AN IDEA FOR THE APPLICATION OF MODERN TECHNOLOGIES IN KINDERGARTEN

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Abstract: This article explores the possibilities of modern information and communication technologies for enriching the teaching in kindergarten, describing a specific pedagogical situation, implemented in the first group "Zaiko" at the kindergarten 'Dora Gabe' in Sandanski, Bulgaria. The aim is to demonstrate how an interactive board, a programmable Bee-Bot toy, an interactive floor and traditional materials can be embedded into a sequence of activities dedicated to farm animals and their children. The introduction reasons for the importance of technologies for children's cognitive and emotional development, outline current research on mobile learning, interactive whiteboards, tablets, digital storytelling and educational robotics. The materials and methods are described in details: all the devices used, worksheets, puzzle, paints and additional objects (toy chick, corn seeds) are mentioned, as well as the methodological techniques - conversation, didactic and mobile games, clarifying questions and encouragement. The course of the situation starts with a riddle about a hen, goes through an interactive presentation with maze and classification tasks, an individual worksheet, a mobile game with a song, a puzzle arrangement, an art technique 'printing' and ends with a coding game 'Tell about the animal' with Bee-Bot and interactive floor game. Observations showed high engagement of all children; they reacted spontaneously with the animal sounds, successfully solved the on-screen tasks and showed a strong desire to participate in both the puzzle and the programming of the robot bee. The discussion highlights that a multisensory approach facilitates the acquisition of new vocabulary and basic science concepts while developing fine motor skills and coordination through print and moving elements. It has been reported that the rotation of individual and group work allows each child to demonstrate knowledge and creative skills at their own pace, and the dynamic change of formats prevents attention loss. From a practical point of view, the teacher should allow sufficient time for the art materials to dry and plan transitions between technology and analogue activities so as not to interrupt the learning flow. It is recommended that future research include pre- and post-tests, longitudinal follow-up of effects, and more active digital engagement of parents through photo sharing or online portfolios. The conclusion highlights that technology alone does not guarantee better learning, but when implemented purposefully and combined with movement, play and art, it becomes a bridge to a richer, more holistic educational experience. The proposed practice demonstrates an achievable strategy for integrating STEAM elements into preschool while developing cognitive, social, and creative skills. The article reasons that such an ecosystem of complementary tools - screen, movement and creativity - creates equal opportunities for every child to actively participate, regardless of their initial interests or technological experience. In doing so, it lays the foundation for a sustainable model of a contemporary kindergarten in which digital tools are not just background decor, but an integral part of the process of meaningful learning and development.
Keywords: Early childhood education, Kindergarten, technology-enhanced learning, Interactive whiteboard, Bee-Bot coding, Multisensory activities

1. INTRODUCTION

Starting from the more inclusive context, some researchers highlight the fundamental role of information and communication technologies (ICTs) in the cognitive and experiential development of preschool children. ICT nowadays is recognized as a tool that can foster the knowledge and the experiences for this crucial age and the support of specific areas in kindergarten according to the educational perspective is thought significant (Drigas & Kokkalia, 2014). As a natural extension of this thesis, mobile learning is seen as a flexible means of enriching the experience of young learners. The use of mobile learning is recognized as a tool that can foster the knowledge and the experiences for this age and the support of specific areas according to the educational perspective (Kokkalia et al., 2016). ICT innovations in teaching can successfully support understanding of basic mathematics and science concepts. Teaching and learning through ICT as an innovative teaching method can be successful for understanding the concept of numbers and natural sciences phenomena at preschool level (Oluwadare, 2015).

Among the specific technologies applied in kindergarten, interactive whiteboards (IWBs) grab attention for their impact on learning and motivation. A review of the use of interactive whiteboards in early childhood classrooms shows that lessons using this technology promote student achievement as well as increase participation, encourage

cooperation, and create motivated learners. When examining closely what children are learning when using the IWB, a variety of positive findings are reported. Teachers express opinions that using IWBs enhances their teaching both kindergarten and pre-kindergarten teachers found that the children wanted turns at the board and seemed to be interested in activities that used the IWB (Goodreau, 2013).

In parallel, the use of tablets is associated with increased academic performance and higher engagement. The findings revealed that tablets significantly enhanced the targeted skills compared to conventional materials; tablets were also rated higher in enjoyment, engagement, and motivation (Fokides & Klaoudatou, 2025).

Beyond the presentation of information, digital storytelling creates a constructivist digital learning environment, where imagination, creativity, inspiration, motivation and the narrative component can offer many benefits to students (Catalano & Catalano, 2022).

