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THE POTENTIAL OF BUKI LEARNING EBA CONTENT TO ENHANCE CHILDREN'S SENSORY ENGAGEMENT: A REVIEW

BUKİ ÖĞRENİYOR EBA İÇERİĞİNİN ÇOCUKLARIN DUYUSAL KATILIMINI ARTIRMA POTANSİYELİ: BİR İNCELEME

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ÖZET

Amaç: Teknoloji çağında doğan bireyleri teknolojiyi doğru kullanmaya yöneltmek ve ilgili beceriler ile donatmak, eğitim sistemlerinin en önemli gerekliliklerinden biridir. Bu amaçla, devletler eğitim politikalarında teknolojiyi eğitime entegre etme sorumluluğu taşımaktadır. Teknolojiyle birlikte duyularını aktif kullanabilmeleri beyin için farklı deneyimler sağlayarak sinaptik bağlantıları güçlendirebilmekte ve çocuklar için çağın gereksinimlerini karşılamakta hem de nitelikli eğitim ve öğretim ortamının oluşmasına katkı sağlamaktadır. Bu bağlamda bu araştırmanın amacını "Buki Öğreniyor" isimli EBA içeriğinin çocukların duyusal katılımını artırma potansiyelinin incelenmesi oluşturmaktadır.

Gereç ve Yöntem: Bu araştırmada nitel araştırma modellerinden doküman analizi tekniği kullanılarak araştırma soruları incelenmiştir. Bu amaçla EBA platformunda bulunan "Buki Öğreniyor" isimli içerikte yer alan sınıf animasyon videoları izlenerek veriler elde edilmiştir. İncelenen dokümanlar araştırmacılar tarafından hazırlanan ve geliştirilen "Duyusal Katılım Kontrol Listesi" ile toplanarak analiz edilmiştir.

Bulgular: Araştırmaya 21 video içeriği dahil edilmiştir. Bu içeriklerin hepsi görsel ve işitsel duyulara hitap ederken 9 videoda denge duyusu, beş videoda dokunma duyusu, bir videoda ise koku ve tat alma duyularının desteklendiği görülmüştür. İncelenen video içeriklerinde toplamda 53 kavramın öğretimi amaçlanmıştır.

Sonuç: Araştırmanın sonucunda EBA platformunda "Buki Öğreniyor" isimli okul öncesi eğitim içeriğinde toplamda 105 videonun yer aldığı görülmüştür. Video içeriklerinin 21 tanesinde sözel yönergelerle duyusal katılımın desteklendiği görülmüştür. Ayrıca çalışmada ele alınan odak kavramların çocukların kavram gelişimlerini desteklediği tespit edilmiştir.

Anahtar Kelimeler: Okul öncesi, EBA, dijital içerik, animasyon, duyusal katılım

ABSTRACT

Objective: In the era of technology, guiding individuals born into the technological age to use technology correctly and equipping them with relevant skills is one of the essential requirements of education systems. In this regard, governments have the responsibility to integrate technology into education policies. Along with technology, actively utilizing their senses can provide the brain with different experiences, strengthening synaptic connections, meeting the demands of the era for children, and contributing to the creation of a quality educational environment. In this context, the aim of this research is to examine the potential of the EBA content named "Buki Learning" in enhancing children's sensory engagement.
Materials and Methods: In this study, the qualitative research model of document analysis technique was used to examine the research questions. For this purpose, data was obtained by watching classroom animation videos in the content named "Buki Learning" available on the EBA platform. The examined documents were collected and analyzed using the "Sensory Engagement Checklist" prepared and developed by the researchers
Results: A total of 21 video contents were included in the study. While all of these contents appeal to visual and auditory senses, it was observed that the sense of balance was supported in 9 videos, the sense of touch in five videos, and the sense of smell and taste in one video. The teaching of a total of 53 concepts was aimed in the examined video contents.
Conclusion: The research findings indicate that the "Buki Learning" preschool education content, available on the EBA platform, consists of a total of 105 videos. It was observed that sensory engagement was supported through verbal instructions in 21 of these video contents. Furthermore, it was determined that the focal concepts addressed in the study supported children's conceptual development.

Keywords: Preschool, EBA, digital content, animation, sensory engagement.

