PSYCHOLOGICAL AND PEDAGOGICAL VIEWS OF BOREDOM IN MATHEMATICS CLASSES

This article investigates the subject of boredom in school. It is one of the keywords defining a modern school. It is also an elusive issue which causes misunderstandings between students and teachers. The concept of boredom is described in two aspects: psychological and pedagogical. Attention was drawn to the following factors: the need for external stimulation, perception of time, enforcement, internal stimulation ability and the emotional response to boredom. Based on observations of mathematics lessons (own research) at different levels of education (primary school, junior high school, upper secondary school), the sources, types and effects of boredom during these lessons were outlined in the article. It was noted, among others, that pupils are not sufficiently stimulated during a lesson, which blocks cognitive activity and human creativity. School boredom was juxtaposed with curiosity and cognitive fascination during the education of today’s “digital natives”.

Keywords: boredom in school, mathematical education, external and internal stimulation, boredom and curiosity and fascination.

PREFACE

“Mom, I’m bored!” – these words I used to hear very often from my daughter – Małgosia when she was in preschool age, and the three of us (me, she and my husband) were having long walks on the hiking trails when reaching Gubałówka, Nosal, Kasprowy Wierch or Giewont. My reaction was always the same – inventing a story and involving my daughter in telling it. She had to help me with creating a hero, his appearance, character traits, family, extraordinary powers, as well as where and for what purpose the hero has to go, and what he has done or is supposed to do. Committed to inventing adventures of the hero, the five-year-old child reached distant mountain peaks, not paying attention to fatigue.

I have not heard these words from Małgosia for a long time, until her working on mathematical spatial figures in school. When asked what they were doing at school at mathematics, she replied, “They did exercises on the spatial grid and I was bored.” “Why were you bored?” I asked, “because I already understand it, and they learn it very slowly.” I was intrigued by her answer. Firstly, how could one get bored when discovering the properties
of spatial figures, especially when this person likes construction-related problems and solving tasks that require spatial imagination. Secondly, I heard that from a person, who was not bored with daily 1.5 hour swim training sessions during which she had to perform monotonous repetitions (over 60 lengths of the pool in a particular style). This confession of a 13-year-old teenager spurred my interest in the sources of boredom of children and adolescents in mathematics classes. In this article, I present an analysis of my own research concerning students’ emotional zone and boredom in mathematics classes.

METHODOLOGICAL BASIS OF OWN RESEARCH

The aim of the research was to determine the level of animation and intellectual stimulation of pupils from primary schools, junior high schools and upper secondary schools during mathematics classes. The subject of the study was the development of students’ mathematical interests in mathematics classes and extracurricular courses, which constituted the main part of the research. The subject of this research is boredom and, to this end, three research problems were formulated: What elements of mathematics lessons were boring to students? What were the sources of boredom in mathematics lessons? What are the consequences of boredom in mastering mathematics by the students?

In the study, the following research methods and techniques were used: testing the mathematical achievements of pupils and observation of research execution during lessons, as well as interviews with professional mathematics teachers. The research was conducted in three types of Olsztyn schools: primary schools in grades IV-VI, junior high schools in grades I-III and upper secondary schools in grades I-III, as part of interim and continuous internships in the years 2000-2017. During the study, I acted as a mathematics tutor of students. I observed lessons taught by mathematics teachers as well as the activities of future mathematics teachers and analysed the documents from the observed lessons recorded on a dictaphone as well as the transcripts of the lessons. The observations and comments were discussed with professional teachers.

THE CONCEPT OF BOREDOM AND ITS TYPES

R. Winter, in his book, provides the following definition of boredom: “This is an annoying, unpleasant state of mind from which we want to escape: feeling that there is nothing we would like to do. Moreover there is an unpleasant feeling that we do not want to do that which is currently available” (Winter, 2012, p. 17). Authors of the “Polish Dictionary” (sjp.pwn.pl) name the factor, which evokes it – repetability¹. M. Zalecki draws attention to the fact “boredom is primarily a result of repetitions and falls upon us when we continue to perform the same action” (Zalecki, 1999, p. 50). Human life is filled with a series of “routines” (Zalecki, 1999, p. 50), during which “we utter the same words and perform the same gestures” (Zalecki 1999, p. 51).

