Abstract
The article presents the results of research carried out in the 2016/2017 school year in selected primary schools in an urban environment (Łódź). The aim of the study was to diagnose the ways of understanding the abstract concept of the horizon, in groups of 8- to 9-year-olds and 9- to 10-year-old children. The research was carried out in a venue that provided a natural learning environment (in two second grade classes and two third grade classes). The research adopted the strategy of didactic intervention. The researcher acted as an observer and a participant, and the research material came from participatory observation. The observation covered both the activities of pupils as well as the effects of these activities. The research material obtained in the course of conversations with children and their artistic activity was analyzed. The research results reconstructed the children’s process of understanding the concept of the horizon and revealed possibilities of enriching educational discourse.

Keywords: didactic intervention, participatory observation, understanding of the concept, ways of categorizing the concept
Introduction – theoretical background for selecting the subject, terminology findings

Cognitivism introduced a real breakthrough in theories on the development of children's intellectual skills. Under the influence of cognitivism, there was a profound change in deliberations on cognitive processes and the nature of knowledge (Kövecses, 2006). Cognitivists have proved that difficulties in recognizing and understanding the meanings of abstract concepts are related to the order in which children acquire knowledge about different realms of reality, thereby laying the foundations for a completely different understanding of children's intellectual possibilities – above all, their innate, natural inclinations to think in an abstract way (Gopnik, Meltzoff, Kuhl, 1999). While admitting the important role of culture, with its symbolic systems, they found that teaching children to understand and interpret abstract concepts is possible, provided they can refer to their experiences from everyday life. In addition, through the naming of different phenomena, the child discovers and experiences the world in which they live – not only the physical one that surrounds, but most importantly, the intangible, spiritual one that is created in their mind (Driver, 1985). The status of language has also changed. Language is no longer perceived as an objective structure with a system of grammatical rules with built-in mechanisms to use, enabling the creation of understandable statements (Langacker, 1991). It is assumed that the structure of language is determined by patterns of neuronal activation that are part of the overall activity of the brain and body (Green et al., 1996). What is more, cognitive processes are largely individual. Meanings, however, consist of conceptual content, expressing specific aspects of the world around us indirectly; they are in thought processes or in the general ways of perceiving the world. They are filtered through personal, unique perception and recognition of what the individual in question is immersed in (Langacker, 1991).

The fundamental change introduced in the theory of cognitive processes by cognitivism resulted in a new concept of education, the essence of which is the creation of subjective ways of describing reality, discovering, interpreting and agreeing on meaning, developing inquisitive, scientific attitudes and cognitive independence (Cameron 2003, E. Bratland, D. Siemieniecka, B. Siemieniecki, 2016). In our research, the basic assumptions of cognitive research were applied. In the description of the empirical material, selected categories of cognitive abilities were included (categorizing certain structures, categorizing and describing a given situation on different levels of abstraction, schematisation) (R.W. Langacker, 1991).
Participants

During the research, both the sample and the research scope were deliberately selected. The study included children aged 8–9 (40 second grade pupils, comprising 22 girls and 18 boys) and 9–10 (42 third grade pupils, comprising 19 girls and 23 boys). The research was conducted in the 2016/2017 school year in selected primary schools, in the urban environment (Łódź). It was not limited to a narrow, selected group of pupils, but rather a representative group, representing different attitudes, views and experiences.

Research Methodology

In the attempt to reconstruct children’s understanding, a qualitative research strategy was applied (Denzin, Lincoln, 2005). Our research strategy stems from the action-perception paradigm (Reason, Bradbury, 2008). This multi-directional, open model of analysis created the possibility to prepare an environment that triggers the intellectual capabilities of children as part of didactic intervention. It was essentially the “intentional creation of didactic conditions that cannot be found in school education, in order to observe the processes of learning in situations unforeseen and unproven by institutions” (Klus-Stańska, 2010: 132).

