

Integration Experiences of International Students in Life Science Classes in Turkey: A Study on Intercultural Education through Textbooks

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Abstract. This study investigates the growing need for inclusive educational practices in Turkish primary schools, where the number of refugee and international students has been steadily increasing. It focuses on how foreign-national students engage with cultural themes in Life Science classes and how these experiences shape their integration into Turkish culture, values, and identity. Employing a phenomenological research design, semi-structured interviews were conducted with students from diverse migration backgrounds to capture their lived experiences. The data were analyzed thematically, revealing two interrelated themes. The first theme highlights the role of cultural elements and symbols—such as national holidays, historical figures, monuments, and the Turkish language—in shaping students' sense of identity and cultural belonging. These elements provided opportunities for reflection and comparison, enabling students to relate Turkish cultural content to their own backgrounds. The second theme demonstrates the influence of language proficiency, ethnicity, and family context on students' integration processes. Students with higher levels of Turkish language proficiency engaged more actively in cultural learning, while family practices, particularly food traditions and parental influence, played a significant role in transmitting cultural knowledge. Overall, the findings suggest that while textbooks support cultural belonging, deeper intercultural understanding requires more inclusive, contextualized, and experiential representations of diversity to ensure sustainable integration.

Keywords: Cultural Integration; Foreign-National Students; Inclusive Education; Intercultural Understanding; Life Science Classes.

1. Introduction

In recent years, millions of people have sought refuge in neighboring countries, such as Turkey, due to the civil wars in Syria and Ukraine. Turkey has faced a large influx of refugees due to its border with Syria. Since 2014, Turkey has been hosting approximately 4 million refugees and asylum-seekers, including 3,351,582 Syrian refugees under temporary protection (Directorate of Migration Management, 2023). Only 1.82% of this population lives in temporary accommodation centers (Turkish Statistical Institute, 2023). According to the 2022 report by the Directorate of Lifelong Learning under the Ministry of National Education, 935,731 foreign-national students are enrolled in Turkey, including 855,136 with international protection status and 730,806 Syrians under temporary protection. At the primary level, enrollment by grade is: Grade 1 (120,738), Grade 2 (79,676), Grade 3 (87,846), and Grade 4 (98,263). Of these students, 49.07% are female and 50.93% male. While the primary school enrollment rate is 78.04%, 31.49% of school-aged children remain outside the formal education system. Foreign-national students in Turkey are mostly concentrated in provinces such as Istanbul, Gaziantep, Hatay, Şanlıurfa, Ankara, and Adana. The majority come from Syria, Iraq, and Afghanistan, with others from countries like Iran, Azerbaijan, Egypt, and Russia, reflecting growing cultural and linguistic diversity in classrooms. This data reveals that Turkey receives a large amount of migration and supports their integration by providing refugees with shelter, health, education, and social services.

However, cultural differences need to be overcome so that they can live in harmony with Turkish society. Ensuring cultural integration is critical for individuals of different social and cultural statuses to participate harmoniously in society. The fact that migrants were initially seen as temporary has led to a delay in long-term integration plans. However, the increase in the number of refugees in the last decade and the challenges of social cohesion have necessitated the acceleration of integration efforts.

1.1. Problem Statement

Life Science textbooks in Turkey incorporate various cultural and historical elements that reflect the nation's educational tradition. As with many instructional materials used in Turkey, these textbooks begin with national symbols, such as depictions of Atatürk and the National Anthem. Atatürk (Gazi Mustafa Kemal, 1881–1938), recognized as the founder of the Republic of Turkey, is portrayed as the leader who safeguarded the independence and dignity of the Turkish nation by initiating the National Struggle (MoNE, 2019, p. 73). His death is commemorated annually on November 10 with ceremonies held at Anıtkabir (MoNE, 2019, p. 73). Another significant element is the National Anthem, written by Mehmet Akif Ersoy as a symbol of devotion to the homeland and nation (MoNE, 2019, p. 157). Finally, the Battle of Gallipoli, which took place on the Gallipoli Front between 1914 and 1918 during the First World War, is remembered as a major conflict between the Ottoman Empire and the Entente Powers. Occurring in 1915 on the Gallipoli Peninsula, this battle has been regarded as a turning point in history due to its strategic significance (MoNE, 2019, p. 49).

In this context, the Life Science textbook introduces Turkey's history and cultural symbols, emphasizing the importance of national identity and the struggle for independence. However, the fact that these concepts and events are not sufficiently comprehensible for foreign students makes it difficult for the course to fully achieve its cultural integration objectives. Therefore, providing detailed explanations of historical and cultural elements and presenting them in a pedagogically appropriate manner becomes a necessity. In Turkey, the Life Science course plays a crucial role in children's cultural adaptation, aiming to equip them with basic life skills as well as knowledge about their own culture and values (MoNE, 2018). This course provides the essential knowledge and skills required to raise individuals as active and responsible members of society. Through cultural integration, children learn to value different cultures, develop social skills, and communicate effectively with people from diverse backgrounds. By supporting this integration, the Life Science course makes a significant contribution to fostering mutual understanding between different cultural groups (Aral, 2016).

Consequently, the historical and cultural elements included in Life Science textbooks should not only be presented descriptively but also explained and contextualized, as this approach both facilitates foreign students' comprehension of the content and plays a critical role in achieving the broader objectives of the course.

1.2. Related Research

In this context, the Life Science textbook introduces Turkey's history and cultural symbols, emphasizing the importance of national identity and the struggle for independence. This part of the study shows the importance of making these concepts and events, along with the details in the textbook, more comprehensible for foreign students and the general readership. In Turkey, the Life Science course is important for the cultural integration of children and aims to help them acquire basic life skills and knowledge about their own culture and values (MoNE, 2018). This course provides the necessary knowledge and skills to raise individuals as active and responsible members of society. Through cultural integration, children learn to appreciate different cultures, develop social skills, and communicate effectively with people from diverse backgrounds. By supporting this integration, the Life Science course makes a significant contribution to increasing understanding between different cultural groups (Aral, 2016). The importance of textbooks in cultural education as an essential component in teaching language and culture persists despite technological advances (Boztilki, 2018). Studies on Turkish education and intercultural communication awareness in Kazakhstan (Sözer & Semiz, 2022), the necessity of harmonizing educational content and policies for refugee students (Üstün & Baş, 2022), the importance of cultural integration in language education (Çebi, 2022), and

value education that promotes cultural adaptation (Türkoğlu, 2019) show how textbooks shape cultural education and how educational materials support cultural awareness and integration.