In this aspect the word repetition is associated negatively, and yet many skills are acquired by repetition until obtaining the habit of their execution. It is tolerated by humans probably because they are aware of the purpose of repetition (Winter, 2012, p. 26). Human memory is renewed through repetition. Young children, probably for amusement and to feel safe, enjoy

¹ Definition of boredom in the “Dictionary of the Polish Language” – “feeling depressed, discouraged, caused by inaction, monotony of life”.

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the same booklets or the same stories (Winter, 2012, p.27). A. H. Maslow wondered, “Why repeated contact with picture A, woman A and music A causes boredom, while the same number of contacts with painting B, woman B and music B causes increased interest and more pleasure?” (Maslow, 1990, p. 57).

Another factor evoking boredom is the sense of detachment that affects, for example, students at a lecture or at school. Lectures/lessons that do not relate to their life or experiences are uninteresting to them. In cases where classes are interesting for young people, however, the lecturer/teacher speaks monotonously and does not engage the listeners, or the subject is too difficult or too easy to challenge young people, this situation will likely lead to their “exclusion” or maybe even sleep. “It is probably in these situations that separation is linked to lack of stimulation, creating an exceptionally overwhelming feeling of boredom” (Winter, 2012, p. 28-29).

Furthermore, “what is boring for someone, may be fascinating for someone else” (Conrad, 1999, p.126). Boredom is not a determinant of the task performed, but a way of perceiving it by the person. This personality trait is defined as “the tendency to experience boredom and lack of personal commitment and enthusiasm, general or frequent lack of interest in one’s own life and future” (Winter, 2012, p.69).

R. Winter distinguishes two types of boredom: temporary boredom and long-term boredom. The former is “caused by doing work requiring repetition of the same activities, whereas the latter is “when there is nothing enjoyable to do” (Winter, 2012, p.33). P. Toohey in his book, “Boredom: A Lively History” defines existential and ordinary boredom. The former is “a group of related disorders: frustration, surfeit, depression, repulsion, indifference, apathy and a feeling of being trapped (Toohey, 2012, p.27)”. K. J. Szmidt draws attention to the fact that this mood often does not have a clear cause and appears unexpectedly (Szmidt, 2013, p. 59). The latter type of boredom faced in school is not a mood, can appear quickly and likewise disappear quickly when the source of apprehension or monotony disappears (Toohey, 2012, p.35).

This researcher divided the ordinary boredom into: situational boredom and boredom of surfeit. The term “situational boredom” was introduced by a German sociologist, M. Doehlemann. It occurs when “a person suddenly finds himself in a situation characterized by monotony, lack of stimulation and tedious (…)” (Szmidt, 2013, p. 59). Boredom of surfeit occurs when “we are bored by any experience that continues indefinitely, in excess, until surfeit, when a man becomes tired of it” (Toohey, 2012, p.18) and it concerns predictable situations (Szmidt, 2013, p. 59).

Boredom is a social phenomenon, which is to say it occurs in situations requiring the presence of other people. It is an “social emotion manifested by a sense of reluctance resulting from a currently unavoidable and predictable situation” (Toohey, 2012, p. 43). Toohey claims that performing a boring activity will not become exciting, however should it be performed voluntarily to serve the community, it will not cause fatigue (Toohey, 2012, p. 12). In terms of biochemistry, boredom is a dopamine-neurotransmitter deficiency that is part of the reward system, which functions in the brain (Toohey, 2012, p. 43). K. J. Szmidt draws attention to the fact that sources of boredom can be not only genetic, but also social and cultural (Szmidt, 2013, p. 60).

Researchers measure boredom with, for example, the Boredom Proneness Scale, which contains 28 statements, in which the respondent states whether a given sentence is true or false and then the points are counted and the vulnerability of the respondent to boredom is determined (Winter, 2012, 71-73). Another test is the BPS questionnaire, created in 1986.
by psychologists N. Sundberg and F. Farmer. The respondents answered 28 statements on a 7-grade scale (1-disagree completely, 7-agree completely). The points are added and conclusions regarding the susceptibility of the respondent to boredom are drawn (obtaining over 117 points means a large susceptibility to be bored).

