EXPLORING UNPLUGGED HIJAIYAH CODING STRATEGIES TO STIMULATE EARLY CHILDHOOD LITERACY AT PAUDQ NUR FADLILLAH TUBAN

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ABSTRACT

The advancement of digital technology requires early childhood education to integrate digital literacy from an early age while preserving Islamic values. One innovative approach that addresses this challenge is *unplugged coding hijaiyah*, which teaches the fundamentals of computational thinking through non-digital, play-based activities involving hijaiyah letters. This study aims to explore the implementation strategies of unplugged coding hijaiyah in stimulating early childhood literacy at PAUDQ Nur Fadlillah Tuban. Using a qualitative case study approach, data were collected through observation, interviews, and documentation. The results show that this strategy is carried out through engaging and structured activities, such as arranging directional arrows, movement simulations, and coding missions. The method effectively enhances children's symbolic literacy, concentration, and logical thinking, while integrating Qur'anic values into the learning experience. Despite challenges such as limited media and parental understanding, teachers managed to overcome these barriers through creativity, collaboration, and socialization. It can be concluded that unplugged coding hijaiyah offers an effective, contextual, and value-based approach to strengthening early childhood literacy in the digital era.

Keywords: Early Childhood Literacy, Unplugged Coding, Hijaiyah Learning

BACKGROUND

The advancement of digital technology has brought about fundamental changes in various aspects of life, including the field of early childhood education. Today's children grow up in technology-saturated environments, where access to digital devices becomes an integral part of their daily lives from a very early age. In this context, literacy can no longer be narrowly interpreted as the ability to read and write in the conventional sense; rather, it has evolved into a set of skills encompassing logical, critical, analytical, and computational thinking. Megawati & Sofiroh, (2025) assert that digital literacy is one of the core competencies of the 21st century that must be instilled from an early age as a foundation for lifelong learning. As a result, early childhood education (ECE) is required to respond to the changing times by developing learning strategies that are technologically adaptive while maintaining the essence of early childhood pedagogy. Approaches that focus solely on cognitive aspects, or that still rely heavily on rote memorization and repetition without active thinking stimulation, are increasingly seen as inadequate. This becomes a major challenge for many early childhood institutions in Indonesia, most of which continue to depend on conventional approaches in developing early literacy. Yet, as emphasized by Piaget in Hendawaty et al., (2025), young children are in the pre-operational stage, which demands learning based on concrete experiences and active exploration of the environment.

There is a growing need for learning approaches that are not only fun and meaningful but also capable of sparking curiosity, training systematic thinking skills, and fostering children's emotional and spiritual attachment to learning materials. One increasingly popular and effective approach in stimulating digital literacy in early childhood is unplugged coding teaching the basic concepts of computer programming without the use of digital devices. This method engages children in understanding logical sequences, composing instructions, recognizing patterns, and solving problems through playful, visual, and

interactive physical activities. Marifah et al., (2022) state that computational thinking is a form of modern literacy that holds equal status to reading, writing, and numeracy. Rahmawati & Agustin, (2024) add that unplugged coding is particularly suitable for early childhood education, as it not only prevents excessive screen time but also introduces the fundamentals of algorithmic and systematic thinking in a concrete and enjoyable way. In the context of Islamic education, the need for an integrative approach that combines digital literacy and Qur'anic values is becoming increasingly important. Qur'anic-based early childhood education (PAUDQ) institutions carry the dual mission of equipping children cognitively while also laying a spiritual and moral foundation rooted in Islamic teachings.

Consequently, the unplugged hijaiyah coding approach has emerged as a solution that bridges these two essential needs: strengthening digital literacy and introducing Islamic values from an early age. This model allows children to learn hijaiyah letters through motor activities and structured games that resemble basic algorithmic logic, turning the process of letter recognition from passive to active and meaningful. Research by Cantika et al., (2024) demonstrates that the use of game-based media in hijaiyah learning can significantly increase children's interest and active engagement. However, studies that specifically explore the application of unplugged coding methods using hijaiyah content remain very limited. This is despite the fact that the approach holds great potential for forming a more adaptive model of Islamic literacy instruction that aligns with the digital era and the exploratory learning styles of young children.

