction and metacognition

operating at the design and implementation phases. The design stage of a project does not correspond to the presentation stage of the traditional presentation-practice-production model nor the pre-task stage of the pre-task, task, and post-task model. In the implementation of social-action-based learning (the action-oriented approach) in terms of project pedagogy, it is the students who (with the help and under the control of the teacher) take as much responsibility as possible in the design of the projects so they become more and more autonomous. The design stage of a project, therefore, cannot be directed by the teacher, textbook, or curriculum. The fact that the design stage of a project does not correspond to the presentation or pre-task stages, however, does not mean that there is no support to learners in project pedagogy. Puren (2009) argues that support by the teacher (and/or textbook and other resources) is necessary before, during, and after the implementation of the social action (project). Such support before the implementation of the project (or preparation phase of the project) is necessary to enable the social actors to be equipped with the linguistic and cultural resources for them to be able to implement the project. The evaluation of a project involves individual and collective self-evaluation by the students as well as evaluation by the teacher and even public evaluation (if the final product is published e.g. the school newspaper or put into a public exhibition, theatrical performance or song night). The other important point is that the stages of a lesson in both the PPP model and task-based language teaching are carried out within a limited time frame of a lesson (one or two class hours) or textbook. The stages of a project, on the other hand, cannot be carried out in such a limited time frame of a lesson and textbook but are realized in a large time frame (e.g. one or two months, the whole semester or even a whole year depending on the complexity of the project). Finally, projects do not function as a tool of communication in the classroom. On the contrary, all types of language activities and tasks (communicative or pedagogical) carried out in and/or outside the classroom are put at the service of the social action, project (e.g. school newspaper).

Conclusion

To become social actors, the students have to move from involving in a simple exchange of information (talking with the other) to acting together to give a product (acting with the other). This, however, does not mean that communication disappears in the project since it is obvious that the social actors (learners) have to communicate well to act effectively with each other, but the status of communication changes: it is no longer the means and the objective (as in the

communicative approach), but only a means at the service of the objective, which is the social action. This change in status is the consequence of the paradigm shift, from the communication paradigm to the social action paradigm. There are distinctive characteristics of projects that reflect the real nature of social action and which differ them from the communicative tasks. Thus, the implementation of social-action-based learning (the action-oriented approach) in terms of project pedagogy differs extensively from both the communicative approach and task-based language teaching. In language teaching and learning, a transition from the reference situation of tourist travel, for which the first threshold level document was prepared, and also from its reference action, which is the language interaction described in terms of speech acts, to the reference situation of a multilingual and multicultural society, where the students will live and work together in a democratic manner (for which CEFR was developed), and to its reference action, which is social action (acting with the other) will be best reflected by the implementation of social-action-based learning in terms of project pedagogy.

Statements of ethics and conflict of interest

"I, as the Corresponding Author, declare and undertake that in the study titled as *"The Implementation of Educational Projects in Social-action-based Learning",* scientific, ethical and citation rules were followed; Turkish Online Journal of Qualitative Inquiry Journal Editorial Board has no responsibility for all ethical violations to be encountered, that all responsibility belongs to the author/s and that this study has not been sent to any other academic publication platform for evaluation."

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