The presence of boredom can be determined by observing certain physical indicators, i.e.: “elbows resting on flat surfaces, tables or armrests, as well as forearms and hands supporting falling heads” (Toohey, 2012, p. 36),

- “‘Antarctic look’ or ‘looking into space’ (...) the gaze is not resting on anything nearby and is lost in some distant space” (Toohey, 2012, p. 39).
- leaning neck,
- yawning.

Researchers have stated that “yawning occurs in transient states between different levels of brain stimulation and supposedly is meant to support central nervous system activity in situations where attention is required and circumstances provide relatively low stimulation” (Winter, 2012, p.).

K. Tuszyńska-Maciejewska, in her article “Did the Ancient Greeks Know Boredom?” quotes the Greek term “schole” – a school, which means “free time”, “spending time”, “lectures”, “scholarly discussions”, but also “loss of ime”, “idleness”, “laziness” (Tuszyńska-Maciejwska, 1999, p.374) R. Winter states that today’s youth may be bored at school not because of low stimulation, but rather because of excessive stimulation. Every day, they are bombarded with many exciting matters that demand their attention, which causes them to lose the ability to distinguish and make choices, “when we receive so much information, it becomes difficult to extract what is important and find any sense” (Winter, 2012, p.44).

A.H. Maslow also analysed the problem of whether boredom is caused by lack of or excessive stimuli, writing “What is boredom, if not excessive satisfaction? And yet, here too, we can encounter unresolved and inconclusive problems” (Maslow, 1990, p.116) A.H. Maslow also draws attention to the fact that a student feels tired and bored when not meeting his self-fulfilment needs, which normally result in “personal growth and development through satisfying one’s own interests. Self-expression, creative activity, the need to search for one’s own identity and meaning in life.” (Petty, 2005, p. 60).

MATHEMATICS CLASSES BOREDOM – A PSYCHOLOGICAL VIEW

According to R. Winter, boredom is a function of five factors:
- Need for external stimulation – “If I am not doing something exciting and even dangerous, I feel semi-dead (a) and apathetic (a)”
- Internal stimulation ability – “my work seldom excites me”
- Emotional reaction – “In situations where I must wait, (...), I become very restless (a).”
- Time perception – “I always think time is running too slow.”
- Compulsion – “I often find myself in situations where I must perform senseless things.”

The first of these factors is “looking for excitement, challenges, frequent changes in activity” (Winter, 2012, p. 73). For example, by performing dangerous sports and experiencing hazardous situations. The search for strong sensations is characteristic more for boys/men than for girls/women. In the observed mathematics classes, students were rarely confronted with the possibility of facing a challenging mathematical task, which they could face alone or in a peer group.

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2 In quotes, statements are made about a person who is bored according to the Boredom Proneness Scale.
Referring to the situation with my daughter mentioned in the preface of the article, I found a number of tasks in her mathematical exercises like: in the drawings of the cuboids, use the colour (colour given) to mark the side edges, the base edges, write the edges: parallel, perpendicular, lateral, upper base, bottom base, and apexes, as well as paint the walls of the given size; on the cuboid grids, paint the walls of the same size; or a task, in which the student should determine which of the drawn grids are cuboid grids. Similar tasks appeared in the book, in the prism and pyramid section (Borzyszkowska J., Stolarska M., 2014a, b). All of these tasks involve the first two levels of Niemierko’s taxonomy.

In some classes, the teachers offered students problem-solving tasks, but they themselves immediately (without giving the students an opportunity to reflect on the tasks) solved them, usually using the method of giving guidance questions. As in the example below, where the teacher did not even ask the students how they could solve the problem, despite the fact that the students had previously solved such tasks in mathematics classes and stated that “the task is similar to the chemistry tasks” (stenograph G6O/2007).

“T: Task 1. How many grams of 15% syrup and how many grams of 25% syrup should be mixed to get 50 grams of 20% syrup.

S: It’s chemistry (yells one of the students).

T: Yes. Listen, we drew such squares (draws three squares on a board, two connected by a plus sign, and an arrow faces the third).

S: Oh yes (says one of the students).

T: Inside boxes we wrote grams, kilograms, litres, and above the boxes we write percentages, samples, or temperatures (writes corresponding percentages above squares and 50g inside the third square).

S: Here the two boxes remain empty, what are we writing here, x? (asks one of the students)

T: Yes, x and y and we know that x and y are syrup. It is better to write on the exam that x is a syrup 15% and y is a syrup 25%, but on a test it is enough.