Procedure for Data Collection

As part of the research, the basic types of procedures for collecting qualitative data were applied: participatory observation, interview (direct, personal, focused), documents – children’s creations, conceptual maps and audiovisual materials.

This study required the researcher to act as an interpretative participant-observer (Angrosino, 2007). The children’s activities and the effects of these activities were observed. We juxtaposed the findings with the extensive statements of the pupils and characteristic examples of situations revealing the children’s processes in conceptualizing selected abstract concepts.

1. The most important element of the research was to organize a varied educational environment. The stimulation of the children’s thinking processes began with associations connected to the concept of *horizon*.

2. Following this, literary texts and illustrations from book covers were used. The children talked about the various dimensions of the universe described
3. Further exploration of the children's experiences involved focus interviews. These focused interviews sparked interaction and increased group dynamics, having a positive impact on the number of ideas generated. It also inspired the children to remind each other of the different situations they had participated in. In such a friendly atmosphere, the children made spontaneous statements, initiated by selected questions: What is the horizon? Is the horizon relevant to people? Can the horizon relate to something or someone else? What are horizons? What are horizons for children? What are horizons for adults? What are the differences between horizons? What is the horizon similar to? What are horizons for? Where do horizons come from? Does anyone designate horizons? Are horizons changing? Is the horizon similar to a border? How similar is the horizon to a border? How different is it? What does the horizon connect and what does it separate? What does the horizon close and what does it open? Is it possible to broaden horizons? What is beyond the horizon? What else can there be? What is more important: what is in front of or behind the horizon? The material obtained from the children's conversations about their graphic representations of both their own output and the covers of the books with the title of horizon were equally important. The children shared their thoughts on the appropriateness of the selected illustrations for the book titles.

The literary texts as well as conversations with the children inspired by visual materials (illustrations and book covers), addressed existential issues, while the method of intersemiotic translation (artistic concretisations), the association mindmap and focus interview stimulated motivation.

**Object of research**

Understanding of the abstract concept of horizon by 8- to 10-year-old children was the subject of the research. The aim of the research was recognizing the ways in which children construct meanings of the concept of horizon and their cognitive abilities in terms of categorizing that came to light when defining the concept of horizon. The set objectives became the basis for the general research problem: How do children understand the meaning of the horizon concept? and four
specific problems: (a) Which attributes of the concept of horizon are considered to be important? (b) How do children categorize the concept? (c) To what extent do they have stereotypical associations? (d) What values do they attribute to the concept of horizon?

**Analysis of data**

When analyzing the data from, the method of explicating semantic features was used, based on the definitions formulated by the children. The dictionary definition (from the Dictionary of the Polish Language) served to verify the meanings suggested by the children. Comparison between the dictionary definitions and the children's descriptions of the subject reveals differences between semantic features significant from the point of view of adult language users and the features considered important for the children. The dictionary definition does not fully describe the meaning of the term, with only limited definitional features. The definitions the children gave contain a more complete picture of the subject, because they convey and reinforce individual ideas associated with the subject.

**Results**

Analysis of the semantic paraphrases used when describing the meaning of the horizon is indicative of the children's ability to distinguish the first dictionary meaning: (1) ‘the line at which the earth's surface and the sky appear to meet: the horizon (the sun was hidden behind the horizon, the sun appeared above the horizon), the apparent approach’.

