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|Research Article / Araştırma Makalesi|

A Holistic Understanding of Teacher Attitudes Towards Curriculum Change: Bronfenbrenner's Ecological Theory Perspective

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Keywords

1. Curriculum change
2. Ecological theory
3. Teacher self-efficacy
4. Teaching beliefs
5. Readiness for change

Anahtar Kelimeler

1. Program değişikliği
2. Ekolojik sistemler kuramı
3. Öğretmen özyeterliği
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Abstract

Purpose: This study aimed to explore the underlying factors behind teachers' self-efficacy for teaching, beliefs about teaching, and their readiness for change in understanding their attitudes towards the constructivist curriculum change in Türkiye through the lens of Bronfenbrenner's ecological theory of education.

Design/Methodology/Approach: The study employed a phenomenological approach to uncover teachers' lived experiences concerning the factors influencing their attitudes towards the 2005 curriculum change in the Turkish education system. Twenty-one teachers from elementary, middle, and high schools were selected through maximum variation sampling. The data were collected through semi-structured, in-depth interviews, and analyzed using content analysis.

Findings: Concerning Bronfenbrenner's ecological framework, the findings resulted in the following themes: a) Teacher-related factors: Teacher characteristics, including their educational background, teaching experience, professional knowledge, skills, motivation, and emotional readiness. b) Micro-system and meso-system-related factors: K-12 school curricula, the involvement of students and parents, the physical and technological infrastructure of schools, the influence of school principals and colleagues in creating a supportive learning environment towards implementing the constructivist curriculum. c) Exo-system-related factors: Socio-cultural environment and mass media. d) Macro-system-related factors: The structural and operational challenges within the education system, the design and quality of professional development activities, the financial status of teachers and the inadequacy of the pre-service teacher education programs and practices, suggesting a pathway for enhancing overall teacher preparedness and support.

Highlights: The study provides the key stakeholders, especially education policymakers, curriculum development experts, school principals, and teacher educators, with essential insights for developing an understanding of the ecology of curriculum change and adopting a non-linear, holistic, and comprehensive view of curriculum change implementation. More specifically, the in-depth exploration of the factors influencing teachers' self-efficacy, general beliefs about teaching, and readiness for change call for those stakeholders to work collaboratively and develop effective strategies to support teachers, who are the curriculum makers and the agents of change, for a successful and sustainable curriculum change.

Öz

Çalışmanın amacı: Bu çalışma, Bronfenbrenner'ın ekolojik sistemler kuramı ışığında Türkiye'de öğretmenlerin yapılandırmacı program değişikliğine yönelik tutumlarını anlamak için öğretime yönelik özyeterliklerinin, öğretime ilişkin inançlarının ve değişime hazır olmalarının altında yatan faktörleri araştırmaktadır.

Materyal ve Yöntem: Bu çalışmada, öğretmenlerin 2005 yılında yürürlüğe giren ve hâlen Türk eğitim sistemini etkilemekte olan program değişikliğine yönelik tutumlarını etkileyen faktörlere ilişkin deneyimlerini ortaya çıkarmak amacıyla fenomenolojik bir yaklaşım kullanılmıştır. Çalışmaya ilkokul, ortaokul ve liselerden maksimum çeşitlilik örneklemesi yoluyla seçilen 21 öğretmen katılmıştır. Yarı yapılandırılmış derinlik odaklı görüşmeler yoluyla toplanan veriler içerik analizi yöntemi ile analiz edilmiştir.

Bulgular: Araştırmadan elde edilen bulgular, Bronfenbrenner'ın ekolojik sistemler kuramı çerçevesinde aşağıdaki temalar etrafında ortaya koyulmaktadır: a) Öğretmenle ilgili faktörler: öğretmen özellikleri, eğitim durumu, öğretim deneyimi, mesleki bilgi, beceri, motivasyon ve duygusal hazır olma; b) Mikro sistem ve mezo sistemle ilgili faktörler: K-12 programı, öğrencilerin ve velilerin katılımı, okulların fiziksel ve teknolojik altyapısı, okul müdürlerinin ve meslektaşlarının yapılandırmacı programın uygulanmasına yönelik destekleyici öğrenme ortamı yaratmaları; c) *Ekzo sistemle ilgili faktörler:* Okul çevresi ve kitle iletişim araçları. *d)* Makro sistemle ilgili faktörler: Eğitim sisteminin yapısı ve işleyiş sorunları, mesleki gelişim faaliyetlerinin tasarımı ve niteliği, öğretmenlerin finansal durumu ve hizmet öncesi öğretmen eğitimi programlarının ve uygulamalarının yetersizliği.

Önemli Vurgular: Bu çalışma, özellikle eğitim politikacıları, program geliştirme uzmanları, okul müdürleri ve öğretmen eğitimcileri başta olmak üzere çeşitli kilit paydaşlara, program değişimine ilişkin ekolojik bir bakış açısı ve değişimin uygulanmasına yönelik doğrusal olmayan, bütüncül ve kapsamlı bir anlayış sunmaktadır. Bu çerçevede, öğretmenlerin özyeterliklerini, öğretimle ilgili genel inançlarını ve değişime hazır olmalarını etkileyen faktörlerin derinlemesine araştırılmasından elde edilen bulgular, başarılı ve sürdürülebilir bir program değişikliği için kilit paydaşların iş birliği içinde çalışmalarını ve program yapıcıları ve değişimin aracıları olan öğretmenleri destekleyecek etkili stratejiler geliştirmelerini vurgulamaktadır.

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INTRODUCTION

Curriculum change has traditionally been seen as an important tool for educational reform, which typically entails the development of national curriculum plans for specific subject areas and the determination of certain objectives, activities, and evaluation for teaching and learning experiences. Especially over the last few decades, due to the increasing demands for the globalization of education standards to improve educational outcomes and raise a nation's human capital and economic competitiveness in the global arena, the reform of the school curriculum has been one of the key instruments of educational change for policymakers in many countries, including Türkiye. Underpinned by a process of constant reform (Levin, 2010), this international trend has, indeed, been characterized as an "epidemic" (Levin, 1998) of change. However, it is criticized that such a trend leads to a focus on performativity in the search for improved outcomes and therefore, reflects an important issue as education outcomes (e.g., the results of international tests such as PISA, TIMSS) are increasingly used as an indicator of the success of education systems across different subject areas.

Fullan (2013) describes that "educational change is technically simple and socially complex" (p. 111). This suggests that no matter if the change is externally imposed or voluntarily initiated; explicitly described in detail or developed gradually throughout implementation; designed to be flexible for modifications according to the varying needs or used uniformly regardless of different situations, there is a system of variables that interact to determine the success or failure of the change implementation. Those variables include the characteristics of change (e.g., complexity, practicality), local characteristics (teachers, principals, community, district), and external factors (e.g., government). Thus, while the simplicity of the technical aspect is no doubt, anyone involved in a change effort will encounter that implementing change is not an easy task, which requires "change in practice" (Fullan, 2016, p. 28).

Accordingly, for a successful change implementation, Fullan (1993) advises that in addition to teachers' change agentry at the individual level, institutional change at the school and system levels is also imperative, implying that successful change requires strategies both at the government or local authority level and at the teacher or school level. In the context of curriculum change, while this stresses the key role of several stakeholders in the process of change, teachers are still at the center of curriculum change as they are the main actors who will implement the change at the class level that is closest to instruction and learning (Rahimi & Alavi, 2017). Thus, teachers' attitudes towards implementing new and mandatory policies and practices are highly crucial for the success of the implementation, effectiveness, and continuation of change. Otherwise, if their attitudes and beliefs are neglected, teachers might show resistance to the intended change, and the success of change would be limited. In fact, efforts to change and improve education in general, and school curriculum specifically, often fail because those involved neither acknowledge nor understand the chief role that teachers play in the change process. Yet, change will always fail until we find some ways in which teachers engage in developing and applying new knowledge, skills, and understandings, while all real change involves, to some extent, loss, struggle, and uncertainty (Fullan, 2016).

Although the central role of teachers in successfully enacting such change has been long highlighted, teachers, in reality, usually feel a tension between a focus on educational outcomes vs. their educational values as well as the aims and purposes of the educational system (Biesta, 2015; Harris & Graham, 2019). Moreover, a tension has emerged between the prescriptive, centrally driven, and imposed curriculum reform which sees teachers as deliverers of the curriculum, and the view that empowers teachers to exercise agency, act as agents of change, and interpret the general guidelines into a curriculum (Carse, 2015; Priestley, 2011). Consequently, this has highlighted the question of what role teachers should play in curriculum change as there has been a growing counterview that teachers do not only deliver a prescribed curriculum, but indeed "they are the ones who give life and meaning to the curriculum" (Harris & Graham, 2019, p. 44) as curriculum makers.

To what extent teachers are encouraged and supported to implement the intended curriculum change also varies across education systems. The context of curriculum change we look at in this study is the constructivist K-12 curriculum introduced to Türkiye in 2005 after the termination of a long-established tradition rooted in behaviorism (Akinoglu, 2008; Bulut, 2007). The new curriculum has demanded a shift in teachers' instructional practices, moving away from teacher-centered towards more student-centered approaches. The process of curriculum changes in Türkiye, however, is usually bureaucratic, authoritative, and driven by policy mandates, rules, and regulations, consisting of several hierarchical levels, which generally takes a top-down approach with the Ministry of National Education (MoNE) at the top hierarchical level and teachers at the bottom. Thus, the introduction of the prescriptive, centrally driven constructivist national curriculum in Türkiye continued to position teachers as recipients and deliverers of the curriculum (Nohl & Somel, 2016). Once the curriculum was published and disseminated, teachers were required to implement the new curriculum. Initially, they were given the curriculum to make sense of it on their own or provided with limited or unsatisfactory in-service training before implementing the new curriculum (Yildirim & Kasapoglu, 2015). Yet, even though an effective curriculum change is highly dependent on teachers' knowledge, skills, beliefs, and attitudes, such change is also significantly influenced by factors external to teachers, such as professional development, physical resources, and instructional support (Clasquin-Johnson, 2016). Thus, in thinking about the success and effectiveness of curriculum change, it is not only necessary to understand teachers' attitudes towards the given curriculum change, but it is also of chief importance to explore the factors influencing teachers' attitudes when attempting to initiate and implement curriculum change.