These studies emphasize the various roles of textbooks in cultural education and the importance of educational policies and materials in this field. The main aim of this study is to examine how foreign primary school students experience the cultural themes they encounter in the Life Science course in their integration process. Unlike similar studies conducted with foreign students, this study focuses on the effects of cultural themes in Life Science textbooks on integration processes. While previous studies such as McCarthy & Thomas Scott Duke (2007), Soylu Kayısılı & Sever (2019), Akcan (2022), Akcan & Blaha (2022), Sexton (2022), Hernandez, Morales, & Shroyer (2013), and Crippen & Brown (2016) focus on culturally responsive teaching in general, this study specifically addresses the effects of cultural themes encountered by students on their integration processes.

In addition, studies focusing on the link between language and culture, such as Chan (2004), Kramsch (2000), Su and Ma (2021), Çelik and Yıldız (2019), Ali et al. (2015), Lin et al. (2020), and Cao (2022), which emphasize the importance of the language-culture relationship for students to understand and integrate their own culture, also strengthen the place of this research in the literature. Finally, examples of studies conducted to examine the problems faced by foreign students in multicultural school environments and to promote their cultural integration also strengthen the basis of this research (Takır & Özerem, 2020; Saka & Çelik, 2022; Takır, 2019; İmamoğlu & Çalışkan, 2017; Filimonova et al., 2019). In this context, this study makes an important contribution to understanding the role of the cultural themes of the Life Science course in the integration processes of foreign students and to filling the gap in the literature.

This study makes a distinct contribution by examining textbook-mediated intercultural integration through the Life Science course at the primary level—an area that remains underexplored compared to broader work on culturally responsive teaching. Specifically, it advances the literature in three ways. First, it shifts attention from general classroom practices to the cultural themes embedded in Life Science textbooks and how these themes are experienced by foreign primary school students during integration. Second, by focusing on students' encounters with national history and cultural symbols in a non-language subject, it refines the language-culture discussion by showing how curricular materials beyond language instruction can structure cultural understanding and belonging. Third, the findings provide an evidence base for improving the accessibility and comprehensibility of culturally dense textbook content for diverse learners, thereby offering implications for textbook design and inclusive educational policy in multicultural primary classrooms.

1.3. Research Objectives

The aim of this study is to investigate how foreign primary school students experience the cultural themes presented in the Life Science textbook, with a particular focus on how these themes contribute to their integration processes. The research explores the role of textbooks as a medium for cultural transmission and integration within the context of formal education. In line with this purpose, the following research questions were formulated:

1. How do foreign students experience the cultural themes in the Life Science textbook?
2. How did foreign students experience the theme of cultural elements?
3. How did foreign students experience the symbol theme?

2. Theoretical Framework

In UNESCO's World Conference on Cultural Policy, culture is defined as the totality of the material, spiritual, mental, and emotional characteristics that define a society or social group. This definition covers a wide range of areas, from science and literature to ways of life, fundamental rights, value systems, traditions, and beliefs (UNESCO, 1982). Culture is a concept that shapes the lifestyle and values of a society through the beliefs, behaviors, arts, languages, and other characteristics of individuals. Bauman emphasizes the fluid and changing nature of culture by defining culture as "events in which the deeper meanings and values of a society are displayed before an audience" (Solomon & Steyn, 2017). The concept of "integration" aims

to reduce problems and conflicts between different segments of society and increase the contributions of social diversity. This is realized through the development of shared values, the reduction of discrimination and social exclusion, egalitarian daily interactions, social solidarity, and equal access to public services (Wang, 2022). In the context of migration and asylum, "integration" is a critical concept that refers to the ability of refugees or foreigners under temporary protection to participate equally and fairly in the society in which they live while maintaining their own identity (Erdoğan, 2022). This concept has come to the forefront in Turkey's migration policies, with an emphasis on Syrian refugees (Turkish-German Exchange Project on the Integration of Syrian Refugees into Host Communities, 2023). In this study, "integration" is approached as a multidimensional phenomenon encompassing the processes of meaning-making, belonging, and participation developed by foreign/international elementary school students as a result of their encounters with cultural themes in the school context. Analytically, integration is defined in four dimensions: (i) linguistic integration, the student's capacity to understand and express concepts, historical references, and cultural content in the textbook at a linguistic level; (ii) symbolic integration, the way of recognizing, interpreting, and relating to symbolic elements such as the flag, anthem, historical sites, and national narratives; (iii) cultural integration, which refers to the processes of becoming familiar with, comparing, and adapting to cultural elements such as food, traditions, daily life practices, and patterns of social interaction; (iv) emotional/social integration, which refers to affective and relational indicators such as the student's sense of belonging, desire to participate, self-positioning, and perception of trust and acceptance. The themes and sub-themes presented in the Findings section have been reported in relation to these dimensions; in the Discussion section, they have been interpreted through the integration dimensions. In this context, the meanings of culture and integration are important for enhancing learning experiences and providing more effective access to students through culture-oriented education. UNESCO's broad definition of culture and integration, emphasizing the value of diversity and harmony between social groups, targets an in-depth approach in education (Wang, 2022). Developed by Gay (2000), culture-based education aims to improve learning processes by combining cultural knowledge, past experiences, and performance styles. This model can motivate students by linking cultural context to learning. Culturally responsive education supports students to connect with social structure, language, and cultural identities and provides an equitable, safe, and inclusive learning environment (Gay, 2000).

