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## Effective Astonishment. Triggers Thinking: a Strategy for Learning to Read by Astonishment

Skuteczne zdziwienie. Wyzwalamy myślenie – strategia nauki czytania przez zdziwienie

### KEYWORDS

implementation project, learning to read and write, learning strategies, learning through discovery, effective wonder

### ABSTRACT

In this article, I discuss the results of qualitative research of an implementation nature. The implementation of the educational project Effective Surprise. Challenging thinking learning to read began in the 2018/2019 school year in a metropolitan environment. Research on children's learning skills in the process of identifying sound and graphic images, as well as reading and writing, was conducted in a group of five hundred 5–6-year-old children after the one-year implementation cycle was completed (in the 2021/2022 school year). I derive the key research category from Jerome Bruner's learning by discovery. In my research, I adopted a didactic intervention model. I acted as a participant observer, while the research material came from participant observation. I focused my observation around the intervention activities designed in the innovative model of initial literacy instruction. I observed both the students' activities and the effects of those activities. The findings revealed three categories of children's learning: (1) by speaking (observing and experiencing linguistic behavior, elaboration – giving meaning to memories, generation – creating lasting memories, learning by questioning – formulating questions that are important from the child's perspective, listening and exchanging ideas and opinions); (2) perceptual learning (using body intelligence, making analogies); and (3) learning by doing (creating model examples, contrasting cases. Capturing key information, producing, building interest and practical knowledge, visualizing, inventing the structure of complex information, imaginative play, developing cognitive control).

## SŁOWA KLUCZE ABSTRAKT

projekt  
wdrożeńowy, nauka  
czytania i pisania,  
strategie uczenia  
się, uczenie się  
przez odkrywanie,  
skuteczne  
zdziwienie

W artykule omawiam wyniki jakościowych badań o charakterze wdrożeńowym. Wdrożenie projektu edukacyjnego „Skuteczne zdziwienie. Wyzwalająca myślenie nauka czytania” rozpoczęło się w roku szkolnym 2018/2019 w środowisku wielkomiejskim. Badania dotyczące dziecięcych umiejętności uczenia się w procesie identyfikowania obrazów dźwiękowych i graficznych oraz czytania i pisania zostały przeprowadzone w grupie pięciuset dzieci 5–6-letnich po skończonym rocznym cyklu wdrożeńowym (w roku szkolnym 2021/2022). Kluczową kategorię badawczą wyprowadzam z uczenia się przez odkrywanie Jerome’a Brunera. W badaniach przyjąłem model dydaktycznego działania interwencyjnego. Występowałem w roli obserwatora jako uczestnika, zaś materiał badawczy pochodził z obserwacji uczestniczącej. Obserwację skoncentrowałem wokół działań interwencyjnych zaprojektowanych w innowacyjnym modelu początkowej nauki czytania i pisania. Obserwacją objęłem zarówno czynności uczniów, jak i skutki tych czynności. Wyniki badań ujawniły trzy kategorie dziecięcego uczenia się: (1) uczenie się przez mówienie (obserwacja i doświadczanie zachowań językowych, elaboracja – nadawanie znaczenia wspomnieniom, generowanie – tworzenie trwałych wspomnień, uczenie się przez pytanie – formułowanie pytań ważnych z perspektywy dziecka, słuchanie oraz wymiana pomysłów i opinii); (2) uczenie się o charakterze percepcyjnym (wykorzystanie inteligencji ciała, tworzenie analogii, kategoryzowanie – dostrzeganie podobieństw, wskazywanie różnic); oraz (3) uczenie się przez działanie (tworzenie modelowych przykładów, budowanie zainteresowania i wiedzy praktycznej, wizualizacja, zabawa wyobrażeniowa).