In this study, we build on the findings of our previous work (Akin-Sabuncu & Calik, 2023) which mainly showed that teachers' attitudes towards curriculum change, specifically the constructivist curriculum change in the Turkish context, are significantly predicted by teachers' beliefs about teaching, self-efficacy beliefs for teaching, and readiness for change. Drawing on this work, the purpose of the present study is to further explore the factors underlying teachers' perceptions of their self-efficacy beliefs for teaching, teaching beliefs, and readiness for change, particularly in understanding how they influence teachers' attitudes towards the constructivist curriculum change. Grounded in Bronfenbrenner's ecological systems theory, this study examines these factors within the interconnected layers of the educational environment—ranging from individual teacher characteristics to broader systemic influences—to provide a comprehensive understanding of how various ecological levels shape teachers' attitudes and responses to curriculum reform. This is important because when the underlying factors are investigated, they might be manipulated, changed, or developed to better support teachers and improve the success of curriculum change. In line with this purpose, our inquiry was guided by the following research question: "How do teachers articulate what influences their self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change in relationship to their attitudes towards the implementation of a constructivist curriculum change?

Context of the Study

Under the given political and economic landscape during the harmonization period with the European Union (EU) membership, a top-down and government-led curriculum reform, known as a revolutionary move due to the transition from subject-centered to student-centered pedagogy (Kosar Altinyelken, 2011), has been put into practice in Türkiye since 2005-2006 academic year. Before the nationwide implementation, the new K-12 curricula were piloted by the Ministry of National Education (MoNE) in 120 schools at the primary level, selected from nine provinces in Türkiye in the 2004-2005 academic year. Following that pilot study, the new curricula were disseminated and implemented nationwide in the 2005-2006 academic year, starting with primary grades (Hazır Bıkmaz, 2006), followed by a gradual implementation across K-12 levels.

This curriculum reform paved the way for an inevitable change in the ultimate goals of education, the knowledge structure, the organization of the learning process and assessment practices, and the ascribed roles of teachers and students. More specifically, the new K-12 curricula focused on several core competencies, such as problem-solving, critical and creative thinking, decision-making, research and communication skills, entrepreneurship, and employment of information technologies (Karacaoğlu, 2018). As opposed to subject-centered pedagogy, the child's characteristics, interests, and needs are considered when designing learning environments. In so doing, students would have the opportunity to utilize their prior knowledge and past experiences to participate in the learning environment, which is deemed essential for active and meaningful learning. In this regard, the new curricula not only highly stressed the use of hands-on experiences, cooperative learning, and extracurricular activities, but it also encouraged teachers to utilize authentic assessment, highlighting the need to assess students holistically throughout the entire learning process via student portfolios, performance and project assignments, concept maps, self, and peer evaluations.

Embedded in these changes, neither the student is seen as the depositor, nor the teacher as the transmitter of the knowledge. In the new curricula, teachers are expected to facilitate learning by providing enriched learning opportunities that challenge students' minds as a prerequisite for seeking and structuring knowledge and building on their capacities. In turn, students are expected to take responsibility for their learning by drawing on their prior knowledge and hands-on experiences, actively participating in collaborative working environments, questioning, discussing, and sharing their ideas, solving problems, and making decisions (Bulut, 2007; Elmas et al., 2014; Koc et al., 2007; Kosar Altinyelken 2011, 2013; Kurtdede et al., 2014).

Nevertheless, despite high aspirations towards the particular curriculum change in Türkiye, the research has shown that there is a significant gap in practice between the intended and enacted school curricula in different subject areas (e.g., Akdeniz & Paniç, 2012; Altun & Şahin, 2009; Elmas et al., 2014; Kosar Altinyelken 2011, 2013; Yaşar & Sözbilir, 2019). This might be alarming since there should be a strong congruence between the intended and enacted curricula to discuss the success of any curriculum implementation; otherwise, the reform might conclude with an implementation failure. Drawing on the body of literature suggesting that teachers play a critical role in the enactment or implementation of curriculum change, this study focuses on teachers' attitudes towards curriculum change in the context of the Turkish education system and it attempts to explore the factors behind teachers' perceptions of their *self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change in understanding their attitudes towards the constructivist curriculum change*.

Teachers' Attitudes Towards Curriculum Change: The Role of Teachers' Readiness for Change, Self-Efficacy Beliefs for Teaching, and Beliefs about Teaching

Teachers have a fundamental role in successfully implementing curricula, which highlights the importance of how they perceive the reform (Kyriakides, 1997). Goodson (2000) asserts that the interplay between the external and personal change forces requires preserving a balance to reach success at the end of the implementation process. That balance between external and personal change might be only addressed by including teachers in the change process and being attuned to their beliefs, commitments, and professional efforts. For a successful change, Weiner (2009) also pointed out the need for understanding people's beliefs, attitudes, and intentions to figure out the necessity of change before bringing it into practice. From this perspective, it can be especially useful to explore teachers' readiness for change to understand why they adopt or resist changes in the curricula. Several

studies illustrated that teachers more often resist externally initiated changes (Du & Chaaban, 2020; Han, 2013; van Driel et al., 2001) and develop negative attitudes if the change does not correspond to their beliefs and values (Carless, 2013; Park & Sung, 2013). Teachers' resistance might generally stem from their non-involvement in the change process, lack of knowledge and support, experienced fear and uneasiness of the unfamiliarity, and concerns about losing their instructional habits (Cerit, 2013; Du & Chaaban, 2020; Kosar Altinyelken, 2013).

As teachers' beliefs directly influence their behaviors and intentions towards the curricula (Chen, 2015; Pajares, 1992; Roehrig et al., 2007), the curricular changes should also correspond to their belief systems, particularly their beliefs about teaching and self-efficacy beliefs for teaching. First, teachers' perceptions of the knowledge structure, the reality, and the ways they employ to fulfill students' interests and needs, including teacher-centered and student-centered approaches, constitute their beliefs about teaching. The literature generally focused on how teachers' beliefs about teaching are linked to their curricular change practices. In so doing, the findings put forth that teachers are mostly reluctant to employ the changes in curricula if the relevant changes do not correspond to their belief systems (e.g., Roehrig & Kruse, 2005; Roehrig et al., 2007; Yates, 2006). Second, teachers' self-efficacy beliefs for teaching refer to their capability judgments on arriving at the intended learning outcomes (Tschannen-Moran & Woolfolk Hoy, 2001). Accordingly, teachers with firmer self-efficacy are more open to using new instructional methods and strategies regarding the changes in the curricula. On the contrary, implementing the changes might be problematic if there are concerns about teachers' capability judgments (e.g., Çayak, 2014; Eskici & Özen, 2018; Ghaith & Yaghi, 1997; Kasapoğlu & Duban, 2012; Nie et al., 2013; Pan et al., 2013).

Research has shown that several factors, including the lack of support and knowledge about the change (Akdeniz & Paniç, 2012; Altun & Şahin, 2009; Bulut, 2007; Dindar & Yangın, 2007; Eraslan, 2013; Kosar Altinyelken, 2011; Yaşar & Sözbilir, 2019); the factors related to learning environments, such as class size and shortage of materials (Altun & Şahin, 2009; Bulut, 2007; Dindar & Yangın, 2007; Kosar Altinyelken, 2011; Yaşar & Sözbilir, 2019); parental attitudes towards the new curricula (Dindar & Yangın; 2007; Eraslan, 2013; Kosar Altinyelken, 2011); the presence of standardized examinations (Eraslan, 2013; Kosar Altinyelken, 2011; Yaşar & Sözbilir, 2019); and the ineffectiveness of in-service trainings (Altun & Şahin, 2009; Bulut, 2007; Dindar & Yangın; 2007; Eraslan, 2013; Yaşar & Sözbilir, 2019) were the most common issues impacting the implementation of the new curricula in Türkiye, which might, to some extent, interplay with teachers' beliefs. In fact, although teachers' beliefs and readiness have a place in how they perceive and implement the new curricula, altering the belief structures is not as easy as structuring the curricula (Fullan, 2016). That calls attention to investigating the factors underlying behind teachers' self-efficacy beliefs, teaching beliefs, and readiness for change as they shape their attitudes towards the implementation of curriculum change. To that end, situated in the context of the constructivist curriculum change in Türkiye, this study employs Bronfenbrenner's (1976) seminal framework, the experimental ecology of education, as a theoretical lens to explore the factors behind teachers' perceptions of their self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change in understanding how they influence teachers' attitudes towards the implementation of constructivist curriculum change.

Theoretical Framework: Ecology of Education

Drawing on Bronfenbrenner's (1976) seminal framework, the experimental ecology of education, as a theoretical lens to explore the ecology of curriculum change, the fundamental assumption underlying this study is that curriculum change is a complex process that requires considering multiple factors at multiple levels of an educational environment. The application of ecology as a holistic theoretical approach is crucial as teachers do not exist in isolation but are embedded within a larger social structure interconnected with other social institutions. Therefore, a non-linear, holistic view of curriculum change supports the adoption of the ecology of education as a framework for understanding the nested arrangement of several structures impacting the success of the enactment of curriculum change. Specifically, we use the earlier version of the theory, where Bronfenbrenner (1976) identifies five interwoven and interrelated contexts/systems in which an individual exists at the center: micro-system, meso-system, exo-system, macro-system, and chrono-system. These systems are useful in that they help understand a complex system with nested layers that are simultaneously interacting and leading to certain patterns of practice. While we acknowledge that Bronfenbrenner's theory of ecology of education has been in a continual state of development with the developed versions focusing on the Process-Person-Context-Time model (Bronfenbrenner, 1989, 1999, as cited in Tudge et al., 2009) and/or the neo-ecological theory highlighting the role of digital era (Navarro & Tudge, 2023), our study benefited from the earlier version as we did not specifically aim to focus on the process, person, context, and time elements of the teachers' perceptions of their self-efficacy beliefs for teaching, teaching beliefs, and readiness for change in understanding how they influence teachers' attitudes towards the constructivist curriculum change; nor did we seek to investigate the particular interactions or the interrelatedness among them within the scope of this study. We did not intend to situate our work specifically in the digital context either.

