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ANTICIPATORY THINKING EDUCATION AS A CHALLENGE FOR TEACHERS IN THE TIMES OF (DIS)PEACE

KSZTAŁTOWANIE MYŚLENIA PRZEWIDUJĄCEGO JAKO WYZWANIE DLA NAUCZYCIELI W CZASIE (NIE)POKOJU

Streszczenie: We współczesnym świecie, w którym jedynym pewnikiem są zachodzące szybko zmiany, kształtowanie kompetencji stało się wyzwaniem dla nauczycieli i edukatorów. Jedną z najważniejszych kompetencji, zgodnie z paradygmatem zrównoważonego rozwoju, jest kompetencja myślenia przewidującego (antycypacyjnego), której kształtowanie powinni wspierać nauczyciele we wszystkich szkołach, na każdym etapie edukacyjnym. W artykule zaprezentowano wyniki badań realizowanych metodą sondażową (z wykorzystaniem ankiety), których celem było określenie deklarowanego poziomu myślenia przewidującego wśród uczniów w wieku 13-20 lat. W badaniu udział wzięło 877 uczniów małopolskich szkół podstawowych i średnich. Analiza wyników pokazała, że uczniowie wysoko oceniają swój poziom myślenia antycypacyjnego, choć dziewczęta deklarują mniejsze kompetencje w tym zakresie. Artykuł kończą konkluzje, charakterystyka limitacji metody i podsumowanie.

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Słowa kluczowe: myślenie przewidujące, kompetencje XXI wieku, nauczyciel, kompetencje nastolatków

Abstract: In the modern world, where rapid change is the only constant, the need to shape competences has become a challenge for teachers. One of the most important competences, according to the paradigm of sustainable development, is the anticipatory thinking. All teachers across all subjects and educational stages should be equipped to cultivate this competence. This article focuses on the level of anticipatory thinking competence among students. The research, conducted using a survey method, aimed to assess the declared level of anticipatory thinking competence among adolescents aged 13-20. A total of 877 students took part in the study. The results indicate that participants generally report a high level of the anticipatory thinking competence, though female students tend to rate their level of competence lower than their male counterparts. The article closes with conclusions, limitations of the method and a summary.

Keywords: anticipatory thinking, competences of 21st century, teacher, teenagers' competences

Introduction

In a global society where social, environmental, economic and political change is accelerating (Sztompka 2012), knowledge alone is insufficient to improve the quality of life (Forawi 2016). Thus, it becomes a challenge for teachers to develop competences among students that will allow them to respond actively to these changes, adapting dynamically to changing circumstances. One of the competences that, according to the sustainability paradigm, should be developed in formal education is anticipatory thinking, sometimes referred to as 'forward-looking thinking' (Barth et al. 2007; Brundiers et al. 2020). The concept of sustainable development requires long-term orientation and anticipation of the future. In documents focusing on sustainable development, terms such as ‚maintenance' (of the ecosystem, peace, balance); ‚the needs of future generations', anticipation and prevention of harmful unintended consequences and the need for intergenerational equity – where future generations are ensured living conditions no worse than those of present generations (Gibson 2006). In this context, anticipatory thinking is extremely important. Young people will soon be the decision-makers whose choices will shape social reality. They will also be responsible for decisions concerning the economy and the environment, which, along with society, are the pillars of sustainable development. Future-oriented thinking is a necessary competence if the primary goal of sustainable development is to be realised: creating a development model that allows future generations to live in conditions at least as good as those of the present generation (Gibson 2006).

Anim Wiek and colleagues note that „sustainability education should enable students to analyse and solve sustainability problems, anticipate and prepare for future sustainability challenges, and create and seize sustainability opportunities" (Wiek et al. 2011). Similarly, the OECD in *The Future of Education and Skills 2030:*

Learning compass 2030 – A series of concept notes (2019) emphasises the importance of anticipating future problems and their possible solutions for sustainable development.

How, then, do we define the competence of anticipatory thinking? This *competence* is defined as ‚causal readiness,' a determinant of an individual's activity and personal readiness to solve complex problems. In the context of anticipatory thinking, these are issues whose symptoms may be observed in the present, but which may arise in the future. According to Geden and colleagues (2018), anticipatory thinking is the deliberate, divergent (diverse) exploration and analysis of future potential (possible) situations in order to avoid surprise when these problems arise. As noted by predictive thinking theorists and researchers Gary Klein, David Snowden and Chew Lock Pin (2007), it is a capacity that engages imaginative processes (imagining) how uncertainties (uncertainties) arising in the present can help identify indicators and causal relationships of future scenarios (future scenarios). Anticipatory thinking complements foresight, which focuses on assessing the likelihood of outcomes for planned actions. Anticipatory thinking is a key macrocognitive function of both individuals and teams. Possessing this competence means, first and foremost, being able to prepare for future problems, but also to take advantage of emerging opportunities (Klein et al. 2007). In other words, anticipatory thinking is the process of recognizing and preparing for difficult challenges, many of which may not be clearly understood until they are encountered. It is a form of sense-making. Typically, making sense involves explaining events and diagnosing problems, a retrospective process. However, it can also involve formulating expectations about future events (Weick 1995).