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1. Giriş / Introduction

Education systems across countries have a structure that constantly evolves, changes, and updates itself in line with the needs. Various studies and projects have been conducted for different educational levels require continuous development, change, and renewal to educate individuals with the qualifications to meet the demands of the era. Particularly, social changes, pandemics, scientific and technological advancements necessitate new educational policies and practices.
The new century we are in is a period of intense technological advancements (1). This situation necessitates the implementation of various educational practices to meet the needs of the era and adapt

to innovations, just like in other fields. The definitions and subcategories of a set of knowledge and skills that form the focal point of educational programs are expanding. When these are examined, it can be observed that many countries aim to provide individuals with the different individual abilities defined as 21st-century skills through education (2). Although there are different views regarding the scope of these skills, they are generally classified under three main categories: learning and innovation skills, information, media, and technology skills, and life and career skills (3). In this context, in a period where digital transformation is accelerating and the importance of technology literacy skills is increasing, various steps have been taken in Turkey regarding technology integration in education. In these efforts, the Republic of Turkey Strategy and Coordination Directorate emphasizes the sectoral needs in line with advancing technology within the 11th Development Plan (2018-2023) and sets versatile goals to meet the expected competencies from different levels of education. Consequently, considering all these efforts and needs, the Ministry of National Education (MEB) presented the 2023 Education Vision document, which encompasses all components of the education and teaching process (4). With this aim, the Fatih Project was initiated in our country as part of the phased transformation efforts that started in the 2018-2019 academic year. This project is a comprehensive initiative prepared in line with the goals defined in Vision 2023, the e-Transformation Turkey project, which defines the actions of Turkey in becoming an information society, and documents, such as the information society strategy, development plans, MEB strategic plan, and IT policy report (5). The general objective of the project is to increase equal opportunities in education and teaching, and ensure more effective use of information technology tools in education and teaching to cater to various learning styles (6). In line with this objective, teacher training programs and Education Informatics Network (EBA) initiatives were planned for the use of it. Accordingly, the development of information, media, and technology skills addressed within the context of 21st-century skills for teachers was targeted (3). Especially in the EBA system, in addition to the presence of various content, support for teachers' content creation was also emphasized. It was observed that the use of Web 2.0 tools was encouraged, along with the creation of educational content for EBA through V Factory and Lumi. Moreover, in our country, the Science, Technology, Engineering, and Mathematics education (STEM) project can be seen as an effort toward integrating technology in education (7). Furthermore, the 2023 education vision document highlights the focus on the development of 21st-century skills, the establishment of an ecosystem for the development of digital content and related skills, and the planning of teacher training in this regard (6).

The Ministry of National Education (MEB) plans various projects to support 21st-century skills in early childhood education (8). In this regard, in-service training and different activities involve preschool teachers in these projects and initiatives, aiming to enrich their competencies suitable for digital life through different techniques and applications (9). However, it has been stated that the Preschool Education Program developed by the MEB (2013) falls short in terms of achievements and indicators for supporting children's 21st-century skills (10). An additional family education support program (OBADER) and computer-assisted educational materials have been developed within the program (11). Furthermore, the EBA platform, prepared for teachers and parents, includes various educational contents that can be created using Web 2.0 tools, as well as training seminars in the Teacher Informatics Network (ÖBA), which guide teachers on how to prepare rich learning materials (12).

In studies related to the use of technology in children's education, it is emphasized that technological devices, such as computers, tablets, and phones, provide young children with rich and lasting learning opportunities through different content, such as various sounds, moving images, animations, and videos (13). Kocaman-Karaoğlu (2016) evaluated the application of digital storytelling by teachers in educational environments as practice that supports students' active participation, provides concrete experiences, and contributes to their technological development (14). Similarly, Alpay and Okur (2021) found that EBA educational cartoon contents are highly effective in children's learning (15). Çetin et al. (2012) revealed that parents and the cartoons they watch play a significant role as learning sources for children's understanding of the concept of space (16). In a study by Çetin and Tekerci (2023) that examined children's views on technology-based acquired scientific concepts, it has been concluded that digital resources, such as cartoons and tablets, are highly effective in acquiring scientific concepts (17). In addition, there are various factors believed to have an impact on children's brain development, thinking skills, scientific thinking, and conceptual development in the process of development and learning. Particularly, advancements in neuroscience provide a wealth of data on brain development (18). According to studies, it is emphasized that approximately two million connections, i.e., synaptic networks, are formed in the newborn baby's brain per second. By the end of two years, the number of synaptic connections in the baby surpasses a hundred trillion, almost twice the number of synapses in an adult brain (19). Therefore, supporting this rapid change in children's brain development is possible by providing multisensory experiences that address all development domains, such as perceptual, motor, and language development (20). In sensory-rich activities that support children's sensory