According to Bronfenbrenner (1976), first, the micro-system relates to an immediate setting in which individuals engage in particular activities in particular roles (e.g., teacher, student, parent, principal) for a certain time in a certain place (e.g., classroom, school). Second, the meso-system includes the interrelations among the multiple micro-systems. For a teacher, it typically encompasses interactions among parents, school, peer groups, administrators, and so on. Third, the exo-system refers to an extension of the meso-system that includes both formal and informal social structures and the major institutions of the society, such as the neighborhood, mass media, agencies of the government, and so on. Fourth, the macro-system is the largest and most

distant collection of people and places to the individual that nevertheless have major influences on them. The macro-system encompasses the larger economic, social, legal, and political systems as well as socio-cultural values and beliefs that both explicitly and implicitly shape the micro-, meso-, and exo-systems. Lastly, the chrono-system includes all environmental changes and historical events that take place throughout the lifespan and affect the individual (Bronfenbrenner & Evans, 2000).

To begin our thinking about curriculum change as a complex system, in our work, we adopted Bronfenbrenner's (1976) framework of the ecology of education to study what factors affect teachers' attitudes towards constructivist curriculum change. In so doing, we placed the main agents of curriculum change implementation (teachers) at the center of this complex and interactive system and wanted to explore their perspectives to better understand how participants view the factors influencing their self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change that subsequently facilitate or hinder the enactment of the curriculum change process, particularly within the context of a constructivist curriculum change that has taken place in the Turkish education system since 2005. Thus, we argue for a framework to think about teachers' experiences of curriculum change implementation more holistically, as such experiences cannot be comprehended adequately without exploring the interconnectedness between these multiple subsystems of social structure.

METHODS

Research Design and Participants

To uncover the lived experiences of the participating teachers in relation to the factors that affect their attitudes towards the constructivist curriculum change, the study employed phenomenological research (Creswell, 2013). The purpose of phenomenological research is to explore the perspectives and lived experiences of several individuals about the phenomenon of interest and reveal the commonalities across them (Marshall & Rossman, 2011). This rests on the assumption that the same phenomenon can be experienced and interpreted in multiple ways by different individuals (Merriam, 2014). Accordingly, this study was designed as qualitative phenomenological research to gain an insight into the world of teachers and reveal the commonalities across their experiences of implementing a mandatory and top-down constructivist curriculum change within a highly centralized K-12 education context in Türkiye.

The study included 21 participants, who were selected through maximum variation sampling (Patton, 1990) by considering their gender, educational background such as the type of the faculty graduated (education faculty or other), year of graduation, the highest degree obtained (two-year degree, bachelor's degree, and master's degree), and professional background including years of professional experience and the school level (elementary school, middle school, and high school). Building these variables into the participant selection process enabled us to capture the common themes that emerged from a great deal of variation and therefore contributed to the richness of the results (Patton, 1990). Certain demographic characteristics of the participants are presented in Table 1. Herein, it should be noted that while the socio-economic status (SES) of the schools was initially not among the participant selection criteria, based on the demographical questions on our interview schedule, we also obtained information regarding the SES of the schools by the participants' own descriptions provided in their interview responses. Understanding the broader ecological context of curriculum change requires considering school level, socio-economic status, and class size. These factors offer a nuanced perspective on how teachers' experiences with constructivist curriculum change might differ across various educational settings, thereby enhancing the study in multiple ways. First, those variables help illustrate how the implementation of the 2005 curriculum change was experienced differently in the school environment. For instance, teachers in resource-limited schools, particularly in low SES settings, might have faced greater challenges in adapting constructivist teaching methods compared to those in well-resourced ones (Dönmez & Akar Vural, 2014; Gömleksiz & Öner, 2013). Additionally, students' readiness and parental involvement in education vary across SES levels, which might be influential on the constructivist curriculum implementation. Second, class size and school SES have a direct impact on teachers' self-efficacy beliefs and their readiness for change. Larger class sizes, for example, may hinder the effective adoption of student-centered teaching approaches, while schools with higher SES might have access to professional development opportunities, as supported by several studies (Bal & Doğanay, 2009; Yiğit et al., 2017). It is imperative that teachers receive successful teaching experiences facilitated by full access to teaching resources and pay more individual attention to students in small classes, as this can greatly influence their confidence in effectively implementing the constructivist curriculum and ease their transition to these necessary changes. By including these variables, the study does not merely focus on the historical moment of curriculum change but also considers its ongoing impact. Understanding how these factors continue to shape teachers' experiences provides insights into the sustainability of curriculum change over time. Therefore, the richness of the study lies in its ability to capture a diverse array of experiences across different school environments by including school level, SES, class size, and the other variables. By exploring how these conditions shaped teachers' responses to curriculum change, the study intends to offer a more comprehensive view of the challenges and successes of curriculum changes.

Table 1. The demographic characteristics of the participants

		Gender	Type of faculty graduated	Highest degree obtained	School level	Socio-economic status of the school	Class size
Participants of the Main Study							
	Teacher D	Female	Education	Master's	Primary	Low	35
	Teacher E	Female	Other	Bachelor's	High	Middle-Low	40
	Teacher F	Female	Education	Bachelor's	Middle	Middle	28
	Teacher G	Female	Education	Master's	Middle	Middle	10
	Teacher H	Female	Education	Bachelor's	Middle	Middle	32
	Teacher I	Male	Other	Associate	Primary	Middle-High	30
	Teacher J	Female	Education	Bachelor's	Middle	Middle-Low	24
	Teacher K	Female	Education	Bachelor's	Middle	Middle	30
	Teacher L	Female	Other	Bachelor's	High	Middle-Low	25
	Teacher M	Female	Education	Bachelor's	High	Middle-High	20
	Teacher N	Male	Education	Bachelor's	Middle	Middle	29
	Teacher O	Male	Education	Bachelor's	High	Middle-Low	35
	Teacher P	Female	Other	Bachelor's	Primary	Middle	30
	Teacher R	Female	Education	Bachelor's	Middle	Middle	15
	Teacher S	Male	Education	Bachelor's	Middle	Middle-Low	30
	Teacher T	Female	Education	Bachelor's	Middle	Middle	30
	Teacher U	Male	Other	Bachelor's	High	Middle	33
	Teacher V	Male	Education	Bachelor's	Primary	Middle	32
	Teacher X	Female	Other	Bachelor's	Primary	Low	22
	Teacher W	Male	Other	Bachelor's	Primary	Low	17
	Teacher Z	Male	Education	Bachelor's	Middle	Middle	33
Participants of the Pilot Study							
	Teacher A	Female	Education	Master's	Pre-school	Middle	25
	Teacher B	Male	Education	Bachelor's	Primary	Low	21
	Teacher C	Female	Education	Bachelor's	Primary	Low	32

Data Collection Procedure and Analysis

As the data collection in phenomenological studies typically relies on in-depth interviews (Marshall & Rossman, 2011) to enter into the world of participants (Patton, 1990) and obtain descriptive data in their own words (Bogdan & Biklen, 2007), the data in this study were collected through in-depth individual interviews with the participating teachers. To this end, a semi-structured interview schedule was developed by the researchers. The interview schedule consisted of both demographical (e.g., gender, age, subject-area, educational background such as the year of graduation, type of the faculty graduated, highest degree obtained, professional background such as professional experience) and also five open-ended questions that are coupled with probes and prompts (e.g., "How do you feel about being ready for change, especially in relation to the constructivist curriculum reform? What might be some factors affecting your readiness for change? i.e., parent-related, curriculum-related, school-related, student-related). Once the interview schedule was developed, it was revised based on the opinions of two experts who are specialized in teacher education and experienced in qualitative research. Then, a pilot study was carried out with three teachers to check the appropriateness and the flow of the questions and test the length of the interview.

The main data collection was done through 21 semi-structured individual interviews with the participants over three months in the fall semester of the 2020-2021 academic year. Considering the COVID-19 pandemic guidelines, all interviews were conducted online. Each interview lasted 30 to 35 minutes on average, was audio-recorded by ensuring the participants' permission, and transcribed verbatim. The anonymity and confidentiality of the participants' personal information were ensured by using pseudonyms (e.g., Teacher G).

The data were analyzed by content analysis method that involved a process of inductive coding (Bogdan & Biklen, 2007; Patton, 1990), and then was followed by deductive coding according to the theoretical framework applied in the study. First, we used certain codes to aggregate the data into smaller parts (Miles & Huberman, 1994). Then, we identified common patterns among the codes in each transcript and generated larger categories across all transcripts. To develop an initial code list, a sample of three transcripts was coded by the researchers. Then, the initial code list was revised based on the discussions and consensus between the two researchers, which helped establish intercoder reliability and increased the consistency of the codes and categories (Miles & Huberman, 1994). Throughout the data analysis process, the researchers continued to meet regularly to discuss the emerging codes and categories (see Table 2 for sample thematic coding). Lastly, to present the findings in participants' own words, sample quotations were selected and translated from Turkish to English.

Table 2. Sample thematic coding

Quote	Codes	Subtheme	Theme
The colleagues around me influence my teaching beliefs the most. We tell the students, 'you are the average of your friend groups.' We are also the average of our colleagues. If teachers are willing to change their environment during the implementation of the change, we become more positive and say, 'Let's do this for our children.	Interactions among colleagues	School-related factors	Micro-System and Meso-System related factors
"I have attended countless in-service training seminars, but only one has left a lasting impression on me. The others felt meaningless. When the presenters come in and say, "We know as much as you do," it signals the end of any real engagement. Many of them are in the same position; the person speaking to me is often not more effective or knowledgeable than I am, and they are not someone who can provide real value. They have been assigned to fulfill a task rather than inspire. When I encounter such a person who approaches me this way, I don't feel compelled to listen. However, if the presentation were prepared with genuine conviction, delivered by knowledgeable individuals who truly respect the audience, it would be far more beneficial. Unfortunately, this is rarely the case.	The quality of professional development activities	Education-system related factors	Macro-System related factors

Trustworthiness

To establish the trustworthiness of the study, we employed multiple strategies (Lincoln & Guba, 1985; Marshall & Rossman, 2011). Specifically, as for the credibility of the study, we consulted two experts specialized in teacher education to share their opinions on the interview schedule, and also conducted a pilot study prior to the main data collection to ensure that the interview schedule worked as intended. Moreover, conducting in-depth interviews with the participants, engaging with the data throughout the data collection and analysis processes over one year, and the intercoder reliability processes contributed to the enhancement of the credibility of this research. Furthermore, to establish referential adequacy in documenting the findings, sample quotations from the participants were presented. Regarding transferability, the study employed purposive sampling, as explained in the participant selection procedure. In addition, a thick description was utilized by describing the overall research process in detail, especially concerning the decisions about the design of the study, the selection and background of the participants, data collection, and data analysis.