Forward-thinking research is concerned with envisioning and creating possible, probable and desirable scenarios to guide present actions (Levrini et al. 2021). This research highlights the importance of education that helps students think critically and creatively about the future and develop a sense of being an influencer. Although there is a growing interest among educators in employing methods that help students develop a more complex way of thinking that connects causes and processes to explain socio-environmental issues such as the climate crisis, the COVID-19 pandemic, migration, war conflicts, and take responsibility and anticipate the consequences of their actions. There is little research on education for sustainable development (Johanson 2021; Hipkins 2021; Rieckmann 2012) and studies on antipathy thinking and its relevance particularly in peace education are still unavailable.

Developing anticipatory thinking present a challenge for teachers who must not only implement the core curriculum of the subject being taught but also focus on developing teaching-learning methods that support the development of anticipatory thinking. This task requires effort and dedication from educators; a teacher aiming to develop anticipatory thinking in students must possess a high level of methodological and diagnostic competence (to determine the level of anticipatory

thinking competence of the students), as well as sensitivity and empathy. This is especially crucial in situations where the established order has been disrupted, such as by the outbreak of an armed conflict near Poland's eastern border. In such a context, the ability to recognise threats and opportunities for development, and to identify early signs that may lead to complex problems in the future is extremely important. A key component of any competence is attitude. Therefore, today's teachers should cultivate among their students the attitude of a keen observer of events – someone who can identify potential threats. Furthermore, students should be aware that their present actions and decisions may have deferred effects, influencing the lives of future generations.

In our study, we focused on how students aged 13-20 assess their competence in predictive thinking, given that they will soon be shaping social, environmental and economic realities. We considered self-assessment to be a crucial factor in causal readiness, aiming to determine how confident adolescents are in their ability to identify potential opportunities and threats, as well as to recognise the symptoms that indicate the need for action to prevent future situations that may be difficult to resolve.

Methodological assumptions of the study

The study was carried out using the assumptions of the nomothetic paradigm, which is appropriate for social research. The aim of the study was to determine (explore and describe) the level of anticipatory thinking declared by adolescents aged 13-20. The focus of the study was therefore the declarations of adolescents, specifically students from grades VII-VIII of primary school and grades I-V of secondary school, regarding the level of anticipatory thinking they perceive themselves to possess.

The main research problem was framed as a complementary question: *What is the declared level of anticipatory thinking competence among the adolescents aged 13-20 taking part in the study*?

The cross-sectional questionnaire study involved 871 students (462 girls and 409 boys) from grades VII and VIII of primary schools (n = 517) and grades I-IV of secondary schools (n = 354) located in the south-eastern, well-industrialised region of Poland. The majority of respondents lived in rural areas (n = 313), followed by small (n = 296) and large towns (n = 258). The sample was organised according to a volunteer-convenience sampling scheme (Leiner 2016), and therefore included students who either (1) received written parental consent to participate in the study (in the case of minors) or (2) provided written consent themselves (in the case of adults).

The study employed a survey method using a questionnaire technique (statement test – sentences with which respondents agree or disagree). A specific tool, the Inventory of Predictive Thinking (IMP), was designed for the study.

The questionnaire included 10 statements, which were used to estimate students' self-assessment of characteristics specific to anticipatory thinking (e.g. statement 4*: I accurately predict the consequences of my own and other people's actions;* statement 8: *When making a decision, I always consider all its possible consequences*). Respondents were asked to rate whether each characteristic described them (1) or not (0). The Chronbach's alpha for the questionnaire was 0.791.

For each student, the sum of the statements they indicated as true within the areas tested was calculated. Students could obtain a score between 0 and 10 based on the number of statements they agreed with. The following scale was used to determine the level of competence:

- Low level of competence – 0 to 3 statements
- Medium level of competence – 4 to 7 statements
- High level of competence – 8 to 10 statements.

The study distinguished some independent variables: (1) the respondent's gender, (2) the place where the respondent lives (rural/small town/large city), (3) the level of education (primary school/secondary school).