engagement, they need opportunities to explore, experiment, experience, and receive feedback from interacting with objects that go beyond sensory-motor skills. In this regard, the environment plays a critical role in enabling children to use their senses and engage in real experiences for their learning (21). Thus, in well-organized environments, children can achieve lasting learning when they can actively experience and use their senses. In preschool education, teachers have an important role in planning learning experiences that activate children's senses, using technology in a positive and manageable way, providing rich, stimulating content, and strengthening children's mental connections (22, 23).
This research aims to examine the potential of technology-mediated multisensory experiences in enhancing children's synaptic connections, processing and distinguishing sensory information, and fostering the development of scientific concepts, based on relevant literature and studies. Therefore, effective use of technology in early childhood can play a significant role in building advanced academic skills, increasing awareness levels, and supporting the optimal development of children's potential.
In this context, it is observed that the research focuses on the content of early childhood education called "Buki Learns" available on the EBA (Educational Informatics Network) platform, which is accessible to all teachers, parents, and children. Evaluating educational content widely used in the education system from various perspectives, such as how they support children's development, content relevance and suitability, concept teaching, and sensory engagement, is crucial in determining the effectiveness of the content provided. Additionally, comprehensive studies are needed to assess the appropriateness of the offered content for the development of preschool children and to enhance and update the content as necessary. This research aims to examine the potential of the educational content called "Buki Learns" on the EBA platform in increasing children's sensory engagement and facilitating the acquisition of sensory concepts. To achieve this general objective, the following questions were addressed:

1) How does the educational content "Buki Learns" contribute to increasing the participation of visual/auditory/tactile/taste/smell/balance senses?
2) Does the educational content "Buki Learns" support children's concept development related to sensory experiences?

2. METHODOLOGY

Research Design

This study utilizes a qualitative research design. Qualitative research is defined as the process of observing and comprehensively understanding perceptions and events in their natural settings through techniques, such as observation, document analysis, and interviews. In this study, the analyzed documents are the videos included in the educational content "Buki Learns" on the EBA platform.
Data Collection Instruments
The research data were collected by watching various classroom animation videos in the educational content "Buki Learns" on the EBA platform and completing the "Sensory Engagement Checklist."
Sensory Engagement Checklist
The sensory engagement checklist was developed by the researchers. The checklist was designed to consist of six dimensions based on the senses addressed in this study. The sub-dimensions of the checklist were determined by reviewing relevant literature and included visual, auditory, olfactory, gustatory, tactile, and balance senses. The content of the prepared checklist includes the name of the video, the focal sense supported in the video, focal concepts related to the supported sense, and instructions encouraging sensory engagement for the child in front of the screen. The aim was to reveal whether digital content encourages children's sensory engagement, which senses are most supported, and the focal concepts related to the senses. Subsequently, the prepared sensory engagement checklist was sent to five domain experts (two early childhood education experts, two measurement and evaluation experts, and one teacher) to determine its content validity. The experts were asked to evaluate the prepared checklist in terms of the research purpose, appropriateness within the scope of content analysis, and detectability of the included senses in digital content. After receiving feedback from the experts, necessary adjustments were made, and the form was finalized. Then, the researchers reviewed the relevant documents within the scope of this study and completed the checklist, considering animations that involve classroom activities and family involvement outside the classroom, as well as guidelines and/or statements and concepts believed to support sensory engagement. The collected data, recorded by the researchers, were examined and analyzed using the content analysis. Content analysis is a data collection method that involves identifying concepts and relationships that help explain the collected data, grouping similar data using predetermined concepts and themes, and organizing and

interpreting these data in a way that can be understood by the reader. Finally, the obtained data were analyzed and presented in tabular form.

Study Group

The study group consisted of 21 videos included in the educational content called "Buki Learns" on the EBA platform. Criterion sampling, one of the purposive sampling methods, was used to determine the study group. Criterion sampling involves studying individuals, objects, situations, or events with predetermined characteristics related to the research problem. In this study, the inclusion criteria for the content included in the study group were being available on the EBA platform, targeting preschool-age children, and being analyzable in terms of supporting sensory engagement through guidelines. Additionally, the fact that the content included in the study group is available on the EBA platform, the official participation of teachers and children through official accounts on this platform, and its status as the official digital platform of the Ministry of National Education (MEB) influenced its selection as the research subject.