PAUDQ Nur Fadlillah Tuban is one of the institutions that has begun to explore the development of this innovative learning model. The institution is committed to providing education that is aligned with technological advancement while remaining deeply rooted in Islamic values. Nevertheless, as in many other early childhood institutions, a key challenge lies in how to creatively integrate digital literacy into hijaiyah instruction, which is often still characterized by repetition and rote memorization. This situation highlights the urgency to explore learning strategies that can enliven children's learning experiences without losing the essence of Islamic values and early childhood pedagogical principles. From a developmental theory perspective, Vygotsky in (Azzahra & Darmiyanti, 2024) emphasizes that children's learning develops optimally in social environments rich in interaction and meaningful support. The unplugged hijaiyah coding approach has strong potential to create collaborative, communicative, and joyful learning spaces in which children can learn through movement, dialogue, and play.

This approach is also aligned with the principle of learning through play, which underpins the philosophy of Indonesia's early childhood curriculum, including the *Merdeka Curriculum*. More than simply introducing symbol recognition, early childhood literacy encompasses the ability to understand symbols, derive meaning, and connect knowledge with experience. As Rahim, (2023),states, effective early literacy does not merely provide children with technical skills but also with conceptual understanding through contextual activities relevant to their lives. In this context, the unplugged hijaiyah coding approach offers children the opportunity to recognize letters as part of patterns, sequences, and stories embedded in physical and social activity. Considering the above theoretical and empirical arguments, it can be concluded that the unplugged hijaiyah coding approach is not merely a new method for teaching hijaiyah letters it is an innovative strategy for fostering meaningful and contextual Islamic digital literacy. This approach is believed to enrich children's learning experiences, broaden their literacy skills, and cultivate structured thinking from an early age. Therefore, this study focuses on exploring unplugged hijaiyah coding strategies for stimulating early childhood literacy at PAUDQ Nur Fadlillah Tuban. It aims to investigate how the model is implemented, how children respond to it, and how the approach contributes to the development of humanistic, joyful, and Qur'an-based literacy instruction.

RESEARCH METHOD

This study employs a qualitative approach with a case study design, as it aims to gain an in-depth understanding of the practices and strategies of *unplugged hijaiyah coding* in stimulating early childhood literacy within a Qur'anic educational context. This approach allows the researcher to capture the subjective meanings held by educational actors and to explore intensively the processes, experiences, and interactions that naturally occur in the field. According to Creswell in Zamili, (2013),

qualitative research provides space for researchers to immerse themselves in the sociocultural context and to interpret the meanings constructed from the participants' perspectives. Meanwhile, Septiana et al., (2024) emphasize that the case study method is particularly suitable for examining contemporary phenomena in real-life settings, especially when the boundaries between the phenomenon and its context are not clearly defined. The research site was purposively selected at PAUDQ Nur Fadlillah Tuban, an early childhood Islamic institution that has begun implementing Islamic digital literacy learning through non-digital (unplugged) coding methods. The research subjects consist of classroom teachers who implement the learning strategy, the school principal as the decision-maker, children aged 5–6 years as learners, and several parents. These participants were selected based on their active involvement in the learning process and their capacity to provide relevant and in-depth information. In line with Safarudin et al., (2023), participant selection in qualitative research is theoretical and contextual, not statistically representative, but based on the depth of information that can be obtained.

Data collection techniques in this study included participant observation, in-depth interviews, and document analysis. Observation was conducted directly by the researcher during the implementation of unplugged hijaiyah coding in the classroom, aiming to observe the strategies used by the teacher, interaction patterns, and the level of children's engagement in learning activities. Semi-structured interviews were conducted with teachers, the principal, and parents to explore their understanding, attitudes, and experiences regarding the implementation of this learning model. The documentation collected included lesson plans (RPPH), learning media, children's work, and relevant developmental records. These techniques were selected in accordance with Habibullah et al., (2025), who state that combining multiple qualitative data collection techniques helps to build a comprehensive and deep understanding of the research object. The data collected were analyzed using thematic analysis, aiming to identify patterns, categories, and themes from interview transcripts, observation notes, and documents. The analysis involved repeated reading, open coding, organizing and reflecting on key themes, and constructing interpretative narratives from the meanings embedded in the data. This approach aligns with the thematic analysis method developed by Nurhaliza et al., (2025), which emphasizes the importance of iterative and reflective processes in understanding the interrelationships between data and the meanings constructed by participants. The entire analysis process was conducted inductively, meaning that theories were built from the data rather than imposing a predetermined theoretical framework from the outset.