Analysis of research results

Analysis of the data collected in the survey shows that nearly half of the respondents (46.07%) declared a high level of predictive thinking competence. A medium level was indicated by 35.46% of respondents, while a low level was indicated by less than one in five respondents (18.47%).

Nearly one in three respondents (29.08%) identified with all characteristics related to anticipatory thinking competence, while less than 1% of respondents (0.8%) did not select any characteristics as describing them. Additionally, about 10% of respondents each indicated that 4, 6 or 7 of the 10 characteristics associated with predictive thinking were applicable to them.

The variable that was significantly correlated with the declared level of anticipatory thinking was gender. The mean value indicated in the self-assessment test was 5.84 for girls and 7.79 for boys, with the overall mean of 6.75.

Women are most often characterised by a medium level of competence in this area (42.2%). A high level of competence was observed in 32.2% of the female students surveyed. Among male students, this high level was twice as common. Female students, on the other hand, were three times more likely to exhibit a low level of competence – almost 27% compared to 9% for males. The relationship between gender and level of competence is statistically significant. The mean values for females and males were 5.84 and 7.79 respectively. The difference is statistically significant.

Among those who identified all 10 characteristics associated with anticipatory thinking as appropriate for themselves, there were far fewer females (around 17% of all female respondents) compared to males (just over 42% of respondents). It is

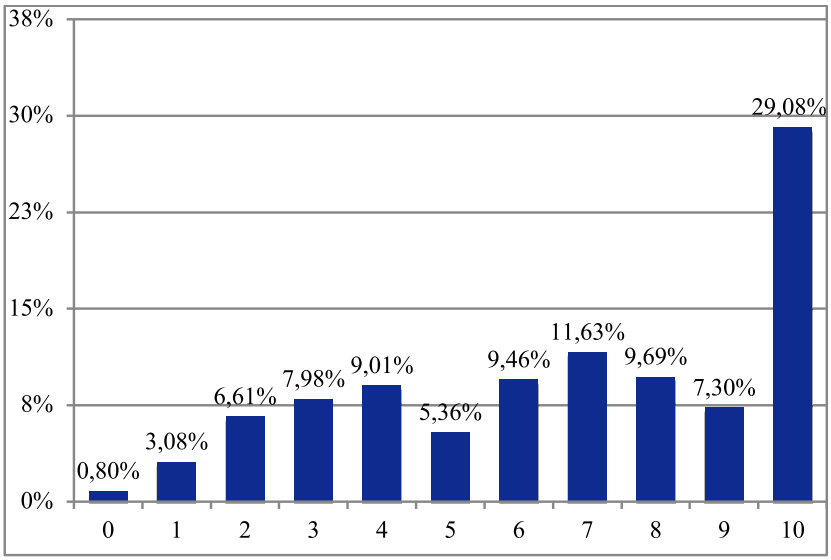

Diagram 1. Number of indications of the characteristics of anticipatory thinking as appropriate among the total number of respondents (N=871)

also noteworthy that male students were twice as likely as female students to select the number of statements indicating a high level of competence in anticipatory thinking. This suggests that boys rate their skills in this area significantly higher than girls, who tend to be more critical of their skills and competences.

When analysing another variable – the educational level at which the respondents studied (primary school vs. secondary school) – the study found no statistical significance. The results indicating low, medium and high levels of anticipatory thinking competence were similar for students both in primary school (ages 13-15 years) and secondary school (ages 16-20). A low level of anticipatory thinking was declared by 19.27% of primary school students and 17.32% of secondary school students, while a medium level was declared by 35.65% of younger respondents and 35.20% of older respondents, respectively. A high level of competence was indicated by 45.09% of primary school students and 47.49% of secondary school students. The average index value was 6.67 for younger learners and 6.87 for older learners.

Analysing the data by place of residence reveals that students living in rural areas scored highest in the measure of anticipatory thinking. Compared to students living in a city (both small and large), rural students less frequently had the lowest values of the indicator and more frequently had the highest. The difference is particularly apparent when comparing students from small towns. The test for the relationship between the variables is statistically significant. The average value of the index for students from rural schools was 7.24, while students from urban areas scored below 7, with averages of 6.22 in small towns and 6.77 in large towns. The difference is statistically significant only between the averages for rural and small towns.

Among respondents living in rural areas 37.22% declared that all 10 characteristics of anticipatory thinking are appropriate for them, while among students living in small and large towns the figures were 20.47% and 29.01%,

respectively. Additionally, the highest proportion of pupils who achieved a low level of competence in anticipatory thinking are those living in small towns (almost a quarter of respondents). In contrast, twice as many pupils from rural areas achieved a low score. Slightly more than half of the surveyed pupils in rural areas reported high levels of anticipatory thinking skills, whereas significantly fewer pupils living in small towns selected statements that would classify their score as high.