Data Collection Process

The primary source of this study consisted of class animation videos accessed from the EBA platform. All videos included in the preschool education content named "Buki Learns" were watched by the researchers. Using the developed control checklist, sensory participation-oriented guidelines, supported sensory focuses, and concepts were identified and recorded in the checklist for their potential to enhance sensory participation. In the subsequent stage, the supported sensory focuses and concepts were listed and tabulated by the researchers.

Data Analysis

The content analysis method was employed in this study. The data collected through the "Sensorimotor Participation Control Checklist" were analyzed by examining the guidelines, sensory focuses, and concepts supporting sensory participation in the digital content. Videos encompassing topics where sensory participation was not possible, and videos with the same content but different topics (e.g., videos focusing on numbers) were excluded from the data analysis.

3. RESULTS

The class animation videos were designed as content depicting the interactions of five children (Nehir, Ali, Arda, Deniz, Duru), their teacher (Zeynep), and a character named "Buki," a chameleon representing a student, both inside and outside the classroom. These animation videos and their content were analyzed through document analysis to evaluate sensory participation and the support of related concepts. The findings obtained were presented in tabular form.

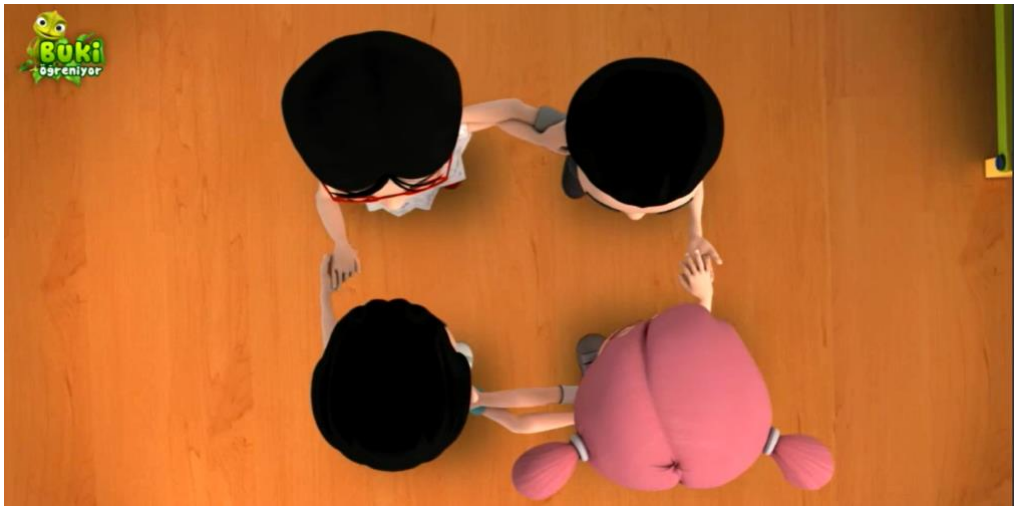
Table 1 below reveals that in all of the videos (N: 21), there are instructions targeting the senses of vision and hearing.

Table 1.
Sensory Categories and Guidelines Supporting Sensory Participation

Categories	Video Title	Guidelines
Vision, Hearing	Song about left and right	"I walk from the right on the sidewalk. I pay attention to every step."
Vision, Hearing	Color Wheel	"First, you should cut a circle out of cardboard."
Vision, Hearing	Addition	"Wonder what I'm doing? I'm inventing an additional machine. You can try it too."
Vision, Hearing	Addition song	"Let's add; let's count."
Vision, Hearing	Disappearing cookies	"I can't believe it; my cookies have decreased again, look."
Vision, Hearing	The world is spinning	"Come on, let me show you how the world spins."
Vision, Hearing	Yesterday, Today, Tomorrow	"Children, think about whom you want to make your New Year cards for tomorrow."
Vision, Hearing	Where did the water go?	"Let's see if you can find out how I lost the water."