In this framework, instructional materials and culturally responsive education can significantly contribute to creating a culturally responsive learning environment by encouraging respect for different cultural backgrounds among students and by recognizing this diversity as an asset. Gay's (2000) definition of culturally responsive education aims to make learning more relevant and effective for students and emphasizes the influence of culture on learning processes. Culturally responsive education suggests that learning approaches and attitudes are influenced by various cultural heritages (Idrus, 2014). It is based on the argument that a simpler and more meaningful teaching process can be achieved when education is linked to students' own life experiences (Gay, 2000). Culturally responsive teaching entails creating a fair, safe, and tolerant environment that encourages students to actively learn. This approach focuses on increasing students' awareness of and appreciation for their social structure, language, and cultural identity (Gay, 2002). However, it is not enough to understand differences; they must be given importance and value, new knowledge must be built on them, and it is essential to interact with students from different cultural backgrounds through these experiences (Mackay & Strickland, 2018). Gay (2002) emphasizes the necessity for teachers to integrate their knowledge of ethnic and cultural diversity into teaching strategies and curriculum designs with cultural sensitivity. Supporting cultural diversity is facilitated through approved textbooks, curriculum guides, and educational plans. Educational equity demands curricula that encompass cultural richness.

3. Method

3.1. Research Design

The research was conducted with phenomenology, one of the qualitative paradigm designs. The research process followed within this pattern is presented in Figure 1.

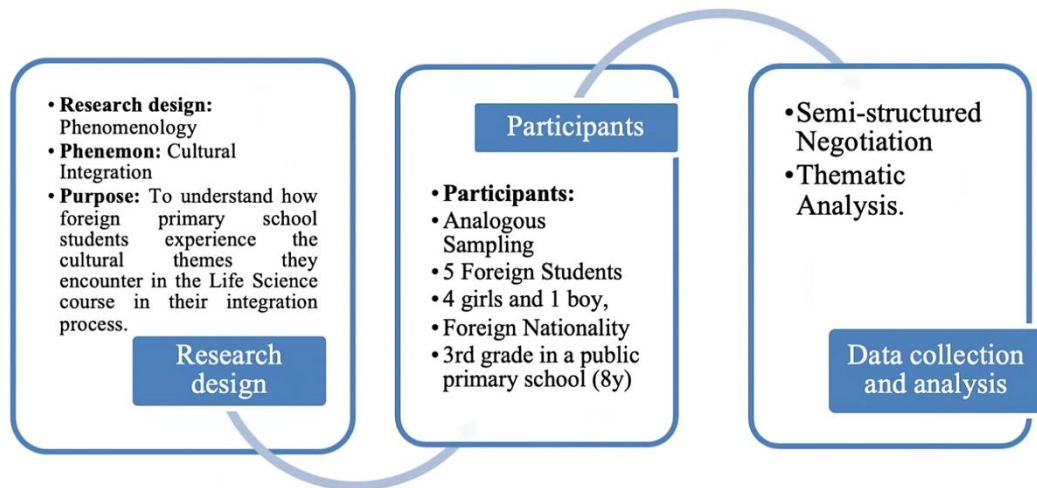


Figure 1. Research process

The phenomenological design aims to explore the perceptions and experiences of a particular phenomenon based on the experiences of individuals and the meanings these experiences create (Annells, 2006). As stated by Cresswell (2013), this approach usually focuses on the question, "What are the perceptions and experiences about this phenomenon?". In this study, the focus is on understanding the experiences of primary school students in the cultural integration processes when they encounter cultural elements in the Life Science course. The research examines the phenomenon of cultural integration and the reactions of foreign students to cultural content in textbooks through a phenomenological design. Students' experiences were explored in depth through semi-structured interviews. "Theoretical" thematic analysis explains how the theoretical foci of the researcher guide the analysis. Thematic analysis tends to focus on specific aspects of the data, providing detailed analysis rather than general descriptions (Braun & Clark, 2006). In this study, cultural themes in the Life Science textbooks were selected as the main subject of investigation, and a "meaning criterion" was adopted to define the themes, which was proposed by Braun and Clark (2006b). Using Patton's (1990) methodology, an analysis was conducted that went beyond the patterns, meanings and implications derived from the data, thus going beyond mere description and summarization and highlighting important patterns and meaning.

3.2. Participant

This study employed a purposive, homogeneous (affinity) sampling strategy to select participants with similar, relevant characteristics for the phenomenon under investigation (Glesne, 2013). During fieldwork in a cosmopolitan district in Türkiye, classroom observations indicated that foreign primary school students showed lower interest and participation when Life Science lessons addressed culturally dense content (e.g., national symbols, heritage sites, and culturally specific practices). Accordingly, the study focused on students' lived experiences of encountering textbook-mediated cultural themes and how these encounters relate to their integration in primary school. Five classroom teachers were contacted as gatekeepers; following parental consent, semi-structured interviews were conducted with five students from the classes of three teachers who agreed to participate. All participants met the criterion of having direct experience as foreign students in Türkiye and of encountering cultural themes in the Life Science textbook, which is essential for phenomenological inquiry (Rolfe, 2006). The purpose of the interviews was to obtain rich, detailed accounts that illuminate how

students interpret cultural items and symbols and how such interpretations relate to their sense of belonging and participation. The sample size (n = 5) is consistent with qualitative and phenomenological principles that emphasize information-rich, in-depth data rather than large numbers (Merriam, 1988; Neuman, 2014). In qualitative research, the goal is to select participants who can provide detailed data aligned with the research purpose (Coyne, 1997), and phenomenological studies commonly work with relatively small samples, with the literature reporting a range of approximately 5 to 25 participants depending on the scope and depth of inquiry (Creswell, 2013; Patton, 2005; Rubin & Babbie, 2016). In the present study, the narrow focus (textbook-mediated cultural themes in Life Science), the homogeneity of the participant group (foreign primary school students), and the depth of the semi-structured interviews increased the information power of the sample, supporting the adequacy of a small n for the analytic aims of phenomenological research. The participants' experiences with the phenomenon of cultural integration are presented in Table 1.