The first equation, we have from this (the teacher shows the notes in the middle of the squares and writes on the board: \( x + y = 50 \)).

And the second equation will be from what? (tries to direct the students)

If there was a temperature it would be associated with energy, and here we have what? (no one answers).

Sugar. How much sugar is here? (the teacher points to the first square and says)

15% in the first syrup and 25% in the second syrup (writes on the board): 15% \( x + 25\%\ y = \) And this together gives us how much sugar? 20% in 50 grams and we have a set of equations:

\[
\begin{align*}
  x + y &= 50 \\
  15\%x + 25\%y &= 20\% \cdot 50
\end{align*}
\]

(wrote on the board).

T: To get rid of the percentages, we multiply 100 times (writes a line next to the second equation and multiplies 100 times)

It is always safer to first get rid of fractions. And remember to multiply only once (performs calculations on the board).

T: Maybe someone will solve the task on the blackboard, Ania please. (the student approaches and solves the task, in about 4 minutes). Try not to write off the board, count yourselves” (Stenograph G6O/2007).

The second factor characterizing boredom is the internal stimulation ability, or in other words, “the ability to self-sustain interest” (Winter, 2012, p.73). It is characteristic of people who can cope with the monotony of everyday life and easily become curious and even fascinated. In the classes I analysed, the teachers tried to draw the students’ attention to the course of the lesson by means of commands such as: “Be quiet, or you will not know...
“later!” (Stenograph SP10O/2015), “Karol, look at the blackboard and pay attention” (Stenograph GDM/2005) “Okay. Who still has not come to the blackboard. Oh, Grześ, you are so quiet, you have not spoken anything, come you will do the next task.” (Stenograph GPU/2006), “Ignacy, let’s see what he remembers” (Stenograph LO10/2016). That can indicate that students were not always interested in the lesson. Most of such reprimands occurred in mathematics classes at primary school and junior high school.

The third factor – emotional reactions of a person to boredom. These vary, “some are upset and anxious, others are calm and patient” (Winter, 2012, p. 74). People who focus on pleasure experience more boredom than those who focus on helping others. This was best seen in mathematics classes at upper secondary school, where those pupils that solved tasks faster, either helped their peers, or wrote calculations on a blackboard. In elementary school, no tasks involving calculating resulted in communicating with peers, playing with toys or other activities such as painting hands or decorating notebooks.

The fourth factor “perception of time” is related to the ability to organize and utilize time. Researchers believe that the subjective feeling of boredom is related to the sensation of slow passage of time and lack of external stimulation. During the observed classes, students many times felt as if the time dragged, which was manifested by glancing at watches or cell phones in the older classes, whereas in the younger classes in students asking their peers how many minutes were left until the bell. On the internet there can be found advice on what can be done during boring lessons (usually during mathematics): “throwing paper balls,” “writing on the bench,” “thinking about the meaning of life,” “analysing the molecular structure of your hair,” “eating lunch”, “sleeping,” “mastering the art of swinging in a chair,” “playing tic-tac-toe”, “decorating your notebook”, “doing homework for other classes”, “making a comic”, “taking pictures and posting on facebook”.

The last of the factors that characterize boredom is “compulsion”, that is to say, the ability to cope in compulsory situations, for example:

- Sitting for 45 minutes at a desk,
- Listening – “Put away all the pencil cases! Place your hands on your desks and listen.
- Looking at the blackboard – “Emilia, Klaudia! You were supposed to look here!”
- Taking notes during the lesson – “Everyone draw a coordinate system” (Stenograph G2O/2017).
- Raising a hand when the student wants to say something; when the student has not done so, he got reprimanded – “I did not let you speak”
- Imposing the method of task solving – In most of the analysed classes, teachers imposed on students a method of solving the task:
  “T: Task b on your own. Please draw a BE segment and mark the centre (silence)
  S: Can we measure?
  T: No, count on the grid” (Stenograph G3O/2004)

Very often the teachers also rushed the students: “No talking, quickly, go on with the layout, quickly draw two straight lines” (Stenograph G2O/2015), “But quickly, in a second I will ask the result” (Stenograph G6O/2007)

3 Term from the internet

4 Taken from a few internet websites
“Under the drawing we write: Construction. Quickly, quickly, chop-chop. You will make the drawing in the meantime.” Teamwork suggested in one lesson was also under the pressure of time – “Each group will get two tasks. It’s a speed contest! You can ask me questions. Work together. Those who solve the tasks first get 3 points, who solve the tasks second – 2 points, and those who solve them third – 1 point. Read and do it? I advise making rough drafts” (Stenograph G14O/2005).