To ensure data validity, this research adopted the four criteria of trustworthiness as proposed by Dinar et al., n.d.(2022), credibility, transferability, dependability, and confirmability. Credibility was maintained through source and method triangulation, as well as participant validation (member checking). Transferability was achieved by providing thick, contextual descriptions, enabling readers to assess the relevance of the findings in other similar contexts. Dependability was ensured by documenting the research process systematically and transparently, while confirmability was established by maintaining researcher objectivity through audit trails and reflective notes. These four principles were used to ensure that the findings truly reflect the reality in the field and are not merely the result of researcher bias or assumptions. Through this deep, reflective, and contextual approach, the study is expected to contribute to the development of early childhood literacy learning strategies that are not only relevant to technological developments but also grounded in Qur'anic values and local cultural wisdom, as exemplified in the practice of unplugged hijaiyah coding at PAUDQ Nur Fadlillah Tuban.

RESEARCH FINDINGS

1. Findings on the Unplugged Coding Hijaiyah Strategy at PAUDQ Nur Fadlillah Tuban

The unplugged coding hijaiyah learning strategy implemented at PAUDQ Nur Fadlillah Tuban has proven to be an innovative approach that not only emphasizes mastery of letter symbols but also focuses on meaningful understanding, logical pattern recognition, and the contextual integration of Qur'anic values. Based on direct observations in the Group B classroom, this approach was carried out through fun, interactive, and participatory play-based methods. Teachers facilitated the learning process in a warm and inclusive atmosphere, utilizing non-digital media such as directional arrows, letter cards, floor paths, and educational worksheets. One of the learning media used is illustrated in Picture 1 below:



Picture 1. Hijaiyah Coding Worksheet

The image above presents a concrete example of unplugged coding activities using Hijaiyah letters. Children are instructed to color each letter according to the sample colors at the top for instance, the letter Ḍād (ض) is to be colored green, Ṣād (ص) purple, and Syīn (ش) pink. While this task may appear simple, it actually reflects basic programming concepts such as pattern recognition, visual instruction, and logical sequencing. Children are required to match the letter forms and follow instructions in order a foundational step in computational thinking adapted to early childhood learning. The term Hijaiyah coding in this context refers to a series of non-digital activities designed to introduce the Hijaiyah letters through the core principles of computational thinking, such as creating step-by-step commands, identifying patterns, and understanding sequences. In practice, children do not only work on worksheets but also engage in physical movement by following directional arrows laid out on the floor, moving from one letter to another. As they take each step, they are encouraged to say the letter out loud and associate it with Islamic vocabulary previously introduced such as *Ba* for *Bismillah*, *Jim* for *Jannah*, or *Mim* for *Masjid*.

The use of this worksheet is part of a broader series of activities, such as the thematic learning session titled "The Adventure of Hijaiyah Letters in the Land of Light". In this role-playing game, children act as "explorers" helping the letters find their way home by arranging directions and guiding the letter journey. This activity not only fosters emotional and spiritual engagement but also stimulates children's motor and social development. They collaborate in arranging the arrows, discuss how to match the colors, and assist peers who are facing difficulties. Through this approach, children are not only learning the Hijaiyah letters visually, but also experiencing them in a tangible and emotional way. They interact with symbols, sounds, movements, colors, and storytelling making the letters come alive with meaning. Teachers also provide positive reinforcement, such as cheer claps, verbal praise, and star stickers to boost motivation and confidence. In summary, the use of media such as the worksheet in Picture 1 demonstrates that unplugged coding can be effectively implemented even without digital devices. With simple yet functional materials, the process of Hijaiyah literacy becomes an enjoyable and meaningful activity that aligns with the developmental characteristics of early childhood learners. This approach not only nurtures children's interest in Islamic literacy but also lays a foundation for systematic thinking, social skills, and spiritual identity from an early age.