Researcher Positionalities

Reflexivity is a central tenet of qualitative research as the positioning of the researchers in relation to the context of the study affects every phase of the research process. Accordingly, the first author is a teacher educator and a curriculum specialist in Türkiye, whose scholarly interests include curriculum studies, curriculum change, curriculum development, implementation, and evaluation. Her educational and professional experiences both in centralized and decentralized education systems in several countries allowed her to develop a scholarly interest in the successful implementation of curriculum change. The second author is also a teacher educator and a curriculum specialist in Türkiye, whose research interests include curriculum development and curriculum evaluation. Her scholarly work and professional experiences in curriculum development and implementation processes expanded her theoretical and methodological arsenal in studying successful curriculum change practices.

FINDINGS

Utilizing Bronfenbrenner's ecological theory, the results of this study showed that teachers mainly discussed the influence of the micro-system-, meso-system-, exo-system, and macro-system-related factors on their self-efficacy beliefs for teaching, beliefs

about teaching, and readiness for change in relation to their attitudes towards the implementation of the constructivist curriculum change. As they did not make any connections to the factors related to the chrono-system, we aimed to provide an in-depth analysis of their responses by focusing on the four systems mentioned above alongside placing the teachers and thereby teacher-related individual factors at the center. Specifically, our results revealed the following categories: a) Teacher-related factors; b) Micro-system-related and Meso-system-related factors; c) Exo-system-related factors; and d) Macro-system-related factors (see Figure 1). These categories portray teachers' lived experiences in each subsystem, reflecting the impact of these factors on their attitudes towards implementing constructivist curriculum change.

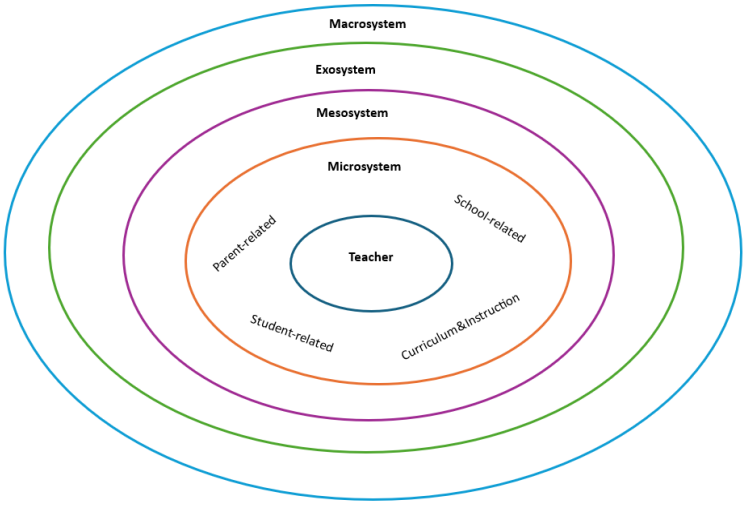

Figure 1. Ecology of curriculum change. (Adapted from Bronfenbrenner's framework of the ecology of education)

Individual System: Teacher-Related Factors

Applying Bronfenbrenner's (1976) framework of the ecology of education in the context of curriculum change, we found that teachers' educational backgrounds, feelings, values, characteristics, and experience are central to the ecology of constructivist curriculum change for a successful implementation, which forms the individual level. Many participants asserted that educational background and teaching experience are influential in shaping teachers' self-efficacy beliefs for teaching. Considering educational background, some teachers stated that they had received their bachelor's degree after the curriculum reform in 2005 and this made it easier for them to adapt to the curriculum change as the teacher education programs in Türkiye have been aligned with the constructivist approach since then. In addition, some teachers explained how obtaining a graduate degree improved their self-efficacy beliefs for teaching, consequently impacting their attitudes towards implementing the constructivist curriculum. For example, Teacher G described her "self-efficacy as higher after master's and doctoral education because one gets the chance to reflect on what they have learned in their teaching. So, they actually realize what they are doing." In this regard, graduate education seems to have an awakening role in Teacher G's position as a teacher and a curriculum maker/developer. In addition, Teacher G continued to explain how her teaching experience also shaped her self-efficacy beliefs for teaching by stating "As you gain experience, you develop yourself professionally and your self-efficacy starts to increase." As illustrated by Teacher G, teaching experience adds to teachers' professional growth and makes them more capable of implementing the intended curricular changes, which thereby influence their attitudes towards implementing the constructivist curriculum. Moreover, as for teacher characteristics, the participants especially stressed the role of being open to development and change especially in terms of participating in professional development activities and following the publications about constructivism as these made a strong impact on their self-efficacy beliefs for teaching and influenced their attitudes towards implementing the constructivist curriculum. Furthermore, teachers expressed that their motivation and knowledge about the constructivist approach also influenced their self-efficacy beliefs for teaching. For example, Teacher O commented, "I feel incompetent at implementing the constructivist approach… I was not provided with the necessary academic knowledge in this regard. That is the biggest problem on this matter [self-efficacy]!" Here, Teacher O evaluated his current knowledge and skills about the constructivist approach and reflected on his lack of adequate knowledge as a concern for his self-efficacy beliefs for teaching, subsequently affecting his attitudes towards implementing the constructivist curriculum.

Similar to teachers' self-efficacy beliefs for teaching, our findings revealed that teacher characteristics, as well as their level of motivation, teaching experience, and knowledge about the constructivist approach also impacted their general beliefs about teaching. Some teachers further addressed the essential role of one's expertise in their field in terms of professional knowledge, skills, and attitudes as they shaped their general beliefs about teaching. For instance, Teacher E criticized her lack of professional knowledge and skills when she said:

> Indeed, many teachers lack professional knowledge and skills in their area and also about the changes in educational systems...Personally, the most important problem I experience with this [constructivist curriculum] change is that I cannot perform professionally enough. That

> is, I don't feel fully equipped in terms of the necessary knowledge and skills; and therefore, my beliefs as well as my pedagogical approach might not be fully constructivist.

As seen, teachers' professional knowledge, skills, and behaviors play a significant role in employed approaches in classes which necessarily mediate their general beliefs about teaching; and therefore, influence their attitudes towards implementing the constructivist curriculum at the individual level. Third, concerning teachers' readiness for change, not only teacher characteristics, educational background, and their level of motivation, but also emotional readiness at the individual level was deemed critical for their attitudes towards the constructivist curriculum change. Specifically, this included teachers' feelings, as illustrated in the words of Teacher G, who addressed the difficulty of experiencing a lot of uncertainty in the process of curriculum change and showed a low level of emotional readiness:

> You leave the system you are accustomed to and adopt a new one. Therefore, you will start from the beginning and have to study for the unknown, so it is quite worrying in terms of whether I can manage it or not.

Similarly, Teacher L shared how teachers' feelings influence their readiness to implement the changed curricula by articulating, "I may think that 'Ok! I learned this and will implement it, but then I may feel challenged and not be able to internalize it or communicate it to the student." As seen, although Teacher L reflected on her high cognitive readiness, she explained that she did not feel comfortable enacting the curriculum change, especially when encountering difficulties. As reflected in her expressions, emotional readiness for the intended curriculum changes might become critical for teachers to be able to put them into practice successfully.

Micro-System-and Meso-System-Related Factors

In understanding the factors influencing teachers' self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change, which ultimately facilitate or hinder the implementation of the constructivist curriculum change, the micro-systems of the current study yielded the complex relations between teachers and the environment in which they are surrounded with, including factors related to curriculum and instruction, students, parents, and the school. That is, the K-12 school curricula, students, parents, colleagues, and school principals constitute the immediate settings of teachers, where each component has a particular role in particular activities. Moreover, following the micro-system, the meso-system in our findings pointed to the dynamic interplays between the micro-systems and the teacher.

In relation to the micro-system of the constructivist curriculum change, teachers largely complained about the elements of the new K-12 school curricula. They discussed the density of the number of objectives, the complexity and abundance of content, and the limited time allotted to cover them as the most important factors, especially in terms of affecting their self-efficacy beliefs for teaching and their readiness for change, which consequently influenced their attitudes towards the implementation of the intended curricular change. For example, Teacher E discussed the high number of objectives as an obstacle to the successful implementation of the constructivist approach within the given amount of time:

> ...You should see the 9th-grade curriculum. You cannot finish it even if you cover all the content without any pause. Impossible! The texts are too long due to the constructivist approach. This process makes me feel unsuccessful and incompetent.

Here, Teacher E addressed the tension teachers experienced in trying to cover all the objectives and information in the curriculum and textbooks in the allocated time. Similarly, Teacher T underscored the abundance of content negatively influencing her readiness for change and mentioned, "...There are too many topics and the curriculum content is highly intense. The most important reason for me to feel resistant to this change might be this." Concerning this, Teacher K talked about the insufficient time affecting her readiness for the change and continued, "…just adequate time should be given to me during the class. Then, I would be open to any change that provides the child with time to think and construct knowledge." As such, teachers criticized how the number of objectives, the content, and the time to cover them altogether inevitably affected their self-efficacy for teaching and readiness for change negatively to implement the constructivist curriculum.