Table 1. Students' cultural integration experiences.

Sample Questions on Students' Cultural Integration	İ	Ö	R	Q	A
Which country do you come from?	*	-	*	+	*
Do you feel that you belong to your culture?	2	1	1	1	1
How was your experience getting used to Turkey?	1	1	1	2	1

*: Syria

-: Afghanistan

+: Kyrgyz

1: Positive

2: Negative

In this study, "affinity (homogeneous) sampling" refers to selecting foreign primary school students who shared key characteristics relevant to the phenomenon, namely being enrolled in a public school in Türkiye and having direct experience with culturally dense themes in the Life Science textbook. Participants were included on the basis of foreign/migrant status, grade-level exposure to the Life Science course/textbook, and parental consent/student assent.

3.3. Data Collection

Phenomenological research primarily relies on interviews, as this technique allows researchers to explore participants' experiences and the meanings they attribute to those experiences through interaction and flexibility (Richards & Morse, 2007). In this study, data were collected using semi-structured interviews specifically designed to align with the study's aims. The interview form was developed following an extensive review of the relevant literature, and its content validity was established through expert consultation with four field specialists (Myers, 2013).

The finalized interview form consisted of two main sections: (1) questions aimed at understanding the students' cultural backgrounds and lived experiences, and (2) questions supported by visual materials focusing on various aspects of Turkish culture. Each question was systematically associated with clearly defined indicators to ensure its relevance to the research objectives and to support structured data analysis. A detailed overview of the interview questions and their corresponding indicators is provided in Table 2.

In line with the study's conceptual framing, the interview questions were designed to elicit students' experiences with textbook-mediated cultural content and its perceived implications for cultural integration in primary school. Accordingly, the analytical indicators were organized around three guiding constructs: (a) culture (encounters with cultural items and cultural symbols), (b) integration/belonging (students' sense of belonging, participation, and positioning in the school context), and (c) culturally responsive education (the accessibility and interpretability of culturally dense content and the need for explanatory scaffolding). This

alignment ensured that data collection and subsequent thematic analysis were conceptually coherent.

Table 2. Interview Questions and Their Corresponding Analytical Indicators

Q No	Question	Indicator (Analytical)	Construct	Content type
1	Have you ever tried these dishes? ...	Familiarity with and experience of Turkish cuisine	Culture	Cultural items
2	Do you know where Çanakkale is?	Knowledge/meaning attributed to historically and culturally significant sites	Culture	Cultural symbols (heritage)
3	Can you locate Turkey on a world map? ...	Geographical orientation and expressed sense of belonging	Integration/Belonging	Integration cue
4	Can you name some provinces...?	Knowledge of Turkey's geographical/administrative structure	Culture (contextual knowledge)	Cultural items/context
5	Which country does this flag belong to? ...	Recognition of national symbols; identity talk	Culture + Identity	Cultural symbols
6	Do you know the Turkish National Anthem? ...	Knowledge/interpretation of anthem, author, and national values	Culture (values)	Cultural symbols
7	What could be the theme of this photograph?	Meaning-making/interpretation of visual cultural content	Culturally responsive education (access/interpretability)	Interpretation cue
8	Why... wearing these clothes? ...	Interpretation of traditional clothing/folk dance practices	Culture	Cultural items
9	Do you know where this place is?	Recognition/meaning of historical-cultural landmarks	Culture	Cultural symbols (landmark)
10	What are the children doing...?	Perceptions of social interaction and play culture	Culture + Integration	Cultural items / Integration cue
11	These are some places in Turkey...	Prior experience/awareness of culturally important places	Culture	Cultural symbols (place)

Prior to the actual data collection process, a pilot implementation was conducted to test the clarity and functionality of the draft interview form. The results of this pilot were used to refine the questions, though the data from this phase were not included in the final analysis (Willis, 2015). To establish rapport and foster a comfortable interview environment, introductory activities and informal conversations were used at the beginning of each session (Qu & Dumay, 2011).

Each participant engaged in two one-on-one interview sessions, each lasting between 40 and 60 minutes. The first session focused on eliciting students' personal and cultural narratives, while the second explored their perceptions of cultural content in the Life Science curriculum. All interviews were audio-visually recorded with the participants' informed consent.

3.4. Data Analysis

Interview recordings were transcribed verbatim and analyzed using theoretical thematic analysis to examine how foreign primary school students made sense of textbook-mediated cultural content and how this related to their integration experiences (Braun & Clarke, 2006). The analysis was guided by the study's conceptual framing and the three constructs used in the interview design: (a) culture (cultural items and cultural symbols), (b) integration/belonging (belonging, participation, positioning), and (c) culturally responsive education (accessibility/interpretability and the need for scaffolding). These constructs served as a sensitizing framework to ensure coherence across data collection, coding, and interpretation.

The analytic procedure followed Braun and Clarke's six-phase approach (Braun & Clarke, 2006). First, the researcher became familiar with the dataset through repeated reading of transcripts and memo-writing. Second, initial codes were generated by marking meaningful units (words, sentences, and paragraphs) related to cultural encounters, meaning-making processes, and participation/belonging. Third, codes were compared and clustered into candidate sub-themes by identifying patterns across participants (e.g., recurring misunderstandings of cultural symbols, comparative reflections on everyday culture, and language-facilitated participation). Fourth, sub-themes were reviewed against the full dataset and refined to ensure internal coherence and clear boundaries between categories. Fifth, final themes were defined and named, resulting in two overarching themes—cultural elements and cultural symbols—with interpretive sub-themes. Sixth, the report was produced using illustrative direct quotations, linking interpretations to the study's constructs and integration dimensions.

Within this process, students' responses to visual stimuli were analyzed using the same coding procedures as verbal data. Interpretations, misinterpretations, and meaning-making strategies elicited by images were treated as analytic units (e.g., symbolic interpretation, lexical segmentation, contextual inference) and contributed directly to the development of sub-themes and themes related to cultural symbols, cultural elements, and integration.