Vision, Hearing	Rectangular Song	"Doors are rectangular; we open them every morning."
Vision, Hearing, Balance	Heavy and Light	"If you are curious about whether the items in your class are heavy or light, be careful."
Vision, Hearing, Balance	Square Song	"Let's be four people. Hold hands. Link arms. Let's form a square. Hey!"
Vision, Hearing, Balance	Forward-Backward Song	"The game is starting; let's walk, come on!"
Vision, Hearing, Balance	Balloon inflation experiment	"First, let's put some vinegar into the balloon."
Vision, Hearing, Balance	Moving robot song	"Come on, dance with me."
Vision, Hearing, Touch	Uncleaned teeth consequences	"You can put the eggs into the jars and pour the acidic drink over them."
Vision, Hearing, Touch, Balance	Beginning, End, Middle	"It's very easy. Would you like to try it, too?"
Vision, Hearing, Touch, Balance	Ping Pong Ball in a Cup Experiment	"If you can get the ball out of the cup, you can play."
Vision, Hearing, Touch, Balance	Paper Boats	"The paper boats are floating in the water. Oh, did you see it? They are slowly getting wet."
Vision, Hearing, Touch, Balance	Up-Down Song	"Hey! Jump! Jump! Jump! Upwards."
Vision, Hearing, Taste, Touch	Teeth Song:	"Don't swallow the toothpaste, rinse your mouth with water."
Vision, Hearing, Taste, Smell	Near-Far:	"Hey, can you hear it, too?"

The findings showed that nine videos enhanced the participation of the sense of balance, while six videos promoted the participation of the sense of touch. Additionally, it was observed that the sense of smell and taste were supported together with visual and auditory stimuli in separate videos. Below are some visual examples extracted from the video content that can serve as samples of sensory engagement:

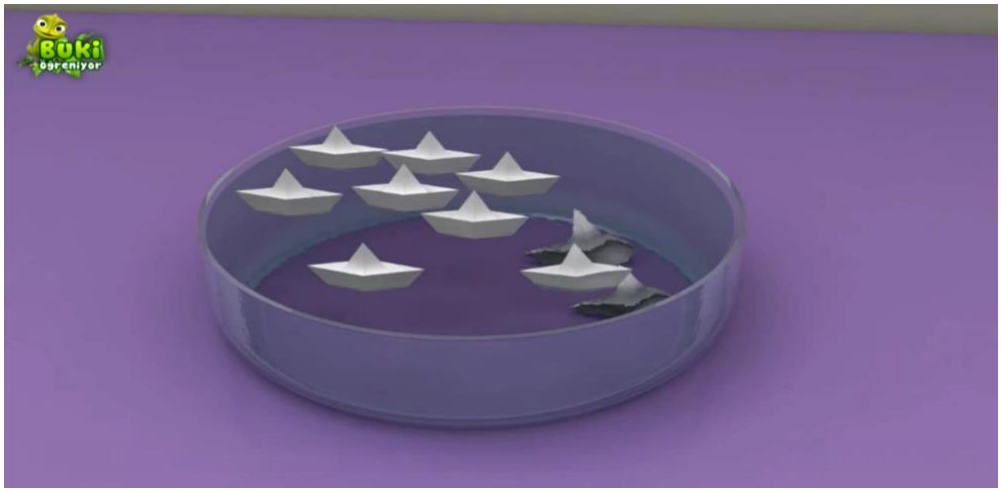


Visual 1. 'Square Song' (Visual, auditory, and balance senses)

Visual 2. 'Far-Close' (Taste, smell, visual, and auditory senses)

Visual 3. 'Color Wheel' (Visual and auditory senses)

Visual 4. 'The World is Spinning' (Visual and auditory senses)



Visual 5. 'Paper Boats' (Visual and auditory senses)

Visual 6. 'Moving Robot Song' (Sense of balance)

It was observed that in all videos (N: 21), the sensory involvement of vision and hearing increased (see Table 2).

Table 2.

Sensory Categories and Focus Concepts in Animations

Supported Senses	**Video Title**	**Concepts**
Vision, Hearing	Right-left song	Right-left
	Color wheel	White
	Addition	Addition operation
	Addition song	Addition operation
	Subtracting cookies	Subtraction operation
	The world is spinning	Day and night
	Yesterday, today, tomorrow	Yesterday, today, tomorrow