## Education through language

I am aware that mental, inner, deep, real changes do not happen en masse or automatically, and I know they are not easy or pleasant acts. They require working on oneself. The research on institutions highlights two areas blocking changes: first, kindergartens/schools do not change because of the barriers to change that lie within themselves. We are unable to “think” a different institution. Second, thinking from the perspective of so-called ‘pop didactics’ about children as learners, kindergarten/school and the learning process is pervasive (Klus-Stańska, 2010, p. 82). With the rejection of behaviourist theories, language acquisition is no longer understood as a mimetic activity, which is not to say that the new position has caused a change in the methodology attached to the schema. Learning to read is still treated as a typically Polish-language activity, focused on the knowledge of language (sounds, letters, lexemes, texts). In the course of learning to read and write, children are primarily activated

cognitively. Children's emotions, social relationships and expression are not taken into account in the learning process. By memorising the sound image of a voice and the graphic image of a letter, children reproduce the shape of the letter and memorise the arrangement of articulators during the sounding of selected groups of sounds. Children's actions are accompanied by the teacher's constant control and immediate reaction to mistakes.

The contemporary view of children's speech and thinking has brought about a cardinal change in the concept of language education: the communicative model of teaching has replaced the transmission and delivery of knowledge (Filipiak, 1996, 2002, 2008; Gołębnik, 1996; Gołębnik and Teusz, 1999; Kłakówna, 2003). On the assumption that language is an innate competence, didactics focuses on stimulating the child's linguistic activity undertaken together with others, on developing the need to speak, and on shaping the awareness of how to use language to get to know oneself, others and the world, to express one's own thoughts and to communicate effectively (Kłakówna et al., 2011, p. 59). Language ceases to be an isolated object of learning and becomes an instrument of thinking and a means of communication in specific learning situations that introduce contexts that are important to the child and take into account students' personal knowledge (Kłakówna, 2014). Linguistic activity, by influencing cognitive processes, becomes an essential component of personal development that does not close with the end of formal education. And being aware of one's language, conceived as the result of the intertwining of individual experiences in the creation of meanings, cultural conventions and linguistic practices provided by natural, unforced interactions, is the basis for its responsible and creative use, which largely determines development throughout an individual's life (Kłakówna, 2016).

The author's concept of initial literacy learning: *Effective Surprise. Thought-developing Learning to Read* (Wiśniewska-Kin, 2020), which is dedicated to preschool children, was based on such re-orientation. The body of required knowledge related to the world of sounds and graphic images becomes present in the child's mind as if by accident, inadvertently, while reflecting on the narrative derived from the text and the visual narrative: it is born from effective surprise (Bruner, 1971). From such surprise and wonder, the process of cognition begins. Jerome S. Bruner's term refers to a certain act or state that arises as a result of the will, combined with the effort of the intellect and the work of the imagination. The act of making a discovery involves rearranging or transforming data in a way that allows one to go beyond the data so regrouped and to gain further, new insight into the problem: "Aha, so that's it!"; "Now I understand what I am actually doing". The essential feature of discovery learning is that the child, in an active learning process, organises the material to be learned into its final form. Bruner (1966, 1971, 1978, 2006) emphasises that discovery learning helps the child to take responsibility for his or her own learning, develops more

complex thinking, allows the child to focus on intrinsic rather than extrinsic motivation, and helps the child to remember (and process) important information (Filipiak, 2011, p. 85). Moreover, “the more the child is able to treat learning as discovering something rather than learning about something, the stronger will be the tendency to learn on the basis of autonomous self-reward, and even better on the basis of the reward of discovery itself” (Bruner, 1978, p. 670).

The suggested strategy for literacy starts from the natural human need to speak and communicate; it perceives language as a universal tool that develops through the educational process (it is not so much the reading process that is important, but rather the child in the process). Leaving the knowledge of the language system (*langue*) for further stages of education, it focuses on the executive and pragmatic aspect (*parole*):

- it fosters the development and respects the subjectivity of preschool learners,
- serves to arouse, maintain and develop children’s natural cognitive needs, in particular the curiosity of the world (by respecting children’s learning interests, sensitivity, emotions and cognitive abilities),
- it supports children in gaining a better understanding of themselves, the world and their place in this world (children learn through speaking, acting and sensory experience),
- it addresses language issues from the perspective of children’s personal knowledge and experience,
- it respects the principles of graded difficulty, learning as a process and continuity of learning,
- it develops the child’s independence and creativity through the individual construction of sound images of the voice and graphic images of the letter,
- it maintains a comprehensible connection with the surrounding reality and the practice of everyday life (the optimum reading technique is not only reflected in reading fluency, but above all in reading comprehension).