In the children's statements, attempts to interpret the third dictionary meaning rarely occurred: (3) ‘range (knowledge, interests, ideas) broad, narrow, horizons of interest’; and the fourth dictionary meaning: (4) ‘opportunities, perspectives (horizons of new life, new, amazing, horizons arise)’. In the children’s statements the second dictionary meaning was not mentioned: (2) ‘environment, surroundings (on the artistic horizon …)’; and the fifth dictionary meaning: (5) ‘curtain, wall forming the back of the stage, evoking the illusion of infinity (theatrical meaning)’. Examples of the children’s statements are presented in Table 1 (the most frequent ones).
Table 1. Examples of the children’s responses to the dictionary definition: (1) the line at which the earth’s surface and the sky appear to meet

<table>
<thead>
<tr>
<th>Age</th>
<th>Male or Female</th>
<th>Ways of categorising</th>
<th>Spatiality</th>
<th>Observer</th>
<th>Action</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0</td>
<td>female</td>
<td>something you can see.</td>
<td>so far away that it curves</td>
<td>Child</td>
<td>runs away</td>
<td>Just know</td>
</tr>
<tr>
<td>10.0</td>
<td>male</td>
<td>line</td>
<td>away</td>
<td>Child</td>
<td>moves/disappears</td>
<td>Don’t know, teacher</td>
</tr>
<tr>
<td>9.0</td>
<td>female</td>
<td>border/island</td>
<td>at the top/at the bottom</td>
<td>captain/pirate</td>
<td>approaches</td>
<td>My house</td>
</tr>
<tr>
<td>9.0</td>
<td>male</td>
<td>sunset</td>
<td>behind the water/behind the island</td>
<td>Traveller</td>
<td>plays tag/disappears</td>
<td>Mum</td>
</tr>
</tbody>
</table>

(1) the line at which the earth’s surface and the sky appear to meet

When defining the first dictionary meaning – the one most often represented in the statements – the pupils synonymously capture the concepts of horizon and skyline, which may result from the overlap of the horizon line with the skyline (in fact, the skyline includes a fragment of the Earth’s surface, the horizon refers to the space above the surface of the Earth). Features of the concept (differently defined by the dictionary and the children) show the diversity of the descriptions. The facets typical of a scientific approach are as follows: type, origin, features, functions, and of the colloquial approach: looking for relationships with humans, indicating the time-space perspective and the behaviours of the “humanized horizon”.

The child’s ways of categorising

Instead of categorizing words such as ‘line, scope, range, possibilities’, the majority of the children described the concept by using the following phrases: ‘something like …’; “It is when someone …”. The children’s phrases indicate that they feel the need to categorize when defining concepts. The phrase “this is something that …” is a categorization by indication. With the pronoun this and the indefinite pronoun something, the children seem to replace the category name that they do not know and cannot explain. The associations mindmap revealed the children’s categorization on the basis of family resemblance. Around this core meaning (the horizon as an apparent contact of the sky with water), other meanings/expansions which the children included on the basis of similarity to the prototype (shore, line) were assigned. However, this is not a similarity, meaning that all elements have all definitional features – just like in the classical categorization.
Analysis of the statements shows that the concept of horizon used by the children was most frequently associated with holiday experiences and film images about holidays. In this area, the meanings were mostly connected with: water, shore, sun, island and ship. In addition, episodic associations were connected with: beach, sand, palm trees, sky, gulls, sunsets, ships, pirates, treasure, and chest.

**Selection and arrangement of concept features from the children’s perspective**

Surprisingly, it turned out that the children at a younger school age were able to give differentiated semantic characteristics of the abstract concept of horizon: time and place of occurrence, relationship with man and activities (shifting and expanding).