To enhance trustworthiness, coding was conducted by the primary researcher and subsequently reviewed with a field expert. Discrepancies were discussed until agreement was reached, and the code–theme structure was refined iteratively. Table 3 provides an audit trail example illustrating how raw data excerpts were transformed into codes, sub-themes, and themes.

Table 3. Coding-to-Theme Development Example

Raw data excerpt (illustrative)	Initial code	Sub-theme	Final theme
"We have a dish like this in my country... My mother makes it."	Home-culture comparison; maternal mediation of culture	Family-mediated cultural transmission through everyday practices (food)	Cultural elements

Raw data excerpt (illustrative)	Initial code	Sub-theme	Final theme
"Anıtkabir... maybe it means 'antik kabir' (The tomb of the founder of the Republic of Turkey)."	Lexical segmentation; misinterpretation of a national symbol	Interpretive gaps in symbolic content due to limited cultural schemas	Cultural symbols
"At home we mostly speak Arabic, but at school I try Turkish."	Home-school language shift; identity maintenance/adaptation	Language as a mediator of participation and cultural access	Cultural elements (or <i>Integration/Belonging sub-theme under your structure</i>)

3.5. Validity and Reliability

To strengthen trustworthiness, multiple strategies were used. First, inter-coder agreement was calculated following Miles and Huberman (1994) using $\Delta = C \div (C + D) \times 100$. The agreement rate was 89.17%, exceeding the 80% threshold for acceptable reliability (Miles & Huberman, 1994; Patton, 2002). Second, peer debriefing was conducted through external expert review of codes and themes, leading to minor refinements. Third, member checking was applied in an age-appropriate manner by confirming summary interpretations with participants. Finally, thick description was provided via detailed context and illustrative quotations to support transferability.

4. Findings

The findings presented in this section are structured based on the four analytical dimensions of integration (linguistic, symbolic, cultural, emotional/social) defined in the study. Each theme is reported in a way that shows how students' encounters with cultural content in the textbook affected which dimension of integration.

Table 4. Analytical Dimensions of Integration and Their Indicators and Themes

Integration dimension	Brief definition (in this study)	Example indicators (in the data)	Subtheme
Linguistic (or cognitive-meaning-making)	Understanding and expressing key concepts/narratives	"What does this mean?", "I didn't understand", "I understood when the teacher explained"	Conceptual ambiguity; need for explanation/scaffolding
Symbolic	Relating to national symbols and historical narratives	Flag, national anthem, Çanakkale, monuments; attributing meaning	Encountering national identity symbols
Cultural	Familiarity with and adaptation to everyday cultural practices	Foods, clothing, folk dance, play culture	Getting acquainted with everyday culture; comparison and adjustment

Integration dimension	Brief definition (in this study)	Example indicators (in the data)	Subtheme
Emotional/Social	Sense of belonging, participation, and perceived acceptance	"I hesitated", "I felt included", "I felt like a foreigner"	Experiences of belonging and participation

4.1. How Did Foreign Students Experience the Cultural Themes in the Life Sciences Textbook?

In the study, the findings obtained as a result of individual semi-structured interviews were determined by the themes in the Life Sciences textbook. The findings of the study were analyzed under subheadings in order to understand how the participants experienced the identified themes. These themes were listed as symbols and cultural elements. The Cultural Elements theme consists of sub-themes such as clothing traditions, entertainment and rituals, arts and crafts, community spaces, and food and drink relations. Under the Symbols theme, there are sub-themes such as language and writing systems, religion and beliefs, history and national events, historical personalities, national and international flags, and aesthetic and visual culture. These themes emerged because of individual interviews and are explained in a visual presentation in the diagram named "Figure 1" in the context of foreign students' cultural integration experiences.



Figure 2. Foreign students' cultural integration experiences.

4.2. How Did Foreign Students Experience the Theme of Cultural Elements?

The theme of cultural elements in the Life Science course of foreign primary school students plays an important role in their integration process. Under this theme, topics such as "food and drink, clothing traditions, music and dance, arts and crafts, and spatial relations" are covered. In the interviews with the students in the research, the easiest communication was based on food. R can say, "I can say in Arabic "meheshi", "falefel" as Arabic food names. Ö specifically stated that pilaf is an important dish in Afghan culture and that "it is not pilaf, it is Afghanistan pilaf.". Regarding the food culture, students R and Q stated that they like "Uzbek pilaf, ravioli, and Kyrgyz ravioli.". He also stated that Kyrgyz ravioli is different from Turkish ravioli. He also gave brief information about the food preparation processes "Onions, carrots, and meat are added to Uzbek pilaf. Kyrgyz ravioli is big, and Turkish ravioli is small.". Student A stated that he preferred Syrian food: "I know falefel, shavarma, and muluhiye". Student I reported living in Şanlıurfa for a period and trying the local cuisine due to its proximity to Syria, stating, "We came from Afrin. First, we stayed in Şanlıurfa near Syria, and I tried çiköfte." Their favorite dishes were identified as "sarma, chicken pilaf, and çiköfte." Upon learning that all these are Turkish dishes, the student remarked, "I never prepared Syrian food. I don't know how, my mother does." This emphasis on the mother's role was mentioned by all interviewed students. When shown images of food culture from the Life Sciences textbook, three students recognized "mıhlama" and "hamsi tava" but had not tasted the other dishes. These included "Laz böreği" and "Black Sea pide," which are cultural dishes from Turkey's Black Sea region. The lesser market presence of "mıhlama" and "hamsi tava" might explain why students had not tasted them. Students have easier access to foods like "mıhlama" and "hamsi tava". Student A mentioned, "We ate them when we went out," indicating easier access to these dishes in restaurants and similar establishments due to their popularity.