Moreover, teachers reflected on the structure of the centralized K-12 curriculum concerning its unfeasibility and inflexibility as these made an impact on their self-efficacy beliefs for teaching and further affected their attitudes towards the intended curricular change. In a centralized curriculum, the decisions related to all components of the curriculum are taken by a central national office, which is the Ministry of National Education (MoNE) in the context of Türkiye. Then, that same curriculum is implemented in all schools across the country. While this makes it easier for the government to control and monitor the curriculum development, implementation, and evaluation processes, it leaves less room to be responsive to the local needs and allows low flexibility and autonomy on the part of teachers. Accordingly, Teacher I complained about the unresponsive and inflexible nature of the centralized curriculum and explained how this hinders teachers' self-efficacy for teaching in implementing the constructivist curriculum in their classes:

> …The curriculum implementation guide is sent to all cities such as İzmir, Ağrı, Sinop, Mersin, and so on [cities across different regions of Türkiye]. Yet, the teachers working in Nişantaşı [ahigh SES urban neighbourhood in İstanbul] and the teachers working in a village in Ağrı [a rural city in Türkiye] are using the same guide. Is this plausible? The conditions, such as students' readiness level, are completely different, but the expectation from the teachers is the same. This eventually prevents teachers, first, from developing themselves professionally and thus lowers their self-efficacy, causing them to be ineffective in the implementation.

Thus, teachers might feel urged not to fall behind the curriculum and focus on the content, not the students, despite it being a constructivist change. Furthermore, with respect to their beliefs about teaching, teachers foregrounded attention to the design of the curriculum, including the content and instructional methods/strategies. For example, Teacher D stated, "What topics are covered and how those are expected to be taught definitely influence my beliefs and my instructional decisions as a teacher. I mean, they certainly influence my philosophy of education." Teacher D expressed that the content and the methods to be utilized in the constructivist curriculum seemed to affect her beliefs about teaching, which might also have impacted her attitudes towards implementing the intended curricular change. In addition, Teacher T highlighted the nature and the complexity of the content in some disciplines as those influenced teachers' beliefs about teaching: "For example, there are some topics in the mathematics curriculum. Waiting for students until they construct knowledge might be time-consuming. Therefore, the traditional [teacher-centered] approach might work better for those topics in the curriculum." Given this, content might be another significant factor shaping teachers' general beliefs about teaching and thereby influencing their attitudes towards implementing the constructivist curriculum.

In addition to the curriculum-related factors, second, the results revealed certain student-related factors in the micro-system of the constructivist curriculum change. In particular, teachers mostly stressed the changing student profiles, students' readiness and achievement levels, engagement, and motivation as the most important factors that affected their attitudes in implementing the constructivist curriculum. For instance, some teachers mentioned how Gen Z students' changing interests and technological qualifications influenced their self-efficacy beliefs for teaching. To illustrate, Teacher G shared her anxiety and said, "As you get older, the generation differences become sharper, so you feel worried about your competence. I mean, as the children raised with technology are different from your generation, you don't know how to address their educational needs." As such, the changing student profile, especially with the advancement of technology, might deepen teachers' capability judgments in responding to students' needs and interests in the constructivist curriculum.

Teachers also made connections between students' readiness or achievement levels and their general beliefs about teaching, as these consequently affected their attitudes towards implementing the constructivist curriculum. For example, Teacher E articulated:

> Because of students' lack of prior knowledge, sometimes I feel like I am solving all those math problems in another language. Then, I intentionally prefer using traditional methods. On the other hand, sometimes I see that students have the prerequisite knowledge. When I see that, I put them at the center of the learning process.

Here, Teacher E addressed the dynamic interaction between the teacher and students, particularly emphasizing students' readiness level. Similarly, Teacher M drew attention to students' lack of prerequisite knowledge:

> Today, I taught a lesson on string in class. Ideally, string should be covered in middle school, but this child came without any prior knowledge. I'm not sure about how to approach the situation. Should I follow the curriculum as planned? Should I talk with him to gauge his understanding? Should I try to comfort him psychologically? It seems that none of these options may be effective. We can't proceed with the lesson as outlined in the curriculum, and it's beyond our control.

Accordingly, students' level of knowledge shapes teachers' general beliefs about teaching and makes an impact on their teaching methods while implementing the constructivist curriculum. Moreover, students' socio-economic backgrounds and socio-cultural beliefs affected teachers' beliefs about teaching, eventually shaping their attitudes towards the constructivist curriculum. Such factors are also vivid examples of the meso-system, showing the interactions between the teacher and the other elements of the micro-system of the constructivist curriculum change process, such as students. To illustrate, Teacher J shared an example of the interaction between herself and her students where she emphasized the influence of the social setting in which the school was located and the students were raised:

> …The school's social environment and the students' beliefs and attitudes about things also influence our attitudes towards curriculum implementation. For example, as a science teacher, I have to teach them the concepts of mutation and evolution. However, students say, 'it is not possible; God created everything!' and then they develop a negative attitude towards the class. I insist that this is a science class, not necessarily a religion-related class… So, with the help of different questions and strategies, you try to make them think differently and offer different insights or thoughts.

Apparently, students' beliefs and values are influenced by their socio-cultural environment (in connection to their exo-system), which challenges teachers' ways of teaching and their beliefs about teaching in implementing the constructivist curriculum. Except these, students' academic progress and outcomes also seemed to be another critical factor for some teachers while evaluating their beliefs about teaching to implement the intended curricular changes. For instance, Teacher N said, "First, I wonder whether the new curriculum works well. If yes, what are the results? Have students performed better? Then, it might be used." Hence, teachers essentially reflected a desire to know the actual outcomes of the curricular change on the basis of students' academic performance, as these were important for tailoring their general beliefs about teaching and consequently shaped whether or not they would show interest in implementing the intended change.

Third, considering the parent-related factors, our results yielded that the interfering behaviors of parents, as well as their knowledge about the constructivist curriculum and involvement in the education of their children seemed to have a significant impact on teachers' self-efficacy beliefs for teaching and their general beliefs about teaching in implementing the constructivist

curriculum successfully. For instance, Teacher C shared her discomfort with the interfering behaviors of parents, which negatively shaped her self-efficacy for teaching to implement the new curriculum:

> Unfortunately, some parents are not open to change… For example, the parent might react in a negative way when we read a story about a pig. The idea of a pig in the curriculum is not appropriate for them for different reasons, and they impose this on the child. Then, the child would not be open to anything… You would like to include the child in the activities, but the parent might hinder this. These certainly affect my self-efficacy and limit the things I can use in class.

As seen above, in the meso-system, the interplay between the teacher and the elements of the micro-systems of the constructivist curriculum change process, such as parents' interfering behaviors, influence students' behaviors in the learning process, which seemed to affect teachers' self-efficacy beliefs for teaching and their classroom practices negatively in implementing the constructivist curriculum. Similarly, parental involvement played an important role in shaping teachers' beliefs about teaching, subsequently affecting their attitudes towards implementing the constructivist curriculum. To illustrate, Teacher L talked about how parents' interests in their children's education influence her beliefs about teaching:

> I worked at two different schools in the same academic term. Considering the curriculum implementation, my motivation and instructional strategies were different because students' motivation was different, which was, to a large extent, related to their parents and parental involvement. How parents value education, how they get involved in their children's education and care about this etc. make a considerable influence on the way I teach my classes.

Here, Teacher L addressed that parental involvement or one's level of interest in their children's education has a significant role in teachers' selection of the teaching methods and tailoring their attitudes to implement the constructivist curriculum successfully.

Fourth, considering the school-related factors, the school and its key elements, such as its physical features, participants and their roles, constitute the final component of the micro-system of the constructivist curriculum change process. Specifically, teachers underscored the physical and technological conditions of schools, including their resources, materials, and facilities, as critical factors that impact their self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change, which subsequently, shape their attitudes towards implementing the constructivist curriculum. For instance, teachers mentioned large class sizes as jeopardizing their self-efficacy beliefs and general beliefs about teaching in implementing the constructivist curriculum. To illustrate, Teacher E stated:

> I cannot say that I am fully implementing all the methods and techniques suggested by the constructivist approach. I try to employ those techniques and methods as much as I can. In this curricular change, you are expected to interact with each child and help them engage in group work, but the class sizes are around forty students. Students should interact with each other in small groups, but we cannot do this. The main problem is not that I don't know the constructivist approach well, but it is related to the physical conditions which challenge me to implement those expectations truly. Suppose that the class size is twenty students; then you can better implement the constructivist curriculum.

As seen, large class sizes burden teachers, negatively affecting their evaluation of their competence and the ways to implement the curriculum. Consequently, that affects teachers' attitudes towards implementing the constructivist curriculum. In addition to the physical and technological conditions of schools, school principals and colleagues play a key role in teachers' immediate settings and are critical to their self-efficacy beliefs, beliefs about teaching, and readiness for change to implement the constructivist curriculum successfully. Teachers especially discussed the attitudes of school principals in terms of whether they encourage the implementation of the curriculum or create pressure on teachers due to reasons such as being uncommunicative and ignorant of teachers' needs during the implementation process. Similarly, colleagues' attitudes and interactions were deemed crucial for teachers' self-efficacy beliefs for teaching and their general beliefs about teaching, consequently making an impact on teachers' attitudes towards implementing the constructivist curriculum. To illustrate, Teacher L articulated how her colleagues' attitudes and their mutual interactions affected her beliefs about teaching:

> The colleagues around me influence my teaching beliefs the most. We tell the students, 'you are the average of your friend groups.' We are also the average of our colleagues. If teachers are willing to change their environment during the implementation of the change, we become more positive and say, 'Let's do this for our children.

Thus, teachers discussed how collaborative work or positive attitudes towards any intended change among colleagues would contribute to their teaching beliefs, leading to the successful implementation of the curricular change. On the other hand, colleagues' habitual educational practices seemed to negatively influence teachers' readiness for the change. As a counterexample, however, Teacher C exemplified how her colleagues' commitment to their educational habits and practices whenever a change in curriculum occurs positively affected her readiness for the curriculum change:

> Some teachers are about to retire. They might be qualified teachers, but they make no progress whenever new innovative and technological approaches come in. Whenever I observed them, I decided I should not adopt such attitudes, so I decided to welcome such new [constructivist] approaches and the resulting changes in pedagogy [constructivist learning-teaching approaches].