**Time and place (spatiality)**

Describing the word in its first dictionary meaning, the children visualized the surface that separates what can be seen from what is not visible. Most often, there were descriptions of the apparent line separating the sky from the earth (land and water) into two parts, which determines the boundary between the space visible for observation and that obscured by the Earth. Commonly, the children also visualized the entire horizon, most clearly observed at the sea-side. In this case, it took the shape of a circle, (*the horizon is so far away that you can barely see, but you can see and see that it even looks as if it was becoming round*). There was also such output where the horizon was partially obscured by hills, trees, buildings (in mountainous terrain, the horizon is the most remote visible element of the landscape). This diversity of horizons is indicated by the statement: The horizon can have different shapes depending on the place we are in. Mountains meet the sky. What you see at this point is the horizon. The horizon can be found at any time of the year or day, however, in the conceptual model of the horizon from the children’s perspective, two characteristics of temporal identification of the object are particularly evident. Predominantly, the children associate the horizon with summer (not a single piece presents the autumn or winter horizon) and the sunset rather than the sunrise (however, this contrast is not as clear as the previous one, because of pieces with the sun appearing in the sky). In the children’s output, therefore, the height of the sun above the horizon changes. Taking into account elements of the topography of the place of observation in reality, the children describe the topographical horizon. In the children’s output, objects usually appear on the horizon, they are completely visible, although the children visualize them as smaller (the question arises whether the children are aware of the sphericity of the Earth). Selected descriptions of objects that appear on the horizon are presented below:
**Objects on the horizon**

| The Sun: | Horizon, it’s something that you can see as if the sun were coming in. The horizon is where the sun goes into the sea, goes out and on the other side the moon grows |
| Water: | There is the sea on the horizon, there is a lot of water |
| Land / shore / island: | When I see different fairy tales, it’s how the captain tells from the horizon that the land is visible, because the horizon is above the ground; The horizon is in front of the shore, or maybe the horizon is the shore |
| Ship: | On the horizon you can see ships that are sailing to the horizon, and pirates are like coming in. The ship is sailing and the island is on the horizon |

Scientific descriptions also indicate the existence of two horizons: astronomical (determined by a parallel to the horizon of the observer) and true (determined by the sphericity of the Earth).

**Relationship with a person (as an observer)**

The children also see the coexistence of the horizon and the observer. In their understanding of the horizon, there is always someone (their eyeline, or the distance equal to the height of the observer’s eyes above the surface of the Earth). Usually, therefore, they visualize the horizon of the observer whom they always place in the centre (on the skyline, never on the horizon line or the horizon). Each time, the observer can look around the horizon: the land, water, an island. It is also important that the horizon viewed by a person is different to the features of the horizon: it is unattainable, elusive, free and independent.

**Activities**

The basic activities distinguished by the children are shifting of the horizon and widening of the horizon

**Shifting of the horizon.** The children notice that changing the observation site (movement) causes the horizon to move with the observer. We are not able to look beyond the horizon, as we cannot look beyond the horizon on the surface of the earth, we can approach the horizon, but the horizon is constantly moving away. This is confirmed by the verbs and adverbs in the children’s statements: *when you sail, you see the island first, then sail on and, again, you see some plants, or some country or continent, that’s another horizon.*

**Widening of the skyline.** The children also notice that the higher the observer is raised above the surface or water, the more distant her/his horizon seems. Because they do not live outside of space and time, they place the cognized reality in space and time and evaluate with the help of elemental semantic oppositions, defining the microcosm of ME (everything on top – evaluating positively, and what is at the bottom – negatively). Widening of the skyline is associated with climbing a high mountain where the destination is located. Climbing, overcoming difficulties, obstacles, reaching the top of a mountain triggers positive associations (you can see more from the top).
(2) range (of knowledge, interests, ideas); 
(3) opportunities, perspectives

Statements on the meaning of the third dictionary definition \(\text{(look beyond the horizon, cross borders)}\) and the fourth dictionary definition \(\text{(travel, reading books open new horizons)}\) were less frequent.

Table 2. Examples of the children’s responses to the dictionary definitions: (3) range (of knowledge, interests, ideas); (4) opportunities, perspectives

<table>
<thead>
<tr>
<th>Age</th>
<th>Male or Female</th>
<th>Ways of categorising</th>
<th>Observer</th>
<th>Action</th>
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</tr>
</thead>
<tbody>
<tr>
<td>9.0</td>
<td>female</td>
<td>when somebody</td>
<td>child</td>
<td>looks for</td>
<td>Just know</td>
</tr>
<tr>
<td>10.0</td>
<td>female</td>
<td>barrier or something</td>
<td>human</td>
<td>conquers</td>
<td>Don’t know, teacher</td>
</tr>
<tr>
<td>10.0</td>
<td>male</td>
<td>border</td>
<td>traveller</td>
<td>widens</td>
<td>My house</td>
</tr>
<tr>
<td>10.0</td>
<td>male</td>
<td>exists when</td>
<td>he</td>
<td>fights</td>
<td>Mum</td>
</tr>
</tbody>
</table>