J. Kozielecki draws attention to the compulsion of students to participate in the class-lesson system, which causes the phenomenon “BaA”, translated as boredom and anxiety. “The school often becomes the producer of boredom, a nightmare of the learning process that kills cognitive pursuit, that diminishes passion and discourages one from anything... save for aggression. For a student, an unbearable burden comes also from anxiety caused by a system too autocratic, too punitive and too bureaucratic. Sometimes it is a neurotic anxiety. The “BaA” phenomenon becomes a problem both for the student and the teacher.” (Kozielecki, 1998, p. 37).

MATHEMATICS CLASSES BOREDOM IN PEDAGOGICAL VIEW

Boredom becomes “a characteristic state of contemporary culture and at the same time a pedagogical problem, because it seems to result from many educational and didactic shortcomings, and at the same time to cause – as a stimulant – more or less pathological behaviour of children and adolescents” (Szmidt, 2013, p. 56). “The key features of boredom are predictability, monotony and limitation” (Toohey, 2012, p. 15). “So if our students are exposed to the monotonous, repetitive, already known to them educational situations of a similar course and content, and furthermore are in a limited and poorly stimulated classroom space, it is no wonder that boredom is an inherent part of their school life” (Szmidt, 2013, p. 60).

Some of the elements that cause boredom in a class were previously mentioned in the context of a psychological view, that is, the content of mathematics textbooks, the teachers continuously using the same teaching methods, compulsion to note what the teacher advises, and even imposing a solution to a task. This part of the article will focus on the appearance of classrooms and their equipment, the course of the lessons, and the types of questions asked by students and teachers during the lessons.

The classrooms where the observations were made were places that might cause students to become bored. The desks were arranged one after the other, so that the students sitting farther saw the backs of their classmates. The decor of the mathematics classes also did not invoke a pleasant mood: white/green boards, markers/chalk, cabinets with mathematics textbooks for the given class, dusty boards – some bent sheets, and on them formulas and graphs – practically not used by the teachers during lessons. Solids made by the students are visibly bent. In some secondary schools and upper secondary schools there were multimedia boards, used by teachers only to display the content of the tasks from an electronic textbook. Only the students giving classes in upper secondary school used the interactivity of the board, for example during a lesson on making function plots in translation and reading their function properties.

Teachers do not have basic didactic resources in their classes, like transparent solids with highlighted line segments such as: height, diagonal of solid and walls, whirling table for presenting rotational bodies, solid grids like a cylinder or cone, basic elements for the demonstration of random phenomena like card decks or dice, etc. Such objects are even
thrown out of school as outdated equipment, and mathematics is taught only using words. Lessons are taught in the same way: The teacher as a person with “exclusivity” of knowledge introduces the necessary theory/patterns without giving the students a possibility of independently discovering even a small part of them. He then solves the example himself on the blackboard, usually explaining it step-by-step to students or creating an impression that the students themselves solve it, by directing them with questions. Then the students solve the tasks in the notebooks and one of them at the blackboard. The teacher checks whether there are no mistakes and omissions in the students’ solutions on the blackboard. Teachers are very vigilant of all sorts of “thinking shortcuts” that appear on the blackboard – “You did well (turns to class) Pawel did this in head. But you know, I will write it for them. (turns to the student)” (Stenograph LO10O/2013).

When the teacher walks around the classroom, he only controls whether the students’ notebooks contain the solutions written on the blackboard, or answers questions from students. The students copied the solutions from the blackboard and said sentences like: “Tomek, what is written there?” or “Write bigger numbers!” (Stenograph LO20O/2017) It can be assumed they copied it without thinking.

J. K. Szmidt draws attention to the fact that “our students with age cease to ask. And while sitting in a school desk, they become bored faster” (Szmidt, 2013, p.65). I analysed the stereographs from lessons considering the type of questions asked by the students. Students ask questions only about:


When the students point out to the teacher that they do not understand, the teacher begins to get upset, instead of trying to understand the students and help them. Probably because of this, students are “afraid” to ask questions about the content of taught material. Because of this, the teacher does not receive any feedback from his students indicating what they could have a problem with.