In addition, coding toys are used to develop algorithmic thinking and problem-solving skills. One reason for using activities that involve a coding toy is that this approach makes it easy for children to understand that a solution can be changed simply by modifying one or more commands (Granone & Reikerås, 2023). A similar game logic is found in educational robotics. Educational robotics manage to combine learning through play, so education is easily transformed into a fun procedure, as it is widely known that learning is done easier, faster and more effectively when combined with play (Chaldi & Mantzanidou, 2021). The use of training robot supports the development of already mastered algorithmic thinking, the skills to solve specific tasks and problems, etc. (Topalska, 2021).

The positive effects of technology on the learning process are also reflected in the attitudes of teaching staff. The teachers showed a very positive attitude towards using technological tools (Konca et al., 2016). It was found that the teachers understood the advantage of technology incorporation in early childhood education and also have a positive mind-set about the use of ICT in teaching and learning in early years (Ogegbo & Aina, 2020). However, these same educators make less use of digital tools when it comes to working with parents. Teachers used digital technologies for their parental involvement practices less than they did for their own personal use or for other activities within the educational setting (Konca & Hakyemez-Paul, 2021).

2. MATERIALS AND METHODS

In this paper we present the pedagogical situation in the first age group ‘Zaiko’ (3-4 year old children) at the kindergarten ‘Dora Gabe’ in Sandanski, Bulgaria. The activities were planned and implemented by the teacher Maria Mihaylova, with the participation of an assistant teacher. The following resources are needed to conduct the situation:

Table № 1: Resources required

Category	Specific resource
Interactive devices	interactive board; interactive toy Bee Bot; interactive floor; laptop; TV
Didactic resources	presentation about farm animals (12 slides, exercises on slides 11 and 12); riddles; picture cards
Audio video	the song ‘Little Animals’ (YouTube: https://youtu.be/w3Vb2DfZoBk)
Working materials	worksheets; ‘Chicken’ puzzle; A4 cardboards; tempera paints; drawing brush; colored pencils; markers; glue
Additional	toy chick; corn kernels

Source: Authors

The following methods and pedagogical techniques were used: conversation, didactic games, didactic exercise, mobile game, clarifying and provoking questions, encouragement, instructions.

The following educational objectives are set: recognize and describe farm animals and their young, know the basic life needs of animals in close environment, understand the need for animal care, perceive and memorize the poem ‘Chicken, chicken’ by Vasil Stoyanov, uses the printing technique to recreate familiar images - a hen and a chicken, develops skills to create a model with the teacher's help, plays a song of the teacher's choice.

The course of the pedagogical situation:

1. Introducing with a riddle - children answer a riddle about the hen; followed by questions about its species, habitat, care, hatch and food.
2. Illustration with real objects - showing a toy chick and seeds of corn (Image №1).

Image №1

Source: Authors

3. Interactive presentation - slideshow of farm animals and their young through the interactive board; "find the mother's way to the young" (Image №2) and "circle only farm animals" (Image №3) children solve problems.