2. Enhancing Early Childhood Literacy through Hijaiyah Coding-Based Activities

The documentation and records of children's development during the implementation of unplugged Hijaiyah coding learning show a significant improvement in the area of symbolic literacy among early childhood learners. The majority of children demonstrated increased ability in recognizing Hijaiyah letters, naming and pronouncing them, and even began to arrange the letters in sequence with greater independence compared to the pre-intervention phase. This coding-based activity not only helped children passively memorize letters, but also encouraged them to understand sequential structures, recognize patterns, and actively engage in the construction of Hijaiyah symbols through a fun and contextual approach.

Teachers utilized visual and kinesthetic media such as directional arrows, pathways, and letter cards to design the children's thinking flow. This process strengthened the connection between letter symbols and their meaning representations, while simultaneously stimulating children's cognitive and language abilities. Based on observations and interviews, some children even began to associate the letters they arranged with Islamic vocabulary they had previously heard from the teacher, such as linking the letter *ba* with *bismillah* or *mim* with *masjid*. This indicates that the literacy process involved is not merely about recognizing letter forms but also about building more contextual and meaningful associations. In addition to phonological and symbolic abilities, improvements were also observed in listening skills and the ability to follow instructions. Children began to show better concentration when the teacher explained the activity stages, and they were able to understand and apply step-by-step instructions in sequence. This is an important indicator in developing systematic and logical thinking, which forms part of the foundation for computational thinking from an early age. The teacher, identified as Ms. S, stated that the children became more responsive and motivated when the learning process was packaged as exploratory activities involving movement and play. She remarked:

"*With this method, the children grasp concepts more quickly. They enjoy it because it doesn't feel like learning it feels like an alphabet adventure game. Even children who are usually passive become more active because they are encouraged to move and think*"

This improvement was also supported by a learning environment that stimulates curiosity, along with delivery methods aligned with the typical learning styles of early childhood visual, kinesthetic, and interpersonal. Children were not merely introduced to letters by sitting still or rote memorization, but rather through meaningful physical and emotional interactions with the learning materials. In general, the unplugged Hijaiyah coding activities have made a tangible contribution to enhancing early childhood literacy both in terms of symbol recognition, comprehension of meaning, ability to follow instructions, and fostering a deeper emotional connection with Hijaiyah letters as part of their Islamic identity. This approach has proven to be an innovative and practical alternative for literacy learning rooted in Islamic values. It is not only relevant to the demands of technological advancement but also remains faithful to the pedagogical characteristics of early childhood education.

3. Integration of Qur'anic Values in Coding-Based Learning

The unplugged Hijaiyah coding learning at PAUDQ Nur Fadlillah Tuban not only emphasizes cognitive aspects such as symbol recognition and logical thinking, but also integrates Qur'anic values contextually into children's learning activities. Each Hijaiyah letter is introduced alongside Islamic meanings that are familiar in the children's daily lives. For instance, the teacher introduces "Alif for Allah," "Ba for Bismillah," or "Jim for Jannah," accompanied by Islamic songs, movements, and short moral-based stories. This approach is thematically packaged through an activity called "Qur'anic Coding Mission" a structured play session that combines logical reasoning, letter recognition, and spiritual values. Children follow a path of arrows that they construct themselves from one letter to the next, saying the name of each letter and associating it with Islamic vocabulary. For example, when arranging a sequence from *Alif – Ba – Ta*, the teacher shares a story explaining that these letters are found in words frequently recited in daily prayers or acts of worship.

The goal of this activity is not only to enhance memory and symbolic understanding, but also to foster emotional and spiritual attachment to the letters of the Qur'an. In practice, this activity is facilitated through unplugged Hijaiyah coding worksheets, which are designed to be simple yet functional. The worksheets consist of columns featuring Hijaiyah letters, associated Islamic words, and directional arrows that children must place to construct a logical sequence. For example:

Table 1. Unplugged Hijaiyah Coding Worksheet

Box	Letter	Islamic Word	Arrow
1	Alif	Allah	→
2	Ba	Bismillah	→
3	Ta	Takbir	↓
4	Jim	Jannah	→

Children are asked to move their bodies following the direction of the arrows while pronouncing the names of the Hijaiyah letters and their corresponding Islamic words. This activity stimulates not only phonological and motor skills, but also connects the letters to acts of worship. For example, when children say the letter *"Mim"*, they simultaneously perform the motion of taking wudhu (ablution), or when saying *"Ha"*, they imitate the gesture of making a prayer. In an interview, a teacher identified as Ms. L stated:

"*We don't just want children to memorize the Hijaiyah letters we want them to love them. If children associate the letters with Allah, with prayer, with good things, they will begin to see these letters as meaningful in their lives*."