CONCLUSIONS

Students are bored during mathematics lessons probably because the students have no interesting tasks to solve, they do not see anything worth their attention, or in other words, the tasks they solve do not relate to their personal experiences. Some students are overwhelmed by the information that the teacher gives them. It appears that for some students remaining bored is comfortable – boredom is safe, because it is predictable. The teacher’s behaviour is predictable, the course of the lesson is predictable, the method and form of work during the lesson is predictable, and even the type of task is not “tiring”, because the students do not have to think to solve it.

In most classes, students received problems already discovered and formulated; they learned about what was already investigated, discovered and what is known for certain in mathematics. Ready-made patterns, claims,
properties, etc. On the analysed lessons, teachers did not create opportunities for students to discover even a small “fragment” of mathematics on their own. This knowledge, called idle knowledge, allows you to pass tests, but it does not facilitate creativity and moreover can even prevent it. Such knowledge does not provoke new questions, it inhibits the discovery of new things to do and after some time becomes uninteresting knowledge (Szmidt, 2013, p.68).

METHODS TO OVERCOME BOREDOM DURING MATHEMATICS CLASSES

The distant and opposite feeling to boredom is curiosity, that is, emotional response to stimuli new, changing and causing cognitive conflicts, or problems. Therefore one of the methods to fight the boredom of students is to stimulate their cognitive curiosity. Creating conditions for a student to encounter something new during a lesson, which is however, linked to what is already known. Curiosity is induced by stimuli that are characterized by “novelty, irregularity, complexity and inconsistency” (Szmidt, 2013, p. 64).

Stimuli of cognitive curiosity are: novelty, surprise and conflict. A man is curious about what is strange, unusual and completely new. For example, the oldest group of students of the Children’s University, when asked whether and why they enjoyed the seminar “How mathematics helps us in real life?” (during which they solved various types of mathematical tasks, arranged in eight positions, concerning topics: golden ratio, Fibonacci sequence, polyhedrons, pi number, Pythagorean theorem, entertainment, tiling, mosaics, stereographs and anamorphic images), replied as follows: “because it was the first time I saw something like that”, “because it was fun”, “everything was very interesting”, “because it was developing”, “because I felt good”, “I was late for the 8th, because it’s fun here” (Bojarska-Sokołowska, 2015, p.136-143). Young people are curious about what constitutes a sudden change, a surprise, what is unforeseen and what they do not expect. That is interesting for a person, what contains contradiction, cognitive conflict, disagreement with what he already knows. For example, a junior high school student, after calculating the sum of the inner angles in a spherical triangle, with astonishment said, “S: I got a sum of 220 degrees, T: well done, S: But that’s possible?”

Inducing curiosity during a lesson is not difficult, the problem faced is an effective extension of cognitive motivation for learning or creative activity – so that the students are able to work on a subject or activity for a longer period of time (Szmidt, 2013, p. 64). Curiosity is closely associated with asking questions. The curiosity of children can be aroused and maintained by giving them lessons using the questions and experiences method. This is a method introduced by the organizers of the Children’s University and consists of five phases.

The first one is to induce curiosity, for example, with an intriguing question, “How to construct four identical triangles using six matches?” The second is providing an inquiry (in the case of platonic solids classes, when the children found the tetrahedron) – they were instructed to find in the room other solids, the walls of which are all of the same shape. The next problem was to count the apexes, walls and edges of the found solids. In the third phase, the action, the students of the Children’s University glued the platonic solids from the grids and filled in a table on the number of individual elements. In the fourth phase, the conclusion, the children sought a relation of Euler formula for platonic solids. In the final phase, the summary, the lecturer discussed the occurrence of platonic solids in real life and their origin (Bojarska-Sokołowska, 2014).
Not only when engaging in extra-curricular activities can a student become curious and amazed. When analysing the stenographs, there can be found many interesting ways teachers utilized to make mathematics classes more interesting. In the lesson: “What does it mean that a number is divisible by another number?” in the fourth grade, the teacher when explaining the topic to their students, referred to their experiences and used their names in assignments. “T: Pay attention, please listen to a short assignment. Don’t write it in your notebooks. Damian, shush. Damian has 21 PLN. He decided to buy as many ice creams as possible. Each ice cream costs 4 PLN. How many ice creams can he buy and will he get a remainder?” (Stenograph SP10O/2013)