Reading ceases to be considered solely as a technical skill, and it becomes a space of deep experience. In the traditional methodological procedure, root words are subjected to so-called “technical processing” which boils down to decomposition into syllables, possibly logatomes, morphemes, phonemes. The teacher checks the children’s skills in syllable or voice synthesis and analysis. The word loses its meaning and becomes a cluster of sounds.

## Research tools

The reflection on the suggested solution gave rise to actions aimed at implementing the project and undertaking interpretative research into teaching phenomena

(Klus-Stańska, 2010, pp. 128–138). Being an interpretatively engaged observer-as-participant in the intentional creation of didactic conditions in order to observe children's learning skills in the process of learning to read and write in situations unforeseen and non-suggested by the institution, I analysed children's creations, I watched the children and I talked to them.

The main aim of my research was to analyse children's learning skills in the process of identifying auditory and visual images of selected groups of sounds and letters during literacy learning.

In the analysis of children's learning strategies, a fundamental difficulty is the selection of linguistic material that can trigger children's learning strategies. I considered that this would be best served by cultural tools specifically constructed for this purpose:

- artistic picture book: "I Turn into Hearing, or Stories Painted with Sound", with two levels of communication: visual (iconic signs) and verbal (conventional signs) – instead of a textbook,
- boards with dynamic illustrations provoking pupils to fill in the gaps and see incomplete figures as complete – instead of still and static, perceptually unnatural matchbox-sized textbook illustrations,
- construction blocks with prototypical letter elements, naturally contributing to the formation of a memory trace of the letter – instead of exercises with lines (repeatedly rewriting something allows only a temporary retention of the rewritten content in memory),
- board games: "Dźwiękoznaki – Literaki" ["Soundcharacters – Letterchats"] triggering genuine curiosity about reading and writing – instead of exercise books with inscribed reproductive activity which often results in getting bored with reading and writing.

I conducted the research in a place that provides natural learning conditions for children. I surveyed 5–6-year-olds from ten kindergartens in Łódź implementing a new literacy strategy. The size of the selected groups was comparable (about 25 children in each group, a total of half a thousand children).

## Attempts to verbalise and visualise sound and graphic images, i. e. the research results

The planned and organised work in the critical events formula (Tripp, 1996) made it possible to bring the problems of the specific formation of sound images of voices and visual images of speech consolidation signs into the children's consciousness, while the cultural tools opened up a world of learning through discovery.

The material collected, confronted with the observation of commonly used educational procedures, allowed me to draw conclusions for educational practice. The findings revealed three categories of children's learning: (1) learning by speaking (observing and experiencing linguistic behaviour; elaboration – giving meaning to memories; generation – creating lasting memories; learning by questioning – formulating questions that are important from the child's perspective; listening and exchanging ideas and opinions); (2) perceptual learning (using body intelligence, making analogies, categorising – seeing similarities, pointing out differences); and (3) learning by doing (creating model examples, building interest and practical knowledge, visualising, imaginative play) (Dehaene, 2021; Dumont et al., 2013; Schwartz et al., 2017).

## Learning by speaking

### Observing and experiencing linguistic behaviour

In designed critical events, we start the child's reflection with a sound, and not with a letter. We do not impose sounds. We adopt two criteria for activating sounds in the child's consciousness: the meaning of the sound and its articulation (due to the place and manner of articulation of the sound). We refer to psycholinguistic studies according to which already five-month-old infants have a primitive ability to read simple vowels from lips: they open their mouth wide when they hear the /aaa/ sound, and when they hear the /iii/ sound they stretch their lips as if they were smiling (Gopnik et al., 2004, p. 83). Preschool children resonate with the linguistic behaviours of the teacher. However, they only map these behaviours into patterns that are intelligible to their own bodies and feelings, which they have previously experienced (hence they are the first to recognise onomatopoeias, which, in time, acquire the characteristics of a sound). At the same time, they do not just look at these behaviours; they experience them (they imitate the system of articulators reinforced by gestures that signal the place and manner of articulation of the sound).