Traditional arts constitute an element of cultural heritage. Interviews with students revealed their limited ability to provide examples of handicrafts. Student Ö mentioned that carpet weaving is a significant craft in their culture, stating, "Handicrafts involve carpet weaving." Student R noted a tradition of carpet weaving in Syria similar to that in Turkey, saying, "Yours is like ours, the same carpet weaving." Student Q cited "the Kyrgyz table" as an example yet responded "no" when asked if this craft was used at home. Student İ remarked, "There are no Syrian-specific handicrafts here (in their home)." It was observed that there were no objects related to handicrafts, a component of the cultural heritage theme, that students could show in their homes.

Student Ö mentioned having limited knowledge about clothing and jewelry, leaving related questions unanswered, suggesting limited experiences in these cultural aspects within their own culture. Conversely, Q noted that Kyrgyz people traditionally wear long jewelry and caps but did not elaborate on these items. "Q: They wear long jewelry, they put it on their head, Caps, they wear." Syrian students A and R, while discussing traditional attire, provided examples pertaining to women's clothing, specifically related to modes of covering. R said, "Like what you have, we have it too. Sometimes we wear something resembling a long skirt. On top of it, some people cover their faces, or only their eyes are visible." A added, "We have headscarves like you do, coverings." İ commented, "Like now, they can do it like this. Some people leave a little gap here (leaving it open without pinning)". "Men wear earrings, some people don't. Yes, people say some wear long clothes, some wear short. The difference from Turkey, for example, men swing something long." Students preferred to express their cultural attire by drawing parallels with the interviewer's culture. The researcher identified that students were unable to provide detailed responses to questions about music and dance. Specifically, student Ö acknowledged having basic knowledge on the subjects but admitted to lacking depth with statements like, "I know a little about the music" and "I know a bit." Student Q highlighted the similarity between Kyrgyz and Turkish musical instruments, citing universal instruments such as "piano, guitar, drum, flute," illustrating the challenges of cross-cultural musical understanding. Student R expressed interest in Arabic music and Nancy Ajram, while A preferred religious songs related to Prophet Muhammad, stating, "Like for our prophet Muhammad, there are a few songs like that I love." R attributed their lack of knowledge about Syrian dances to never having visited Syria, saying, "No, I haven't seen Syria, so I don't know." A provided insights into dances at Syrian weddings, stating, "They play songs and dance like you do. They dance like you but the songs are different. Folk dance, halay." This reveals that students possess general knowledge on music and dance, but cultural and religious values shape their musical preferences, and a lack of cultural experience can limit their knowledge. Interviews highlighted the significance of historical sites for cultural heritage and the differences in perceptions. A Kyrgyz student's remark, "There was a museum on top of the mountain, but we didn't go." indicates disinterest in historical sites and how cultural biases can influence historical perception. Syrian student R, with limited knowledge of historical sites in Syria, mentioned, "The Umayyad Mosque, okay, and the Damascus Citadel, that's it." Additionally, there was a general lack of knowledge among students about historical places in Turkey, with no awareness of sites mentioned in the Life Sciences textbook, such as Mogan Lake, Akköprü, and Hacıbayram Veli Mosque.

4.3. How Did Foreign Students Experience the Symbol Theme?

In the analysis of language and writing systems, Student İ reported speaking both Kurdish and Turkish with their family, engaging in Arabic conversations with Syrian people, and learning English, stating, "We speak Kurdish, sometimes, I mean we speak Turkish, my mother understands but can't speak much, but some people are Syrian, they talk to us, and we talk to them, but I don't fully know English." The researcher observed that while Syrian students spoke Arabic within their families, Kyrgyz and Afghan students communicated in Turkish. This indicates Syrians' tendency to preserve their native language, whereas Kyrgyz and Afghans are in the process of adapting to Turkish culture. Language usage emerges as a determinant in assessing how integrated immigrant students are into their new country. Specifically, the fact that these students arrived in Turkey during the same period reflects that differences in language preferences indicate their levels of cultural integration.

Fairy tales and proverbs can be seen as cultural elements of language. The limited knowledge of fairy tales and proverbs among interviewed foreign students is noteworthy. İ stated, "I don't know any fairy tales; when given one, I read and write down what I remember." When asked about proverbs, they pondered before saying, "There was one in an exam, something about Nasreddin Hoca, my teacher, but I really don't know these." R mentioned, "I listen to fairy tales. Sometimes in Turkish, sometimes in Arabic, like The Little Match Girl, The Tortoise and the Hare. There's a proverb, a bit like yours in Turkish, I know one, our teacher said it's also in Turkish, "one stone kills two birds", it has an Arabic version". R is aware of an Arabic proverb and listens to both Turkish and Arabic fairy tales. A shared, "I listen to Arabic and Turkish fairy tales; my mother often tells us an Arabic tale "San Die", a beautiful and sad story about a girl with blond hair whose parents died, and she was lied to by a man claiming to be her father before he revealed the truth before dying." The information on fairy tales and proverbs from foreign students reflects their varied approaches and learning methods regarding these cultural elements. One student expressed trying to overcome their lack of fairy tales by reading and writing down the given ones, while having limited knowledge of proverbs. Another student demonstrated an effort to understand cultural elements in both Turkish and Arabic by listening to fairy tales in both languages and learning a Turkish proverb and its Arabic counterpart. The third student mentioned listening to both Turkish and Arabic fairy tales, thereby grasping the relationship between language and culture.