Another teacher during a lesson that was difficult for students: “Reducing transcriptions – algebraic expressions” in the sixth grade explained to the students the need to use letter transcriptions when shopping in a supermarket. “Mom packs 6 bananas into the basket, we will note it as 6b, 3 oranges – 3o, 2 lemons – 2l, 1 orange is rotten, so we put it away -1o. She recalled that she will have guests so she took another 6 bananas and 7 lemons. We note what is in the basket, so we get: 6b + 3o + 2l – o + 6b + 7l. Price is per item, so we have to sort the fruits, so we get: 12b + 9l + 2o” (Stenograph SP2O/2014).

One of the secondary school teachers during a lesson: “Length of a circle” experimentally introduced approximating the number Pi. Yet another teacher improved the topic “Solving systems of equation with the inversion method” with cards specially prepared for students. Moreover, I had an opportunity to see a very interesting mathematical classroom in elementary school in a small town near Olsztyn. From spatial constructions made by the students, the teachers made an exhibition. Each of the constructions consisted of a few or over a dozen spatial solids shaped as a person, animal, etc. There were various mathematics textbooks for elementary and secondary school, as well as other books: task books, mathematics promotion books, etc.

CONCLUSION

Boredom is normal, useful and incredibly universal part of human experience” (Toohey, 2012, p.173). Nowadays, teachers have a very difficult task because they have to compete with short advertisements and entertainment culture (Winter, 2012, p.29). “Children and adolescents are bored because they have no capacity to maintain interest in their activities” (Winter, 2012, p. 155). “Teachers who are satisfied with providing simple facts, and the subject they teach does not thrill them (even mathematics can be exciting!) probably will not arouse curiosity among their students.” (Winter, 2012, p. 156). The simplest cure for boredom is a variety of experiences (Toohey, 2012, p.159). It can be understood as an abundance of methods, forms, means used, but also variety of tasks addressed to the students. According to N. Doidge, “stimulation is beneficial to the brain,” “diversity of stimuli strengthens the brain and drives away boredom” (Toohey, 2012, p.160).

How to stimulate the cognitive curiosity of our students? Research reports and experiences of good teachers and popularisers of science as well as “enthusiasts” in their field show that it is necessary to create conditions that encourage asking questions, to present abstract content in a way for it to become personal, concrete and familiar content, to surprise students, to combine teaching content with their experiences, inspire students to continue their work on the topic, also in their spare time (Szmidt, 2013, p. 65).
CITED LITERATURE


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NUDA NA LEKCJACH MATEMATYKI W UJĘCIU PSYCHOLOGICZNO-PEDAGOGICZNYM

STRESZCZENIE:

Przedmiotem tego artykułu jest nuda w rzeczywistości szkolnej. Jest ona jednym ze słów kluczowych, które definiują współczesną szkołę. Jest także jedną z nieuchwytnych kwestii, które powodują nieporozumienia pomiędzy uczniami a nauczycielami. Opisano pojęcie nudy pod dwoma kątami: psychologicznym i edukacyjnym. Zwrócono uwagę na następujące czynniki: potrzebę zewnętrznej stymulacji, reakcje emocjonalne na nudę, zdolność stymulacji wewnętrznej, percepcję czasu oraz przymus. Na podstawie obserwacji lekcji matematyki (badania własne) na różnych poziomach edukacji (szkoła podstawowa, gimnazjum, szkoła po-nadgimnazjalna) przedstawiono źródła nudy podczas tych lekcji, jej rodzaje i skutki. Zwrócono uwagę m. in. na fakt, że występujące sytuacje uczniów podczas lekcji, który powoduje blokadę aktywności kognitywnej i twórczości. Zastawiono nudy szkolną z ciekawością i fascynacją poznawczą podczas edukacji szkolnej i pozaszkolnej dzisiejszych “cyfrowych tubylców”.

Słowa kluczowe: nuda w szkole, edukacja matematyczna, zewnętrzna i wewnętrzna stymulacja, nuda a ciekawość i fascynacja.