	Where did the water go?	Water-absorbing, non-absorbing
	Rectangular song	Rectangular
Vision, Hearing, Balance	Heavy-light	Heavy-light
	Square song	Square
	Forward-backward song	Forward-backward
	Balloon inflation experiment	Dim-inflated
	Moving robot song	Moving-stationary
Vision, Hearing, Touch	What happens to unbrushed teeth?	Dirty, clean, white, hard, soft
Vision, Hearing, Touch, Balance	Beginning-middle-end	Beginning-middle-end
	Cup with ping-pong ball experiment	Floating-sinking, narrow
	Paper boats	Floating-sinking, wet, numbers 1-10
	Up-down song	Up-down
Vision, Hearing, Taste, Touch	Tooth song	Dirty-clean, soft, morning-evening, front-back
	Distant-close	Distant-close
Vision, Hearing, Taste, Smell		
Total	21	53

Five videos involved vision, hearing, and balance senses; four videos involved vision, hearing, touch, and balance senses; one video involved vision, hearing, and touch senses, one video involved vision, hearing, balance, and taste senses, and one video involved vision, hearing, taste, and smell senses, respectively, concerning the concepts presented. In total, it was determined that in the content that enabled multi-sensory involvement, 21 videos contained 53 concepts.

4. DISCUSSION

Based on the findings, it was observed that Buki Öğreniyor, an educational content, consisted of 189 different types and 18 main topics. When all 18 main topics were examined, there were 105 class animation videos. All 105 videos were reviewed and analyzed. Ninety-three educational content studies were excluded as they lacked guidelines supporting sensory involvement. When the general characteristics of the content were examined, there were 21 educational contents that ere relevant to the research objective, and these contents were categorized under dimensions-quantity (N:1), geometry (N:2), location-space (N:5), colors (N:1), numbers (N:3), time (N:2), and contrasts (N:7). It was observed that 53 concepts were supported through digital content to enhance children's conceptual knowledge.

Early childhood brain development, which occurs concerning the developmental characteristics of children and various variables, is an important consideration for educators. Supporting their development in line with the advancements of the era and in a multifaceted manner is crucial for building a society of qualified individuals. In this regard, understanding the impact of changes and advancements in the field of science and technology on education, and integrating innovations into the educational environment when designing learning processes, are at the forefront of current research (35, 36). Studies focusing on the integration of technology into education particularly examine its effects on children's learning from various perspectives (14, 37, 38). Accordingly, it is believed that activities involving technology in early childhood (such as in schools, homes, and digital platforms) have a significant impact on children's brain development, thinking skills, scientific thinking abilities, and conceptual development, among other aspects.

Based on this idea, this study aims to examine the educational content "Buki Learns" in digital content widely used in children's education through official channels. For this purpose, two research questions were included in the present study. In line with this, the educational content "Buki Learns" was examined to evaluate its contribution to enhancing the participation of sensory modalities, such as vision, hearing, touch, taste, smell, and balance, and supporting children's conceptual development related to these senses. The research findings and secondary research data were discussed together to provide a comprehensive analysis of the research outcomes.

When reviewing the literature related to the research topic, emphasis is placed on the brain's ability to easily adapt to the environment and its flexible structure during early childhood. In neuroscientific explanations, the brain's ability to easily adapt to the environment in its early stages (39) and its capacity to form more functional and rich neural connections are referred to as neuroplasticity (40). In the preschool period, the brain is highly sensitive to the environment in terms of both neuroplasticity (39) and the organization and myelination of white matter pathways (41). Therefore, creating suitable and positive environmental conditions is crucial for brain development in children. The quality of the stimuli provided to the child is closely related to the occurrence of more permanent and effortless learning. Multisensory stimuli provided to children facilitate the formation of synaptic connections between neurons in the brain. Thus, the quality of the environment presented to the child should be designed to contribute to this adaptive process. Through experiences provided at an early age, synaptic connections in the brain are strengthened, enabling the individual to develop more effectively and qualitatively (39).