The school principal, referred to as Ms. R, added that unplugged coding activities have become an effective medium for embodying Qur'anic values:

"*The children feel like they're playing, but in reality, they are laying the foundation of faith learning to know Allah through His letters, in a way that fits their developmental stage*."

This integration is also reflected in daily routines, such as singing the "Qur'anic Letters" song before starting lessons, or mentioning letters during worship activities. This process transforms Hijaiyah literacy into a part of the child's spiritual life, rather than merely an academic skill. Furthermore, this approach aligns with the philosophy of the early childhood education curriculum, which emphasizes "learning through play." Children learn through real-life and social experiences, rather than one-way instruction. Through this method, the learning process becomes active, joyful, and meaningful while remaining in harmony with the Islamic values that form the foundation of Qur'anic education.

4. Challenges and Strategic Solutions

Although the unplugged Hijaiyah coding approach has proven to be innovative and effective in enhancing early childhood literacy in an integrative manner, its implementation at PAUDQ Nur Fadlillah Tuban has not been without structural, technical, and cultural challenges. The primary challenge lies in the limited availability of teaching media that aligns with the unplugged coding concept. As a relatively new approach within Qur'anic-based early childhood education, there is still a scarcity of ready-to-use learning resources such as teaching kits, visual aids, or educational games that support logical thinking without digital devices.In addition, teachers' skills in designing and implementing coding-based activities have become a challenge of their own. Not all educators have a background or training in computational thinking methods or their application in early childhood settings especially when contextualized with Islamic content, such as Hijaiyah letters. This challenge is further reinforced by parents' limited understanding of the goals and benefits of this approach. Some parents still perceive play activities as mere time-fillers without significant academic value, resulting in a lack of support or reinforcement at home. In an interview, a teacher identified as Ms. T expressed:

"There are still parents who ask, 'Why is my child just playing with arrows in class?' When in fact, behind that, the child is learning logic and recognizing Hijaiyah letters in a fun and active way."

To address these issues, teachers at PAUDQ Nur Fadlillah have taken strategic and creative steps, demonstrating pedagogical commitment and innovation. One key initiative has been the creation of homemade learning media using simple, easily available materials such as colored paper, used cardboard, popsicle sticks, and raffia string. These materials are assembled into arrow pathways, Hijaiyah letter cards, and thematic role-play games integrated with Islamic values. Furthermore, the teachers have developed an internal module as a guide for implementing unplugged Hijaiyah coding activities. This module includes instructional steps, learning indicators, and documentation of classroom activities. Its purpose is to ensure the learning process is structured, well-documented, and replicable by other teachers in the future. To bridge the understanding gap between school and parents, the teachers actively conduct awareness sessions through parent meetings. In these forums, they explain the benefits of the unplugged coding strategy and present photo and video documentation of children's classroom activities. Through this approach, parents begin to realize that play is not an empty activity, but rather an integral part of the learning process that simultaneously nurtures children's cognitive, social, spiritual, and emotional development. The principal, identified as Ms. R, stated:

"We emphasize that literacy is not just about reading it's about shaping thinking and character. So, when children arrange arrows and read letters, they are actually learning many things at once."

The success of this strategy relies heavily on the synergy between teachers, the school, and parents. The creativity of teachers in designing materials and planning lessons, institutional support in providing space for innovation, and parental openness to embracing new educational approaches form three essential pillars for the sustainability of this program. By building intensive and collaborative communication, the existing challenges can be addressed gradually and even turned into opportunities to strengthen a more participatory and transformative educational ecosystem. Through these efforts, PAUDQ Nur Fadlillah has not only demonstrated an adaptive capacity to respond to contemporary challenges but also shown that a Qur'anic value-based early childhood education approach integrated with non-digital technological methods can be implemented meaningfully, even with limited resources. This approach reflects the spirit of progressive education, which focuses not only on academic outcomes but also on meaningful, inclusive, and life-relevant learning processes for children.