Cultural symbols express the identity and values of a society, yet students' limited knowledge of monuments is noteworthy. Student İ was unaware of the Gallipoli Campaign and the city, while R, A, and Q could not recognize monuments. The exception was Ö, who knew the significance of Gallipoli and the battle, "yes, the place of the Gallipoli battle," having gained this knowledge through site visits. This indicates that direct experiences can effectively teach students about monuments and historical sites. Q was unaware of the National Anthem and its author, whereas İ, R, A, and Ö knew two verses of the National Anthem by heart, learned in school. However, A and R, "There is an anthem, but I don't know it," admitted to limited knowledge of their country's anthems, similar to the Kyrgyz student. Q's unawareness of the National Anthem and its author contrasts with İ, R, A, and Ö's knowledge of two verses, frequently read in school as A mentioned, "I learned it in school; we always read it when we open the book." This highlights the educational significance of the National Anthem. Yet, A and R's limited knowledge of their national anthems points to integration challenges post-migration, similar to the Kyrgyz student's lack of knowledge. Ö, R, A, and İ correctly identified Mehmet Akif Ersoy as the author of the Turkish National Anthem but lacked detailed information about his life, suggesting deficiencies in learning materials and teaching methods. During the interview, all students correctly identified Turkey's flag and could describe their countries' flags, except Ö who had no information about the Afghan flag, showing varying levels of knowledge about the cultural and symbolic meanings of flags among students. The symbol of Atatürk was specifically associated with "His life, Mausoleum, Atatürk, and the Nation." When shown an image of Anıtkabir from the Life Sciences textbook, all except Q recognized it and knew its location. Ö could identify the image but lacked knowledge of its significance. İ stated, "This is Anıtkabir, I know," R mentioned, "Atatürk rests in Anıtkabir," and A said, "Anıtkabir is where Atatürk's tomb is located." Ö knew Anıtkabir was in Ankara, the capital of Turkey, but was unclear about its importance, attributing it to being the capital, "Because it's the capital of Turkey." When asked how they acquired this knowledge, Ö responded, "I just remember, I don't know." This suggests a need for further information on Atatürk and Anıtkabir. R knew who Atatürk was, stating, "Atatürk is our ancestor," despite being Syrian. A recognized Atatürk as "the savior of the country" and knew the name "Mustafa Kemal," indicating basic knowledge of Atatürk. The Syrian students R and A referring to Anıtkabir as "Antik kabir" – a mispronunciation – indicates their struggle to accurately understand historical and cultural contexts, highlighting gaps in their knowledge.

5. Discussion

The findings in the discussion were examined through the linguistic, symbolic, cultural, and emotional/social dimensions of integration. This approach clarifies which indicators embody the concept of “integration” in the study, thereby strengthening the analytical interpretation of the findings.

To examine how foreign primary school students experience cultural themes in the Life Science textbook and how these encounters shape integration, the findings were organized under two overarching themes—cultural elements and cultural symbols—with several subthemes. The first theme, cultural elements (e.g., food, clothing, music, and traditional crafts), appears to function as an accessible entry point for intercultural meaning-making in migration contexts. Rather than remaining at the level of surface exposure, these everyday cultural practices invite students to activate prior knowledge and engage in comparison, which helps them construct bridges between their home cultures and Turkish culture (Binder, 2018; Chan, 2004). Notably, students’ frequent references to events and practices from their countries of origin can be interpreted as an effort to position themselves as knowledgeable participants in classroom discourse, transforming cultural difference into a resource for engagement rather than a barrier. In this sense, subthemes such as food and drink, clothing traditions, arts, and crafts supported integration by enabling students to recognize both similarities and differences, thereby fostering cultural understanding and facilitating a more affirmative orientation toward participation and belonging. At the same time, these positive effects are likely contingent on the extent to which culturally dense content is contextualized and scaffolded, so that comparisons deepen understanding rather than reinforcing stereotypes or remaining purely descriptive.

However, many students exhibited limited familiarity with their own cultural heritage, especially in areas like traditional music, dance, and crafts. The absence of traditional crafts in the home and limited knowledge about cultural attire were particularly noticeable. Female students, especially those from Syria, referred more frequently to women’s traditional clothing, reflecting gendered cultural expectations (Koç et al., 2017). Students rarely mentioned jewelry or male clothing traditions, indicating a limited engagement with certain cultural symbols. Interviews also revealed that students had difficulty identifying their culture’s musical instruments and dances, highlighting a lack of exposure and intergenerational transmission in these areas.

The findings highlight the family—particularly mothers—as a key cultural mediator through whom cultural knowledge is transmitted via everyday routines, most visibly through food practices (Demir et al., 2017; Senzaki et al., 2016). Students’ enjoyment in discussing dishes from their home cultures and their frequent association of these foods with maternal figures suggests that “food talk” functions not only as a description of cuisine but also as a way of activating cultural memory and asserting continuity of identity in a migration context. In contrast to this relatively accessible domain of everyday culture, students’ engagement with historical and symbolic content in the Life Science textbook often appeared thin and decontextualized. Limited recognition of monuments and heritage sites points to a lack of shared cultural schemas needed to interpret such references, which may be intensified when symbolic content is presented without sufficient contextual support. The misconception of Anıtkabir as “antik kabir” is particularly revealing: it indicates meaning-making through familiar lexical segmentation rather than through historically grounded understanding, suggesting that national symbols can be linguistically “read” but not culturally “decoded.” Moreover, students’ limited knowledge of their own national symbols (flags, anthems) suggests that the challenge is not only acquiring host-country symbolic knowledge, but also uneven access to heritage knowledge. Taken together, these patterns underscore the need for textbooks and classroom mediation to present symbolic content more explicitly and contextually—through brief explanations, guided visual interpretation, and opportunities to connect symbols to students’ lived experiences and prior knowledge.

Language emerged as a central mechanism shaping cultural integration trajectories, not merely as a communication tool but as a bridge (or barrier) to participation in culturally dense

content. Differences in home–school language practices across groups can be interpreted as reflecting distinct integration strategies: Syrian students' preference for Arabic in family settings may signal intentional heritage-language maintenance and identity continuity, whereas Kyrgyz and Afghan students' more frequent use of Turkish may suggest faster functional adaptation within the school environment (Su & Ma, 2021). Importantly, these patterns should not be read as linear “more Turkish = better integration”; rather, they point to the complex ways families balance belonging in the host society with sustaining cultural continuity. At the school level, stronger Turkish proficiency appeared to expand students' ability to engage with cultural themes and participate in classroom discussions, indicating that language competence supports cultural participation and the confidence to position oneself as an active member of the classroom community (Ali et al., 2015; Çelik & Yıldız, 2019). This implies that supporting integration requires instructional moves that explicitly connect language and culture—such as clarifying culturally specific terms, using multimodal scaffolds, and creating structured opportunities for students to compare meanings across languages and cultural frames—so that cultural learning becomes accessible without undermining students' linguistic repertoires.