Neuroscientific studies have shown that the number of synaptic connections in the brain of an eight-month-old baby is greater than that of an adult, and unused synaptic connections weaken over time (40). This phenomenon applies to humans and other species. For example, in an experimental study, one cat was allowed to explore its environment using its own senses, while the other cat was mechanically guided to complete the same exploration after being placed in a box. The results of the study showed that the cat that actively used its own senses to explore the environment exhibited a higher level of adaptation and sensory development compared to the cat that mechanically followed the same path explored by another individual (41). Therefore, it is crucial to ensure intensive use of synaptic connections for brain development. Interaction with the environment through sensory experiences begins even in the womb, as humans start engaging with the surroundings through their senses (42). Consequently, plasticity during childhood is most pronounced in areas related to vision, hearing, language, and motor skills (40). However, screen use is not recommended for children under the age of two, as the early childhood period is when brain plasticity is most intensive (43). Young children have difficulty distinguishing between events in a video and information presented by a live person (44), and children in the sensorimotor stage have limitations in understanding two-dimensional screen content (45). Although this suggests that screen exposure is not appropriate for young children, the specific impact of early screen exposure on the brain is not yet fully understood. Nonetheless, research indicates that from approximately the age of two, well-designed screen environments with specific educational goals tailored to the child's age can positively impact their development (44). To effectively support sensory participation, children need feedback from the objects they interact with (26). Therefore, children should not be left alone in front of a screen, and the importance of receiving feedback through interaction

with adults should not be overlooked. It has been observed that spending screen time with an adult in a meaningful interaction is beneficial for language learning in 24-month-old infants. However, excessive screen exposure in infants under 12 months old is reported to negatively affect language and brain development (44).

Many research studies emphasize the benefits of effective use of technology (46, 47, 23). It appears possible to support balance by promoting physical activity, language development through adult conversations facilitated by auditory perception and technology, and visual perception through rich visual stimuli. Furthermore, the functionality of touchscreens and appropriately selected digital games are said to support the sense of touch. The key point here is that using technology correctly supports active learning (48). However, it is argued that technology use may lead to a lack of stimuli from the environment, with the child's attention solely focused on the screen, which may pose risks to the child's development (49). Hutton et al. (2020) found that high levels of screen time reduced the myelination of white matter pathways by disrupting microstructural pathways (41). On the other hand, Pall (2020) stated that there is no scientific evidence regarding the effects of screen use on brain development (50). In this context, for screen use to truly benefit sensory participation, it is crucial to the child to receive feedback from the objects they interact with (26). It can be said that for screen time to have positive contributions to children's development in terms of sensory participation, it should involve interactive engagement with an adult, not just passive video watching.

In the scope of this research, it was observed that the instructions in the videos, as well as the conversations between characters, served as a conversational element and directly addressed the child. A total of 21 videos included instructions and concepts aimed at the child, supporting the teaching of 53 concepts in total. Additionally, although instructions were not heavily used in general, the videos enhanced sensory engagement and featured visually rich images, contributing to visual perception.

The research findings indicated that not every video included instructions that supported sensory engagement. However, it was noteworthy that the videos were designed to serve as models for children. In a related study conducted by Kara and Altunbay (2020), it was explained that cartoons and animations are tools that appeal to sensory organs and serve as models for children.

In the research findings, it was observed that the educational content "Buki Learns" predominantly focused on increasing sensory engagement, particularly in the areas of visual and auditory perception. This finding aligns with studies that have examined animation videos, cartoons, and television programs. In relation to this, Yapıcı (2006) emphasized that television, not in isolation but through the programs it offers, is remarkably attention-grabbing as it stimulates the auditory and visual senses of children and infants (52). On the other hand, Temizkan and Atasoy (2016) stated that television plays a big role in individuals' cognitive, social, and emotional development (53). Alpay and Okur (2021) also highlighted in various studies the use of educational video content specifically designed for preschool children in television programs, which address different sensory modalities to support sensory development (15).

When examining the relevant literature related to the research aim, it can be observed that previous studies have particularly focused on the visual and auditory senses. Moreover, studies that support visual and auditory senses have predominantly centered on digital book applications. In Sezgin's study (2017), the effects of digital coloring books on the visual and auditory memory of preschool children were investigated. The research findings showed that digital children's coloring books simultaneously enhance children's multi-sensory skills, and a project proposal called "Miniart" was suggested. In the design, visual communication design elements were considered, and efforts were made to create an appropriate design language with aspects of form and content, interaction, sound, and music (54). Similarly, in Aşkın's study (2016), digital children's book applications were examined in terms of visual communication design elements, such as dimension, typography, illustration, color usage, interactive features, and guiding graphics, and application recommendations were provided (55).

Furthermore, the research findings indicate that tactile sensory participation was encouraged in six videos. In these videos, attention is drawn to the sense of touch through instructions (e.g., "Now touch the carpet," "Put some paste on a soft brush"). Similarly, in Ferhat's study (2016), especially in digital contents, such as simulations and augmented reality, the sense of touch, along with all other senses, was mentioned to be supported (56).