DISCUSSION

The first finding indicates that the *unplugged coding hijaiyah* strategy at PAUDQ Nur Fadlillah Tuban is implemented through enjoyable, movement-based play activities adapted to the developmental stages of early childhood. Children are invited to arrange letter paths using directional arrows, follow movement trails, and carry out step-by-step instructions resembling simple algorithms. This strategy targets not only letter recognition but also enhances children's cognitive abilities in sequencing, pattern recognition, and concentration development. This concept aligns with the view of Arvi et al., (2025), who assert that computational thinking is a 21st-century skill that should be taught from an early age, even without the use of digital devices. The *unplugged* approach allows children to grasp the fundamentals of programming through hands-on activities that are relevant to their natural ways of learning. Furthermore, the enhancement of children's symbolic literacy through *coding hijaiyah* activities shows that this method effectively integrates cognitive and affective processes simultaneously. Children are not merely memorizing letters, but also understanding sequences, recognizing sounds, and associating meaning through direct interaction. This is supported by Alam et al., (2025), who emphasize that early childhood literacy is a multisensory process involving symbols, real-life experiences, and social environments. In this context, children actively engage in literacy through a combination of visual (letters and arrows), auditory (songs and stories), and kinesthetic (movement following coding directions). Thus, this activity strengthens the principle of *learning*

through play, which is a core approach in early childhood education, as recommended by the Ministry of Education and Culture in the implementation of the *Merdeka Curriculum for Early Childhood Education*.

From the value integration perspective, the finding that *coding hijaiyah* is used as a medium to instill Qur'anic values reflects a relevant and contextual pedagogical innovation. Literacy is not only seen as technical reading ability but also as a vehicle for internalizing Islamic values. The strategy that connects hijaiyah letters with concepts of divinity and Islamic morality is consistent with the holistic Islamic education approach, as stated by Al-Attas in Firmansyah, (2019), that the aim of Islamic education is not only to develop the intellect but also to instill *adab* (ethics and good character). Through activities such as *"Qur'anic Coding Mission"*, children not only learn letters but also develop an awareness that these letters are part of the sacred revelation of Allah, thus fostering spirituality and Islamic identity from an early age. The challenges in implementing this strategy highlight the importance of teacher creativity and institutional support in delivering innovative learning. Limitations in learning materials, time constraints, and parental understanding are real obstacles, but not insurmountable.

Teachers, as front-line facilitators in the classroom, are able to independently design instructional media and develop simple activity guides to support learning. This approach reflects the socio-cultural learning theory by Vygotsky, which emphasizes that children develop through social interaction and support from their immediate environment, including teachers and families (Lestari et al., 2024). Parental involvement in understanding the goals of *unplugged coding* is a crucial element in creating an educational ecosystem that fosters mutual support between home and school. Overall, the *unplugged coding hijaiyah* strategy implemented at PAUDQ Nur Fadlillah Tuban demonstrates that digital literacy and Islamic values can be harmoniously integrated in early childhood education. This strategy not only addresses the challenges of education in the digital age but also offers a model of innovation that is relevant to local contexts and the nation's spiritual culture. With proper teacher training, the provision of adaptable learning media, and the enhancement of parental digital literacy, this learning model holds significant potential for replication in other Qur'an-based early childhood education institutions.

CONCLUSION

This study demonstrates that the implementation of the *unplugged coding hijaiyah* strategy at PAUDQ Nur Fadlillah Tuban serves as an innovative approach in holistically stimulating early childhood literacy. Through structured and enjoyable play-based activities, children are not only introduced to hijaiyah letters, but also trained in logical thinking, sequencing, and understanding simple instructionsall without the use of digital devices. This strategy has proven effective in enhancing symbolic literacy skills, concentration, and listening abilities, while simultaneously fostering contextual computational thinking. In addition to its cognitive impact, the strategy also successfully integrates Qur'anic values into the learning process by embedding Islamic meanings into each activity. As a result, *hijaiyah literacy* is not treated merely as a technical skill but as part of the child's spiritual development. The success of this strategy's implementation relies heavily on teacher creativity, supportive school environments, and parental involvement in understanding and supporting the learning process. Thus, *unplugged coding hijaiyah* not only serves as an alternative method for introducing hijaiyah letters, but also acts as an integrative bridge between digital literacy, character education, and Islamic values. This strategy holds significant potential to be further developed and adopted by other Qur'an-based early childhood education institutions as a literacy learning model that is adaptive, humanistic, and values-based.

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