Exo-System-Related Factors

An exo-system is a broader extension of the meso-system that includes various formal and informal social structures, such as neighborhoods, mass media, and local, state, and national government agencies. Those structures do not directly affect the individual but rather surround the immediate environment in which the person exists (Bronfenbrenner, 1977). Expanding on the

elements influencing teachers' self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change in implementing the constructivist curriculum change, we identified that the socio-cultural environment in which schools are situated and teachers work, as well as mass media served as sub-themes of exo-system. For example, Teacher C underlined the key role of the socio-cultural environment where she has been working in affecting her beliefs of teaching, which subsequently influenced her attitude towards implementing the constructivist curriculum:

> The location where you work is a crucial factor affecting my teaching beliefs. I'm not referring to cities specifically; various socio-economic statuses can exist even within the same city. I have previously worked in the Black Sea region; I have also worked in a village where people do not speak Turkish. I can tell you from my experience in various environments that the neighborhood and the place surrounding the school definitely make a big difference.

Teacher C's perspective illustrates that the socio-cultural environment of her school significantly influences her beliefs about teaching, which is a crucial factor in implementing the constructivist curriculum. Besides, teachers also mentioned that mass media became influential in their beliefs about teaching, especially regarding the implementation of a constructivist curriculum. For example, Teacher L explained how mass media plays a critical role in shaping their beliefs while applying the constructivist curriculum by stating "The press plays a significant role in shaping my belief in teaching. The press always devalues teachers, talks about their salaries, shows incidents of violence, or obsesses about headscarves." As such, Teacher L emphasized the significant impact of mass media by highlighting negative incidents or drawing attention to various other factors that influence her beliefs about teaching, particularly in relation to implementing the constructivist curriculum.

Macro-System-Related Factors

According to Bronfenbrenner's framework of the ecology of education (1976), the formal and informal structures, including educational policies, social, economic, legal, and political systems that encompass the settings teachers are involved in, form the macro-system-related factors. Elaborating on the factors affecting teachers' self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change in implementing the constructivist curriculum change, we found that the structure and operational problems of the education system, the financial status of teachers, the design and quality of professional development activities, and the shortfalls of teacher education programs constituted the sub-themes at macro-system level.

First, concerning teachers' beliefs about teaching and self-efficacy beliefs for teaching, teachers pointed out the structure and operational problems of the education system, such as the implementation pressure and yet the lack of psychological support from the ministry, the presence of a strong organizational hierarchy, the changing nature of the system vs. neglecting teachers' decisions, all of which consequently affected their attitudes towards implementing the intended change. For example, Teacher P complained about the neglecting manner of the ministry for taking teachers' opinions and voices in the curriculum design process as an important factor influencing her beliefs about teaching, which therefore, affected her attitudes towards implementing the constructivist curriculum:

> The people in the ministry look at everything from the top and think that everything might be changed, but we experience difficulties when implementing the new curriculum. They shouldn't ignore these difficulties and give a voice to teachers. For example, we frequently prepare and submit reports that this curriculum is not appropriate for children because of X, Y, Z reasons, the textbooks are not suitable for the development level of the children, and we pinpoint the mistakes in the textbooks. However, no action is taken to improve the things that we recommend. Then, I try to find my own solutions in this process. For instance, I decided not to make use of anything in the curriculum that is not relevant to my students' developmental levels.

Parallel to this finding, teachers also mentioned that the top-down structure and the inadequate explanation of the introduced change influenced their readiness for change to implement the constructivist curriculum. For instance, Teacher M highlighted the negative effect of the top-down reform on her readiness for the change and stated, "The change should take place after asking teachers' opinions and suggestions. Do most teachers think that this change is necessary and useful? No one will be open to change when the change is imposed on them." Teacher M criticized the sudden changes in the curriculum where teachers are not involved in the design and initiation of change in a top-down fashion. Supporting this finding, Teacher L underscored the inadequate explanation of the change and insufficient support, which might create ambiguousness among teachers as a threat to their readiness for the change:

> We don't know what to do if the change is introduced as bothering, fearful, unknown, and unclear. In general, every change brings fear, and so teachers might doubt that they don't sufficiently figure it out. Then, how can they [teachers] enact the change? I think the immediate and top-down changes are, from the beginning, explained suddenly and quite superficially to the people who, then, introduce and explain those changes to us. Consequently, those people explain those changes very superficially too. Eventually, it ends up that everything is only expected from teachers without sufficient training and support.

As reflected in Teacher L's expressions, unclear expectations from teachers regarding the changes in the curriculum might not be instrumental to help clarify the questions in teachers' minds and impact their readiness in a negative way while implementing the intended curricular change. Moreover, teachers largely agreed that the financial status of teachers in Türkiye is another important factor negatively influencing their self-efficacy for teaching, beliefs about teaching, and readiness for change in implementing the constructivist curriculum. That is, most teachers drew attention to their living conditions and the financial costs of reaching basic educational sources and materials, such as having a personal computer or buying books. Teacher I indicated how his financial status affects his self-efficacy for teaching especially when it comes to implementing the constructivist curriculum:

> The living conditions of teachers are terrible. For example, I cannot buy a new laptop, so I cannot access the relevant sources that might be important for my classes that are expected to be student-centered. That negatively influences my entire approach to teaching and learning and hinders me from developing confidence and skills to implement the curriculum.

Indeed, Teacher I described how teachers, in general, are deprived of reaching relevant resources and pedagogical tools. While teachers mainly expected the necessary professional development support and opportunities from the ministry, we saw that they also felt urged to invest in improving their capabilities by themselves. Otherwise, we noted that it poses a threat to their self-efficacy and might further affect their attitudinal behaviors towards implementing the constructivist curriculum change.

Teachers also brought attention to the quality and the design of professional development activities or in-service trainings as these impacted their self-efficacy beliefs for teaching, beliefs about teaching, and readiness for change. In particular, they criticized the issues related to knowledge-centeredness, duration, planning, and instructors' qualifications when describing the quality and design of those activities, which are developed and implemented in Türkiye centrally by the MoNE. For example, Teacher D illustrated how the flow and the structure of the professional development activities aimed at introducing constructivist curriculum change were not suitable for gaining mastery experiences, which in return, influenced her self-efficacy beliefs:

> In professional development activities, one instructor usually comes, opens a power-point presentation, and delivers a talk. Then, an exam is given, and the training finishes. In this way, constructivism is only explained traditionally. I think teachers should be engaged in this process through different activities; they might plan a lesson and discuss it together each week. The instructor should demonstrate what we can do differently. I believe there should be some real opportunities to improve our ability to translate constructivism into our lessons.

Teacher D's expressions reflect her dissatisfaction with the ongoing professional development activities and exemplify the apparent mismatch between the adopted approach and its implementation in spaces where teachers are supposed to be provided with the opportunity to learn how to implement constructivism successfully. Teacher I also expressed concerns about the qualifications of the instructors leading the in-service training on the constructivist curriculum. This lack of qualified training hindered Teacher I from acquiring the necessary knowledge and skills needed for effectively implementing the curriculum and gaining mastery in his teaching experiences.

> I have attended countless in-service training seminars, but only one has left a lasting impression on me. The others felt meaningless. When the presenters come in and say, "We know as much as you do," it signals the end of any real engagement. Many of them are in the same position; the person speaking to me is often not more effective or knowledgeable than I am, and they are not someone who can provide real value. They have been assigned to fulfill a task rather than inspire. When I encounter such a person who approaches me this way, I don't feel compelled to listen. However, if the presentation were prepared with genuine conviction, delivered by knowledgeable individuals who truly respect the audience, it would be far more beneficial. Unfortunately, this is rarely the case.

Teacher I's critique of professional development activities, which were provided and indeed required by the MoNE, highlighted the instructors' lack of competence or efforts to provide authentic examples, guidance on do's and don'ts, and good practices for implementing the constructivist curriculum. As a result, this might increase the risk of failure in implementing the constructivist curriculum unless teachers find an opportunity to internalize the basic principles of constructivism during the centrally implemented nation-wide professional development activities, constituting a substantial component of the macro-system. Some teachers also raised self-efficacy issues due to the lack of role models displaying how to implement the constructivist curriculum. Teacher M, for example, highlighted the need to observe some experts before and throughout implementing the change and said:

> …An expert might come to our classes and explain how the course might be better aligned with the new constructivist curriculum. Then, we can build on this and try to create our own way, but we first need to learn by observing, as I don't feel confident otherwise.

Teacher M stresses the need to observe the practices of an expert before implementing the intended curricular changes in their classes. That would affect her self-efficacy beliefs towards implementing the constructivist curriculum. Teachers also addressed the common shortfalls in teacher education programs, such as the excessive focus on the theoretical aspects rather than the pedagogy and practice. These might have a negative impact on their self-efficacy for teaching and shape beliefs about teaching in a negative way when they try to implement the intended curricular change successfully. For instance, Teacher A criticized the insufficient time allocated for practicum courses in teacher education programs and stressed how those courses would be useful for teachers' self-efficacy to implement the constructivist curriculum. Particularly, Teacher A said, "I think there should be more practicum courses in the teacher education programs and more time for school placements and student teaching. As you observe the reality and gain first-hand experience, your efficacy tends to increase much more." Although teacher education programs are not within the immediate settings in which teachers themselves are involved in their everyday lives after graduation, those programs might influence teachers' self-efficacy for teaching by providing invaluable curriculum practices during pre-service education. Then, teachers' attitudes towards the constructivist curriculum change might be more positive when they start their teaching careers.

DISCUSSION

This study was conducted in the light of Bronfenbrenner's Ecological Theory (1976) in order to portray the ecology of curriculum change by exploring the factors underlying teachers' perceptions of their self-efficacy beliefs for teaching, general teaching beliefs, and readiness for change, which have been shown to be significant predictors of teachers' attitudes towards the constructivist curriculum change in the Turkish education context. By drawing on insights from Bronfenbrenner's ecological

systems theory, this study yielded a more comprehensive and holistic understanding of the factors influencing the success of curriculum change implementation that are nested in the following interwoven and interrelated systems with teachers placed individually at the center as agents of change: micro-system, meso-system, exo-system, and macro-system. While the teachers in our study made powerful connections to several factors in those four systems or contexts, we also acknowledge that they did not address the factors that might be important in the chrono-system (Bronfenbrenner, 1976) of the ecology of curriculum change implementation.