In other research findings, the sense of taste was supported in one video through the instruction "Don't swallow the toothpaste, rinse your mouth with water" in a sensory participation-oriented song titled "Teeth." While it may not be possible to directly support the sense of taste for children in front of the screen, they can be encouraged to engage in experiential activities related to taste. However, a study conducted by Orhan and Karaman (2011) reports that the sense of taste, particularly the senses dependent on external factors, such as taste and smell, can be supported through real-time simulations with special devices (57).

According to this research, the sense of balance was supported in the nine videos examined through both instructions and visual elements. Particularly in song videos, the creation of dance choreographies encourages children to perform different body movements, which serves as an incentive for physical activity. This not only supports body awareness but also enhances the sense of balance. Similarly, in the study conducted by Önen and Sandıkçı (2022), the findings suggest that physical activity can be hindered by digital content, but some digital content, such as video games, pedometers, and accelerometers, are designed to support physical movement (58).

A noteworthy finding of this research is the absence of any content that supports the sense of smell through instructions or visual elements. This implies that the sense of smell requires real-world stimuli to be supported. However, with the advent of digital scent technology, it has become possible to transmit smells to different locations. Examples of this include the distribution of scented tissues to the audience during specific scenes in movies, the inclusion of scent coding in certain video games and websites, and various other applications (59). While these solutions may be somewhat costly for the educational content being examined, at the very least, curiosity can be sparked regarding how the surrounding objects or the scent of existing flowers in the environment could be, similar to the instructions used to support other senses, or it can be supported through conversations among children.

The animation content of 'Buki Öğreniyor' can be evaluated as entertaining, educational, and attention-grabbing for children. Technological literacy, which is one of the 21st-century skills, is a skill that should be acquired by individuals, especially starting from the early childhood education period (10). It is observed that the 'Buki Öğreniyor' content is designed to introduce various 21st-century skills to young children using technology. Coding skills, which are one of the technological skills, are addressed in different categories within the educational content. However, it is observed that these skills are mainly utilized to support the sense of balance through the bodily movements incorporated into the song content, which serve as a model for children in front of the screen. In this case, encouraging instructions are embedded within the songs to support and motivate children watching the screen. In a related study, Yücel, Görkem, and Tuncer (2021) found that in the robotic materials designed for early childhood education, concepts covered in early childhood education were concretized and actively engaged by children, especially through the utilization of the sense of touch (60). In the video content examined in this research, it is also observed that the sense of touch is supported and integrated with the concepts addressed through the instructions.

Some activities like virtual reality, augmented reality and technological simulation systems that can be used at different educational levels have been noted to stimulate multiple senses and enable more efficient utilization of sensory input (61). The fact that the videos examined in this research simulate aspects of early childhood education creates an environment that activates children's multiple senses and allows them to use their senses more effectively.

Within the framework of the 21st-century skills determined by the Ministry of Education, the necessity of developing individuals' competence and skills related to science and technology includes the ability to engage in scientific inquiry and the perception and understanding of the natural world (62, 63). In this context, comprehending and perceiving the natural world is possible through the effective use of the senses. This highlights the importance of establishing a foundation for effectively using technological resources. Therefore, in the videos examined in the research, it is crucial for children to be more active and for the teacher to be portrayed as a guide. Sections, where children make inferences about the natural world during their exploration process, should be conveyed to the viewers during the dialogues in the videos, as this is important for imparting the relevant skills.

5. SUGGESTIONS

In this study, classroom animation videos from the preschool education content available on the EBA platform were examined in terms of sensory engagement. However, the preschool education content named 'Buki Öğreniyor' on the EBA platform does not consist solely of classroom animation videos. The content also includes different types, such as educational games, exercises, coloring, and story scenes. In line with the findings obtained from the research, the following recommendations are presented:

1. The preschool education content named 'Buki Learns' can be examined based on its different educational content in terms of supporting sensory engagement.
2. The supporting of sensory engagement can be examined in the preschool education content named 'Buki Learns' based on different categories.
3. The overall preschool education content named 'Buki Learns' can be evaluated holistically, and the supporting of sensory engagement can be examined in a way that encompasses the entire educational content.

Conflict of Interest Statement
There are no conflicts of interest.

Ethical Approval
This article does not contain any studies with human or animal subjects.

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Data Accessibility
All data are available in the article.

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