Thinking about the third and fourth aspect of meaning triggered the following statements:

<table>
<thead>
<tr>
<th>(3) range</th>
<th>(4) opportunities/perspectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>People read books and broaden their horizon of knowledge. I am referring to the horizon of knowledge, because they read and expand their horizon of knowledge through these books. There is a smudged horizon there.</td>
<td></td>
</tr>
<tr>
<td>I do not know how to say it, the horizon is a barrier or something. It can be such a barrier of fear. He is trying to overcome the fear of heights, trying to fight to the end. He has such courage in his heart. It is the horizon of courage.</td>
<td></td>
</tr>
<tr>
<td>He takes care of animals, and animals are his passion and his family does not allow him to do it, and he does it, he opposes the will of his parents, he exceeds this will. He crosses the border because it’s good for him.</td>
<td></td>
</tr>
<tr>
<td>How can these Polish travelers be afraid, but they are looking for treasures. Someone does not believe them, and they say that they will succeed, they will succeed, they will succeed and then they return with the treasure because they had such imagination that something is there and that they will succeed. And these other people will be very surprised ... Madam, to broaden the horizons you must have courage and imagination and even desire.</td>
<td></td>
</tr>
</tbody>
</table>

Based on the collected statements, it is clearly visible that for the children the horizon is not an unambiguous term and not determined in a precise way. The
third graders, defining the third and fourth dictionary meaning, pay attention to the aspect which mentions opening unusual horizons (*knowledge, courage, overcoming barriers, will*). They pay attention to the volitional, mental and emotional activity of a person who wants to broaden their horizons: to broaden horizons, one must have *courage and imagination and even desire*. What distinguishes this dictionary meaning is the information about the pursuit of something and the ability to consciously, deliberately, free of external coercion, perform certain activities.

**Evaluation**

The questions that the children asked the horizon caused its “humanization”. This led to placing the horizon in the circle of values and metaphysical anti-values: *to exist, create, discover, arise, live vs. disappear, end*, vital values: *do, look, travel* and sensory values: *like, be needed*. From the questions to the humanized horizon, we can draw the conclusion that the pupils in the research perceive the horizon as a distant, large/long object, escaping, disappearing, never-ending. The children's statements testify that we see things not as they are in objective reality, but rather as they appear in our experience:

**Summary**

In the research, we assumed that while maintaining certain conditions in organizing the educational environment, pupils would be willing to take the trouble to interpret difficult, complex existential problems. It was also assumed that an non-authoritarian style of working together was necessary, which is why the children’s right was recognized to independent, sincere statements, authentic, though often not fully-formed, linguistic judgments.

Due to the conviction of the possibility of including existential problems in the traditional space of educational discourse, there is food for thought on the educational conditions that must be met in order to harmonize educational discourse with pupils’ discourse anchored in the disordered and uncontrolled individual experiences.

The designated areas of analysis of the material gathered from the children's discourse allowed us to become acquainted with the discrepancy between what is school-related and what is private. The analysis made it possible to formulate postulates and “maps” of directions, showing ways of taking into account children's
viewpoints of the reality they grow in. The analysis also allowed for determining
the possibilities of enriching educational discourse and triggering the linguistic
images anchored in culture and personal experience created in young minds.
Observation and reflection deprived of reductionist attitudes create invaluable
opportunities to capture surprising, non-stereotypical reactions and include them
as valuable (though not necessarily representative) in the whole picture of the
phenomena examined.

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