### Elaboration – giving meaning to memories

Repeating or rewriting something over and over again only allows the repeated/rewritten content to be temporarily retained in memory, whereas linking new information to what is already known leads to the formation of a lasting memory. By giving meanings to memories, children activate other memories and then retrieve them, creating access pathways to stored information. In the case of activating sound images, we start with free recall, so that the child can decide for himself what to recall (we activate the spatial memory of the situation triggering the association with the sound, the

spatial memory of visual images of letters built with three-dimensional blocks). Over time, we activate targeted recall, which will trigger the child's associations not only around the onomatopoeia, but also the sound and the ways in which it is articulated.

### Generating – creating lasting memories

Generating is a technique for extracting content from memory: remembering one thing makes it easier for children to remember the next thing. The acquisition of a memory reinforces the effect of spaced repetition. Gradual memorisation makes memories more durable. A stronger memory trace is harder to erase.

A sequence of twenty-two critical events around real-life situations, reinforced by evocative visualisation-pictures, triggers associations around all of the sounds and letters learned so far. In a picture book, a strong external cue to guide recall is the visualisation of a gesture (increases the strength of recall). Gesture representations of sound images are equally important. Simply by showing children a gesture (a partial reinforcement cue), the imagery of the sound image and the graphic image of the letter is activated in their consciousness. Moreover, the reinforcement of the memory trace is achieved through cumulative repetition: remembering earlier gestures resonates with remembering new gestures [gesture (situation) remembered + gesture (situation) activated].

### Learning by asking – formulating questions that are important from the child's perspective

Learning by asking questions creates a context of continuous inquiry instead of one-off answers. It stimulates curiosity, intention, attention and well-connected memories. Learning by questioning appeals to very basic mechanisms that support learning: (a) the mechanism of curiosity (curiosity activates the brain's reward and memory systems; children want to know the answer to the questions posed; they react spontaneously to information about a new sound and letter; they express this in an enthusiastic cry: "I love you!"); (b) the mechanism of answering complex questions: these encourage the reaching for important problem-solving skills. Children learn to recognise what they already know and what they do not yet know. Figurative visualisations and picture book texts lead to a "child's need to know". They seek answers to "real life" questions: Which people appear on the board? What does the boy think and dream about? What sensations accompany him? What solutions do family members formulate? How does he react to their suggestions? Do you have any ideas to solve the boy's problem? How do you think it may be easily solved?

## Listening and exchanging ideas and opinions

By listening and exchanging ideas and opinions, children try to create a shared understanding. Listening and exchange are at the heart of shared learning which is also beneficial in terms of the motivation and understanding of auditory and visual images from which children will, in time, reconstruct a sound and a letter. Observations of children's conversations show that children do not "tell" themselves what they see on the board, nor do they ask questions of other children to test their knowledge, as teachers do. They join in the conversation and jointly work out their interpretation of the visualisation/text; they cooperate with each other, but they often also disagree with each other; they ridicule proposals that do not fit into their cognitive schema, and they often instigate with questions, probing the teacher's reactions. They share thinking: one child picks up a thread, another develops or transforms it, another finds evidence to support a line of thought or refute a position, and yet another tries to summarise the thought. When extracting sound from a visualisation, we don't give the children precise instructions; we tell them to look for evidence of the sound we are going to use, and the children talk about the visualisation in the way they want to. They activate strategies for extracting the sound from memory: through gesture, situation, image, and text.

## Perceptive learning

### Using body intelligence

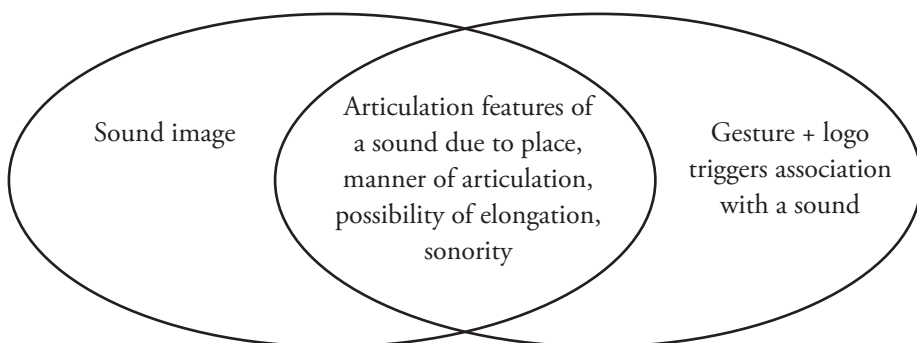
At the beginning of literacy learning, children do not have perceptions of arbitrary signs to consolidate speech; they do not translate the sound image into a graphic image of a letter in their imagination. Children's perceptual experiences create a sense of a sound and letter in their consciousness. Children learn to think of sound and graphic signs in terms of the properties of the real world (they associate sounds with real-life situations: attending a match, a birthday party, a trip out of town). Children do not just look at graphic signs or listen to sounds; they embody them. Embodied cognition helps children to recognise the world through touch; children make sense of abstract concepts through perceptual-motor activity. By constructing a letter on their own from blocks in 3D space, they get feedback on the task, which helps them see discrepancies between what they have done and what they should do, and this allows them to adjust future actions. Creating model examples reduces children's cognitive load.