First, at the *individual level*, we found that teachers' educational background, teaching experience, knowledge, skills, motivation about the content of change (constructivist approach), and certain teacher characteristics, such as being open to development, are influential in their self-efficacy beliefs for teaching; and therefore, make an impact on their attitudes towards implementing the constructivist curriculum. Those factors seemed to contribute to the mastery experiences of teachers, deemed to be the most substantial source of self-efficacy (Bandura, 1997). As asserted by the social learning theory, individuals' mastery experiences in the form of personal accomplishments or failures shape their self-efficacy beliefs (Bandura, 1977, 1982, 1997). In our case, the increase in the teaching experience over the years, studying further through a graduate-level degree, and possessing the knowledge and skills about the change seemed to feed teachers' enactive experiences towards the constructivist curriculum, leading them to feel more competent towards implementing this change in their classes. The literature also supported the findings that different teacher characteristics, such as accumulated experience in teaching (Cheung, 2008; Veyis, 2020; Wolters & Daugherty, 2007) and the educational background (Ocak et al., 2017) increased teachers' competency beliefs towards working on any designated task or applying changes or innovations in education.

Our findings indicated that teaching experience, motivation, and professional knowledge, skills, and attitudes about the content and nature of change also impact teachers' general beliefs about teaching. Several studies found that teachers' educational background and teaching experiences were critical in forming and shaping their beliefs (Murphy et al., 2004; van Driel et al., 2001); therefore, the current study findings seemed to come as no surprise. Similarly, Buehl and Fives (2009) pointed out the role of professional knowledge gained through sources, including publications and the world wide web, and the teaching experience as the most common sources of teachers' beliefs about teaching. In the Turkish context, Isikoglu, Basturk, and Karaca (2008), and Şahin, Işıksal, and Ertepınar (2010) confirmed the important role of teaching experience in the formation of teachers' general beliefs about teaching. Every change in the system might, indeed, challenge novice teachers; however, they learn how to balance their expectations and experiences as they spend more time in the teaching profession. In addition, the accumulation of teaching experiences over the years might help teachers develop a larger repertoire of professional knowledge and necessary pedagogical skills, which would be instrumental in adopting the changes in the curricula by employing different approaches and strategies (Isler & Cakiroglu, 2009).

The aforementioned factors also play a significant role in teachers' readiness for change, which is another considerable factor predicting teachers' attitudes towards the implementation of the constructivist curriculum change. Additionally, we noted that teachers' emotional readiness was deemed critical for a successful implementation of the constructivist curriculum change at the individual level. There might be a number of factors that might influence teachers' feelings towards this curriculum change. Consistent with the findings of the existing literature, uncertainty during change, teachers' insistence on their long-established instructional habits, and the lack of understanding about the change seem to boost the fear and uneasiness experienced by teachers and reduce their confidence, which in return, might increase their resistance to the changes brought by the new curricula (Altun & Şahin, 2009; Cerit, 2013; Du & Chaaban, 2020; Kosar Altinyelken, 2013). Indeed, teachers might prefer to stay in their comfort zones or preserve the status quo in their teaching rather than learn a new approach unless they are involved in decision-making processes about the change; and therefore, this might negatively impact their emotional readiness towards implementing the constructivist curriculum.

Second, regarding the *micro-system* of the curriculum change implementation that we built from Bronfenbrenner's ecological systems theory, our study revealed that teachers are surrounded by complex immediate environments that involve K-12 school curricula, students, parents, colleagues, and school administrators. These micro-systems influence teachers' self-efficacy beliefs for teaching, general beliefs about teaching, and readiness for change and make a significant impact on their attitudes towards the implementation of the constructivist curriculum change. By highlighting the interrelations among those micro-systems, such as parents, colleagues, and administrators, our findings also shed light into the meso-system of the curriculum change implementation, as explained further.

First, having a closer look at the findings at the micro-system level, it is remarkable to note that there is an apparent conflict between the intended curriculum change and its implementation, mainly due to some curriculum-related factors, such as the number of objectives, the intensity of the content, and the allocated time for them. Previous research also found that the curriculum's heavy structure and the time to cover all its elements seemed to have influenced teachers' belief systems in Türkiye, largely moving from the constructivist side to more traditional teaching beliefs (Haser & Star, 2009; Özgün-Koca & Şen, 2006). In our study, teachers frequently complained about how the written constructivist curriculum versus its actual implementation challenged their capability and made them unprepared for this change. That might be related to giving no space for teachers and ignoring their voice and autonomy in the curriculum design process, making them feel like technicians or implementers rather than decision-makers (Cobanoglu & Capa-Aydin, 2015). In this regard, the top-down imposition of the constructivist curriculum

change in Türkiye is often described as one of the main reasons for the failure of successful implementation (e.g., Yaşar & Sözbilir, 2019; Yildirim & Kasapoglu, 2015), which also confirms Fullan's (1991) proposition for the undeniable role of teacher beliefs in the implementation of top-down change practices. Additionally, the feasibility and flexibility issues in this centralized curriculum point to the same problem for teachers as they expressed that they usually became helpless and powerless to address students' needs and interests in their classes. Given these, it is reasonable that the top-down structure of the constructivist curriculum makes a negative impact on teacher belief systems.

Students, another element of the micro-system of the constructivist curriculum change, also seemed critical in shaping teachers' attitudes towards implementing the constructivist curriculum. The influence of students' changing profile, readiness and achievement levels, engagement, and motivation on teachers' self-efficacy beliefs for teaching might be explained by Bandura's (1997) triadic reciprocal causation model in the social learning theory. Accordingly, the model has a dynamic interaction of the individual, behavioral, and environmental factors, which attempts to describe how individuals' self-efficacy beliefs change. For the current study findings, teacher self-efficacy for teaching might be considered an individual factor that might influence or be influenced by environmental factors, including students' profiles, readiness and achievement levels, engagement, and motivation. That is, teachers would less often question their competency levels while implementing the constructivist curriculum unless students experience problems about the necessary prerequisite knowledge and skills or their achievement and motivation levels. Besides, the millennium children or Gen Z had different needs, interests, and expectations from the curriculum, especially with the immense advancement of technology, which might challenge teachers' capabilities and create tension and anxiety during the implementation process. Moreover, as for the beliefs about teaching, teachers would be more likely to tailor their instruction based on their students' academic knowledge, skills, motivation, and progress (e.g., Fleurette Nelson, 2017; Savasci, 2006).

Parents, who are a substantial element of the micro-system of the constructivist curriculum change, shaped teachers' belief systems and readiness to implement the constructivist curriculum as well. The literature highlights the need to raise parents' awareness of the constructivist curriculum change to deal with their lack of knowledge and interfering behaviors (e.g., Eraslan, 2013; Korkmaz, 2008; Kosar-Altinyelken, 2011; Yildirim & Kasapoglu, 2015). That sounds reasonable especially considering the dynamic interplays between parents, students, and teachers at the meso-system level. In parallel with our findings, parental involvement was underscored as a prominent factor in previous research (e.g., Savasci, 2006) in shaping teachers' instructional practices.

Schools, including their physical features, participants, and roles, constitute the final component of the micro-system of the constructivist curriculum change for the current study. First, the physical and technological infrastructure of schools seemed to put pressure on teachers while judging their capabilities and implementing the changed curriculum, and applying constructivist teaching pedagogies. The findings of several research also pointed out how large class sizes and lack of educational materials, sources, and technological infrastructure pose a threat to teachers' efforts to implement the constructivist curriculum successfully (e.g., Anılan & Sarıer, 2008; Bulut, 2007; Ersen & Yanık, 2008; Karadağ et al., 2008; Kosar Altinyelken, 2011; Yapıcı & Leblebiciler, 2007; Yaşar & Sözbilir, 2019). In our study, the gap between schools' physical and technical facilities and the implications of the intended curriculum change seemed to create distress and challenging teaching environments for teachers, debilitating their physiological and affective states, a common source of self-efficacy beliefs. Second, verbal persuasion and vicarious experiences, other sources of self-efficacy, seemed to influence teachers' capability judgments whenever they attempted to interact with the school administration or observe colleagues' behaviors towards the curriculum change. The research has also shown that colleagues play crucial roles in teachers' beliefs about teaching and their commitment or willingness to change the curriculum (Tobin et al., 1994).

Third, concerning the *exo-system* of curriculum change, the socio-cultural environment of the schools and mass media are the important factors especially influencing teachers' beliefs about teaching. As the curriculum change might be experienced differently depending on the school environment due to the lack of adequate resources in schools (Dönmez & Akar Vural, 2014; Gömleksiz & Öner, 2013), parents' involvement with their children's education (Bal & Doğanay, 2009; Yiğit et al., 2017), and the resulting challenges, the socio-cultural environment where the school is located might impact the effectiveness of the implemented curriculum change. Moreover, the negative representation of teachers in mass media such as devaluation, low status of the teaching profession and incidences of violence against teachers (Atmaca, 2020; Bayar & Bayar, 2022) similarly affect teachers' beliefs about teaching negatively. This might consequently influence their well-being and professional satisfaction (Bayar & Bayar, 2022), leading to a gap between the intended and the enacted curriculum within the ecology of education.

Lastly, our findings suggested that the *macro-system* of curriculum change ecology encompassed factors such as the structure and operational problems of the education system and of the Ministry of Education, the design and quality of nation-wide centrally designed and implemented professional development activities, the financial status of teachers, and the inadequacy of the pre-service teacher education policies and practices. Specifically, these structures were found to have a considerable impact on teachers' self-efficacy beliefs for teaching, general beliefs about teaching, and readiness for change; and therefore, were reported to influence their attitudes towards the implementation of the constructivist curriculum change.