Image №2

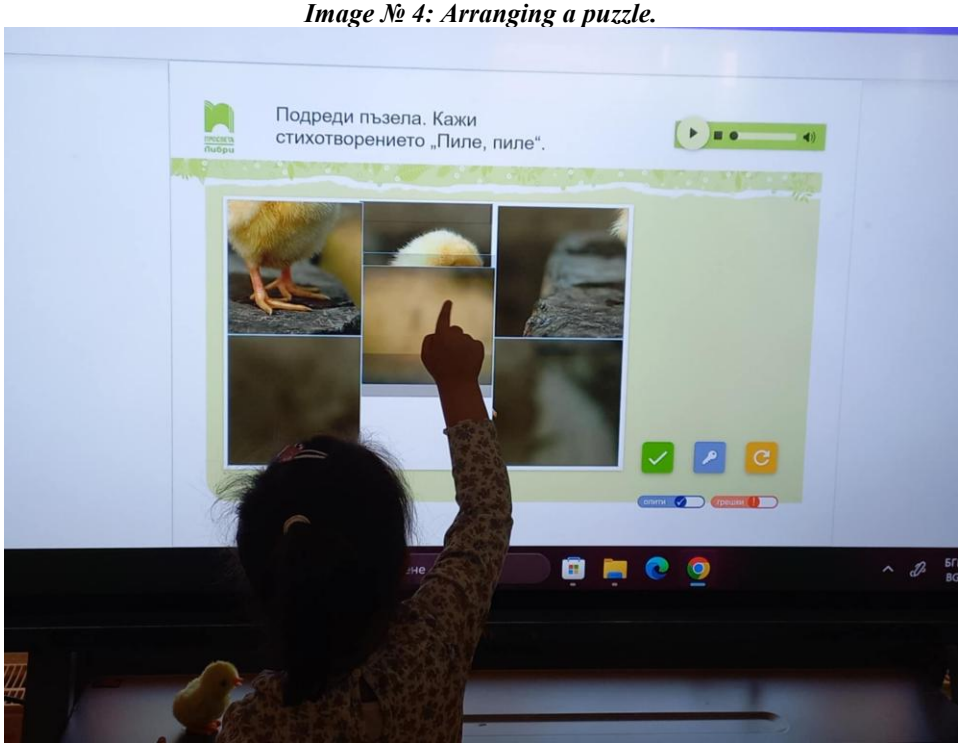
Source: Authors

Image №3

Source: Authors

4. Individual worksheet:
   Task 1: naming the young animals and matching them with their mothers;
   Task 2: colouring the heart to a preferred animal.
5. Moving game - performance of the song 'Little animals': children move rhythmically one after another and imitate animal movements.
6. Puzzle 'Chicken' - Image № 4.

Image № 4: Arranging a puzzle.



Source: Authors

7. Art activity - presswork silhouettes of a hen and a chicken with hand and finger on cardboard; drawing with felt-tip pens is postponed until the next day due to paint not drying.
8. Game ‘Tell about the animal’ (application of programmable interactive toy Bee-Bot) - the teacher programs the bee; a selected child points to an animal to which the Bee-Bot moves; after reaching, the child describes the animal (name, number, food, sound, home, etc.) with guiding questions from the teacher (Image № 5).

Image № 5. Working with a programmable device

Source: Authors

9. Finishing the situation with a game on the interactive floor dedicated to object detection. Children are given the task to find the object (one or more) - animal, plant, etc. and step on it.

Image № 6. Game using an interactive floor

Source: Authors

3. DISCUSSION

The results of the observed educational situation confirm that a carefully selected combination of digital resources and traditional materials can enrich the learning process in the first age group. The high engagement of children during all stages - from the interactive presentation to the Bee-Bot game - shows that even 3-4 year olds successfully grasp basic knowledge when information is presented in a multisensory and playful way.

Pedagogically, the interactive board facilitated the visualization of concepts about farm animals and their young, and the Bee-Bot programmable toy encouraged initial algorithmic thinking and speech. Combining motor activity (mobile play) with cognitive tasks (maze, classification, puzzle) created a dynamic yet structured environment in which each child found opportunities to engage.

Of interest is the smooth rotation of individual and group activities. The worksheet provided an opportunity to demonstrate knowledge independently, while the puzzle and song highlighted the power of collaboration. In this way, different learning styles were addressed and both cognitive and social-emotional skills were supported.

The observed enthusiasm for the artistic technique of "presswork" suggests that mixing analogue and digital formats sustains attention and develops fine motor skills. However, the delay in drawing due to paint not drying is a reminder of the need for the teacher to plan sufficient drying time or provide alternative materials (e.g. kraft stamps) so as not to interrupt the creative line.

4. CONCLUSION

The present study showed that a single but well-structured pedagogical situation, based on the principles of playful learning and multisensory engagement, can tangibly support the cognitive, social and emotional development of children in the 3-4 years age range. Combining interactive devices (chalkboard, Bee-Bot, interactive floor) with traditional materials (puzzle, paints, worksheets) created an environment where each child had the opportunity to explore, create and move without losing focus on the main cognitive goal - building conceptions of farm animals and their young.

Technology alone doesn't guarantee better learning, but when implemented purposefully, with a change of pace between screen, movement, and creative activity, it becomes a bridge to richer, more holistic childhood experiences. The pedagogical situation presented shows a way forward: from the interactive whiteboard that visualizes concepts, to the Bee-Bot that introduces logical sequencing, to the paint-prints that leave a lasting 'sensory imprint' on learning. The next step is to make this practice a sustainable culture of the learning environment - so that every child, regardless of their starting skills and interests, has equal access to motivation, creativity and knowledge.

Recommendations for future research: Longitudinal studies to track knowledge and skill accumulation in systematic ICT use; Comparative studies between low and high technology integration groups; Measurement of cognitive, socio-emotional and motor indicators using validated instruments (e.g. observational scales of engagement and motivation).

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