## Creation of analogies

Children find parallels between the sound image of a vowel and the “triggered” perceptual-motor system (in the form of gestures) and associations around the “sound-signs” that trigger the sound image.

Chart 1. Formulating an analogy between the sound and the gesture



The children substituted the sound for gesture (*retrieval of soundcues*), which provided them with a gradual increase in connective bonds: sound image – gesture representation. Inter-sensory integration enabled children to link auditory representations with visual representations. At the sight of a gesture, children trigger the meanings they associate with the sound. By finding analogies, children begin to understand the essence of articulation and they articulate the sound correctly.

## Categorising – seeing similarities, pointing out differences

Learning what something is also requires learning what that something is not. This is why children's attempts to categorise visual images of letters are extremely important. Children experience that they can assemble different letters from the same blocks; they point out their similarities and notice their differences, they have the opportunity to rebuild the letter, to turn it upside down, to look at the letter upside down. The prototype elements of the blocks make it possible for children to find the differences. Written letters make it difficult for them to find contrasts (through the accumulation of letter details). There are so many differences that it is very difficult to figure out which ones are important. The smaller the contrast, the more likely children are to see the desired dimension of differentiation.

## Learning by doing

### Producing. Building interest and practical knowledge

At the core of making is motivation, which naturally triggers a readiness to learn. It is a natural human need to produce and create oneself in the world, whether through ideas or products. Children find the greatest satisfaction in seeing the fruits of their own labour. Children are interested in the letter models they construct with blocks and in the illustrations they make in an artistic picture book. Over time, children broaden their circle of interest: they begin the adventure with the involvement and practical successes that accompany the production of letters and sounds materialised in the form of gestures and visualised images, and end up with an interest in reading and writing.

### Visualisation

Visualisation reduces the burden of holding too much information in the mind at once. By drawing sounds, children create pathways to stored information. They visually search for information instead of searching through their own memory. They decide on their own which meaning variant of onomatopoeia they will visualise. When children draw their ideas, they can begin to see connections and links between sound images that they did not see before. By looking at different artworks, children have the opportunity to interpret them, making meanings around the shapes, sizes, colours, and textures chosen in the work. Deliberate effort geared towards reinterpreting spatial representation can help children reorganise what they see. In the process of creating visualisations, children independently build a mental (imaginative) model of the sound image of a voice, activating memory pathways that become permanently embedded in memory structures.

### Imaginative play

Play is motivating and the ability to turn activities into play increases engagement. The learning process is also useful outside the play context. And besides, play is simply a source of enjoyment and can perfectly support activities that we know support maturation and learning. Instead of asking children questions checking their knowledge of sounds and letters, we suggest playing board games with unusual visual material (Kisiel, 2020). They arouse emotionality and valuing, open players up to humorous interpretations, encourage conversation about the representational layer and non-literal meanings, activate associations about visualised gestures that materialise sound (Demonstrative Alphabet), develop visual and auditory memory (Eagle Eye game with gestures/letters, Letter-Sound Memory, Circle Diagrams).

The initiated reflection has become the source of cognition and change; a tool for constructing action-oriented knowledge (Červinková and Gołębiak, 2010). Depending on how a child is introduced into the world of reading, writing and speaking, he or she will give them different meanings. This is because the role of first experiences in interpreting experienced situations is immense and the initial “interpretative record” derived from them is often imprinted permanently into people’s minds.

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