Students demonstrated limited knowledge of fairy tales, proverbs, and holidays from their home cultures. Awareness of universal days was higher than knowledge of national or religious holidays, indicating a potential erosion of cultural memory in the migration context. This lack of familiarity may result from limited exposure or weakened intergenerational transmission within the family. For example, one student's difficulty recalling national holidays exemplifies the challenges migrant children face in maintaining cultural knowledge over time. The inclusion of local cultural elements in language education can enhance cultural understanding and integration. As culture encompasses language, values, traditions, beliefs, and social norms (Lin et al., 2020), educational materials should reflect this complexity. The study also found that the school environment, including teacher attitudes and peer behavior, plays a critical role in shaping immigrant students' engagement with cultural content (Atik & Özer, 2020; Saka & Çelik, 2022). Positive reinforcement of cultural diversity contributes to feelings of inclusion and motivation.

The findings indicate that textbooks alone are rarely sufficient for fostering deep cultural understanding, particularly for migrant children whose access to the host society's historical and symbolic repertoire is uneven. Students' limited familiarity with the cultural and historical sites referenced in the Life Science textbook suggests that symbolic content remains abstract when it is not connected to lived experience. The fact that students' accounts of Atatürk and the founding of the Republic were often fragmentary—and that their narratives drew more strongly on family visits, community exposure, and everyday social contexts than on classroom instruction—points to the central role of out-of-school cultural mediation in shaping what becomes meaningful and memorable. This aligns with the argument that curriculum design should not treat cultural knowledge as a purely textual object but should deliberately connect instructional content to experiential and situated learning opportunities (Üstün & Demirtaş, 2023; Liang et al., 2023). Accordingly, the pedagogical implication is not to reduce textbook-based cultural themes, but to bridge them through guided visits (when possible), virtual museum experiences, curated visual narratives, and structured classroom activities that invite students to relate new symbolic knowledge to their own cultural repertoires. Such integration of experiential learning with textbook content can reduce interpretive gaps and support more meaningful participation and belonging in multicultural primary classrooms.

6. Conclusion

In conclusion, this study shows that the Life Science textbook can create meaningful opportunities for intercultural learning and contribute to foreign primary school students' integration; however, these benefits are uneven and shaped by intersecting factors. Everyday cultural elements (e.g., food, clothing, crafts) were generally experienced as more accessible and engaging, enabling comparative reflection and positive orientations toward Turkish culture. At the same time, students often displayed limited knowledge of both host-country symbolic content (e.g., monuments, heritage sites, national narratives) and their own national symbols and heritage practices, suggesting gaps in heritage knowledge and culturally shared

schemas. Family influence—particularly mothers' roles in daily routines and food traditions—emerged as a key pathway through which cultural knowledge and memory were transmitted, whereas symbolic and historical content in the textbook was frequently processed at a superficial level. Language proficiency also functioned as a crucial mechanism: students with stronger Turkish skills participated more actively in cultural learning and classroom talk, while limited exposure to cultural sites, commemorations, and traditions constrained deeper meaning-making. Overall, the findings suggest that textbooks alone are insufficient for fostering deep cultural understanding unless culturally dense content is explicitly scaffolded and connected to students' lived experiences in and outside school.

Life Science textbooks should scaffold culturally dense content through child-friendly glossaries for key terms and proper nouns, brief context boxes explaining the relevance of symbols/sites, guided visual prompts, and short compare-and-connect activities that link Turkish cultural themes with students' own cultural repertoires. Clear explanatory cues for national symbols (e.g., Anıtkabir, flag, anthem) may reduce misreadings and support more historically grounded understanding. Teacher professional development. Teachers in multicultural classrooms should receive practical training on language-mediated meaning-making (e.g., lexical segmentation, literal translation, partial schema activation) and culturally responsive strategies such as dialogic explanation, multimodal scaffolding, and structured peer talk. Unit-linked exemplars can help teachers turn culturally loaded textbook moments into inclusive learning opportunities. School-based cultural orientation. Schools can support integration with feasible orientation activities that connect textbook themes to lived experience, including brief micro-orientation sessions on key symbols and routines, virtual/locally feasible heritage experiences, family-involved cultural sharing events, and peer-buddy systems that strengthen participation and belonging. Policy-wise, these supports can be embedded within inclusive schooling initiatives coordinated across curriculum units, schools, and local authorities.

Limitation

This study has several limitations that should be considered when interpreting the findings. The data were collected from only five students, consisting of participants from Syria, Afghanistan, and Kyrgyzstan, which restricts the generalizability of the results. In addition, the research employed a qualitative design and focused exclusively on the Life Science textbook, limiting the scope of analysis to a single subject area. Finally, the study was conducted in one district of Turkey, and therefore the findings may not fully reflect the experiences of foreign students in other regions or educational contexts.

Recommendation

Future studies may expand this line of inquiry by (i) including larger and more diverse samples across regions and school types in Türkiye, (ii) using longitudinal designs to examine how textbook-mediated cultural engagement relates to integration trajectories over time, and (iii) triangulating student interviews with classroom observations, teacher interviews, and document analysis to better capture how cultural themes are mediated through instruction. Researchers may also examine how integration outcomes vary across student groups with different linguistic repertoires and migration histories, and how specific textbook scaffolds or school-based orientation supports influence interpretability, participation, and belonging.

Declaration of Generative AI and AI-assisted Technologies

This manuscript was prepared without the assistance of Generative AI. All intellectual contributions, critical analyses, and final revisions were conducted by the authors. The authors take full responsibility for the accuracy, originality, and integrity of the content presented in this work.

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