In particular, at the macro-system level, we found that the observed pressure, the lack of psychological support from the ministry, the presence of a strict organizational hierarchy, changing nature of the system, and neglecting teachers' decisions had considerable impact on teachers' beliefs about teaching and self-efficacy beliefs for teaching in implementing the constructivist

curriculum. In line with the findings at the micro-system level, the top-down structure of the educational policy-making processes restricts teachers' endorsement of this change (Yildirim & Kasapoglu, 2015). That causes them to act as technician-teachers who possess the relevant knowledge and skills to implement the curriculum consistent with the demands of the authority but lack autonomy and reasoning and display a high level of fidelity to the curriculum and the top figures in making decisions during implementation (Yıldırım, 2011). On the contrary, professionals in shared control and distributed decision-making situations are more likely to make sense of the curriculum by being flexible in adapting and transforming their knowledge and skills to respond to the needs of the curriculum. As Jenkins (2020) argued, in top-down curriculum reforms, teachers might display passive agency, leading them to maintain their existing teaching practices, feel alienated from the teaching profession, and experience intense frustration (Carse, 2015). This might explain teachers' hesitations and potential questions about their capabilities and teaching beliefs in implementing the changed curriculum. Besides, the literature also underlines the hindering role of the system's constantly changing nature or instability concerning the curriculum and educational policy changes. In such conditions, teachers might expect to return to the old curriculum and implementation practices, which might also cause difficulties for teachers in internalizing the changes and adapting their instructional practices accordingly (Bümen, 2005). In addition to the top-down imposition and the instability of the changes in the educational system, the unclear explanation of such changes might lead teachers to criticize the curriculum in terms of its functionality and applicability (Altun & Şahin, 2009), diminishing their readiness towards implementing changed-oriented practices in the curriculum.

Concerning the macro-system of the ecology of constructivist curriculum change, second, the design and quality of the professional development activities developed and implemented by the MoNE seem to be incongruent with the essential characteristics of the change. That is, in parallel with the literature, the professional development activities were found insufficient and unsuitable for fulfilling teachers' desire to improve their knowledge, skills, and attitudes about the constructivist curriculum (e.g., Bulut, 2007; Buluş Kırıkkaya, 2009; Doğanay & Sarı, 2008; Yaşar Sözbilir, 2019). Teachers especially complained about the design and implementation of those activities since much emphasis was placed on the theoretical foundations, rather than providing teachers with adequate hands-on experiences and good practices. Additionally, the instructors' or trainers' competency levels were criticized. These findings are also evident in the literature (e.g., Altun & Şahin, 2009; Buluş Kırıkkaya, 2009), and they point to an important problem for teachers' self-efficacy beliefs. Teachers might have the opportunity to observe and model the instructors' knowledge, skills, and behaviors in those nation-wide trainings and make inferences by considering the context of their own students and classes. Yet, the aforementioned problems decrease the chance of observing and modeling effective practices; and therefore, diminish teachers' vicarious experiences, the second essential source of self-efficacy. Besides, as teachers hold beliefs about their teaching, learning, and students (Pajares, 1992), regardless of any change, those activities seemed to fall behind providing the true meaning and principles of the constructivist curriculum, which would shape the beliefs that teachers hold about teaching by sufficiently preparing them to embrace the basic principles of this curriculum change.

At the macro-system level, teachers' financial status has also influenced their belief systems and readiness for the curriculum change. As many teachers criticized the quality of professional development activities, they tended to seek alternative routes to advance their knowledge and skills towards the constructivist curriculum; however, teachers' salary or income levels seemed to prevent them from reaching the relevant sources. Indeed, the economic conditions of teachers concerning their salary are listed as one of the factors impacting the status of the teaching position (Ünsal, 2018). This might also affect teachers' productivity and the quality of their teaching. In Türkiye, the salary of Turkish teachers is below the OECD average (Arslan, 2017), which might challenge their living conditions and establish their priorities accordingly. Therefore, the shortfalls in fulfilling the tangible (e.g., instrumental and material) and intangible (e.g., knowledge and skills) needs towards implementing the constructivist curriculum might make them feel incompetent and unprepared for this change.

Lastly, teachers highlighted the shortcomings of the pre-service teacher education programs, another substantial component of the macro-system, in providing future teachers with the essential knowledge, skills, and attitudes for implementing the constructivist curriculum. The literature also stressed the role of pre-service teacher education programs in shaping pre-service teachers' beliefs concerning the curriculum (Çobanoğlu, 2015; Ogan-Bekiroglu & Akkoç, 2009; Uzuntiryaki et al., 2010; Toluk Uçar & Demirsoy, 2010). As pre-service teachers enter those programs with already existing beliefs about teaching, there might be inconsistencies between the curriculum requirements and teachers' classroom practices unless teacher education programs provide sufficient opportunities for teacher candidates to help them develop the essential knowledge, skills, and attitudes to implement the curricular changes successfully. In this regard, teacher education programs were criticized for drawing much attention to theory-driven courses rather than promoting pre-service teachers' skills and experiences in student-centered pedagogy. Similar to pre-service teacher education, teaching experiences also contribute to in-service teachers' mastery experiences, increasing their self-efficacy beliefs for teaching. Therefore, the emphasis placed on theory-driven courses rather than providing teacher candidates with more opportunities to transform the theory into practice would lessen their mastery (i.e., direct teaching experiences) and vicarious experiences (i.e., observing credible models' teaching) even during their initial teacher education and would create major problems when they start their professional careers. Since beginning teachers usually deal with several difficulties in their early years of teaching, such as seeking to develop their professional identity and maintaining their presence in the classroom despite the lack of support from academic mentors, their self-efficacy levels display a falling tendency

(Woolfolk Hoy & Burke-Spero, 2005). Therefore, pre-service teacher education programs might be a critical foundation for pre-service teachers to embrace the essential characteristics of the constructivist curriculum and implement it successfully.

CONCLUSION AND RECOMMENDATIONS

Effective and supportive ecological systems are likely to facilitate the implementation of the intended curriculum change process. Taken together, this study suggests how these systems (teacher-, micro-system-, meso-system-, exo-system, and macro-system-related factors) are intimately interrelated, and that omission of this holistic perspective is likely to result in an incomplete representation of the implementation of curriculum change. Accordingly, the findings of the study, first, may help policymakers and curriculum development experts be aware of potential factors influencing teachers' attitudes towards curriculum change in Türkiye and beyond. To that end, although the study acknowledges the influence of many stakeholders in the implementation of the curriculum change process, the findings, above all, suggest that teachers sit at the heart of the curriculum change process; and therefore, their attitudes and beliefs including self-efficacy beliefs for teaching, general beliefs about teaching, and readiness for change should not be neglected for the success of the change. This further implies that teachers should be encouraged to act as agents of change and their perspectives, suggestions, and feedback should be taken into consideration throughout the change process for continuous improvement as opposed to the view that positions teachers simply as the deliverers of a prescribed curriculum. However, there is a recent curriculum movement in Türkiye called the 2024 Education Model, which also reflects a top-down curriculum development practice. Only one week was given to curriculum stakeholders, including teachers, curriculum development experts, academics, parents, and citizens, to submit their suggestions and criticisms about the model. Thus, teachers might simply find it challenging to internalize recent changes and provide quality feedback, without their beliefs and readiness for change taken into consideration. Given that teachers' beliefs about teaching, self-efficacy for teaching, and readiness for change are essential for successful curriculum implementation, considerable attention should also be given to these elements when considering the ecology of curriculum change as they are essential for ensuring the sustainability of the intended changes. Moreover, based on the factors found at several levels of the ecology of curriculum change, policymakers and curriculum development experts may plan interventions to support teachers for a successful implementation of the intended change. More specifically, teachers might be provided with in-service trainings before and throughout the curriculum change implementation process to reduce the feelings of fear, anxiety, and uncertainty that every change brings to some extent. In so doing, such trainings should be designed in a way that comprises a synergistic blend of practice and theory so that teachers, in collaboration with school principals and other significant collaborators in the school climate, can develop both the knowledge and skills that are needed for the particular change, especially with the presence of direct modeling provided by the instructor. Future professional development programs must prioritize hands-on, practical training that features expert modeling and mentorship. In this regard, the findings of this study also point to the urgent need for pre-service teacher education programs to be enriched through more practice and school-based experiences so as to foster pre-service teachers' professional development and familiarity with the curriculum, as well as the roles expected from teachers and students. Moreover, given that curriculum implementation is always impacted by economic concerns and technological infrastructure, teachers and schools should be supported with the necessary learning resources and suitable infrastructure not only for the success but also the sustainability of the intended curricular changes.

Similarly, considering that parents are one of the most important stakeholders who often have power and strong views about what their children's education should achieve, trainings might also be offered to parents to raise their awareness about the new roles expected from learners and teachers in the curriculum. For example, parents should be engaged in workshops to better understand their evolving role in student learning according to the constructivist curriculum. Moreover, to help school principals, who play a critical role in managing the implementation of curriculum change processes at the school level, especially in the top-down hierarchical implementation structures, school principals might be provided with assistance and trainings about the nature and implications of the curricular changes as well as how to create a positive, cooperative, and supportive school climate for teachers to enact the intended change without fear of failure and bring it to life successfully.

The findings of the present study mainly elaborated on teacher-related factors and the factors related to the micro-system, meso-system, exo-system, and macro-system of the curriculum change in an effort to understand teachers' self-efficacy beliefs for teaching, general beliefs about teaching, and readiness for change. Given this, future research might further investigate the chrono-system of the ecology of curriculum change implementation and describe how settings and teachers' implementation of the constructivist curriculum evolved over time. Lastly, it is recommended that future studies should employ multiple sources of evidence, such as data from interviews, observation, and document analysis, to shed light into the actual implementation of the intended curriculum change, which might offer a more nuanced portrayal of the ecology of curriculum change implementation. While this study focuses on teachers, additional research could also incorporate perspectives of students, parents, school principals, and policymakers. This would provide a more comprehensive view of curriculum change, as these groups are key actors in the ecological system of curriculum change.

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Statements of publication ethics

We hereby declare that the study has no unethical issues, and that research and publication ethics have been observed carefully.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers. The first author has made substantial contributions to the conceptualization, the research design, data collection, analysis and interpretation of the data, reporting the findings, and writing/editing/revising the manuscript. The second author has made substantial contributions to the conceptualization, the research design, data collection, analysis and interpretation of the data, reporting the findings, and writing/editing/revising the manuscript.

Ethics Committee Approval Information

The ethical committee approval was obtained for this research from TED University Human Subjects Ethics Committee with the decision numbered 2020/05, dated July 29, 2020.

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