Table 1. Declared level of anticipatory thinking vs. place of residence of students surveyed (N=871)

Declared level of competence	Village	Small town	Large city
	%		
Low	12.31	24.16	20.47
Medium	36.59	36.58	32.66
High	51.1	39.26	46.87

When analysing individual responses, it was observed that the largest number of respondents identified with the statement that they reflect on present and future problems (possible/potential problems that may arise soon) – this was true for 73.77% of respondents. Additionally, more than 70% of the respondents indicated that they are usually attentive observers. Conversely, the statement concerning the search for explanations for observed phenomena received the fewest responses, with slightly less than 60% (58, 61%) of responses selecting it. Furthermore, only about three in five of the male and female students surveyed declared that they accurately recognise problem situations. Nearly 65% of respondents claimed to be able to react quickly to changes in their environment. Notably, 50.75% of the girls and almost 75% of the boys (74.51%) indicated this as true for themselves. The relationship between gender and this indication is statistically significant. Regarding the location of the school, the highest number of students studying in a rural area (68.45%) indicated this component of the critical thinking competence as appropriate for themselves; this was slightly more than 55% among students studying in a small city, and 61.54% among those from large cities. This relationship between place of residence and identifying this characteristic as appropriate is statistically significant.

Conclusions

In a society where the only certainty is change (Bauman 2007), the ability to anticipate the effects of relentless change and to recognise its direction is one of the key competences that determine effective activity and action (Klein et al. 2007). Furthermore, research shows that although many young people are interested

in the future of the world, a sense of helplessness and even hopelessness is quite common among teenagers (Nordensvaard 2016; Strife 2012; Threadgold 2012).

The presented results of the study show that the surveyed students aged 13 to 20 rate their competence in predictive thinking highly. However, it is concerning that girls perform significantly worse in the self-assessment test on predictive thinking compared to boys. Regarding girls' lower self-assessment, it is worth noting that their harsher assessment of their competence and skills in many aspects is discussed in the scientific literature (Chubb et al. 1997; Agam et al. 2015; Birndorf et al. 2005; Seiffge-Krenke et al. 2009). The study revealed that among students living in rural areas, small towns, or large cities, those from rural areas report the highest levels of anticipatory thinking. Roscigno and Crowley (2001) highlight that the academic performance of rural children tends to lag behind that of those living in large cities. The high scores obtained by rural pupils in the self-assessment of predictive thinking competence can be explained by a compensatory mechanism of overestimating self-evaluation as part of self-validation (Wojciszke 2002; Rudman et al. 2007).

It is also difficult to explain the lack of clear differences between younger pupils (ages 13-15, primary school) and older pupils (ages 16-20, secondary school) in their self-reported possession of characteristics specific to anticipatory thinking. One would expect older pupils to exhibit more characteristics indicating the possession of high levels of anticipatory thinking.

It is crucial that today's students are able to cope with the complexity and uncertainty of future problems (Ojala 2017). Therefore, fostering anticipatory thinking has become a challenge for educators. In a globalised world, a change in one part of the globe may lead to changes in other regions. In this context, it is crucial to have confidence in one's ability to address complex, and sometimes yet unrecognised problems of the future (Ojala 2017).

Limitations of the method

Like any research method, the procedure we used also has certain limitations. First, we investigated students' self-reported characteristics related to anticipatory thinking, which we identified based on a literature review. To determine the actual rather than the declared level of anticipatory thinking, it would be necessary to develop a standardised competency test or to conduct research using the observational method, which could present a challenge to the research. Additionally, it would be valuable to deepen the research by using qualitative methods, such as analysing the core curricula of the respective teaching subjects in grades VII-VIII of primary school and I-V of secondary school, to determine which content, methods and forms of work support the development of pupils' anticipatory thinking. Furthermore, it would be useful to ask teachers how they assess the level of anticipatory thinking

of their students. For this purpose, a survey and qualitative research using a focus interview technique should be planned, as teachers assess their students' level of anticipatory thinking competence influences how they attempt to develop this competence among adolescents.

Summary

The aim of the survey was to determine the declared level of predictive thinking of students in the final grades of primary school and all grades of secondary school. The data obtained indicate that pupils rate their competence in this area positively, but there is a statistically significant difference between the ratings of girls and boys. Further research should be conducted to determine whether girls' self-assessment is underestimated or if their competence is actually lower.

In the context of today's the challenges, particularly the challenge of building peace in a global world where new conflicts are emerging, it is crucial for students to understand that every action, every decision has consequences. They need to realise this not only in the context of everyday life challenges, but also when making important, life-changing decisions. Living in a peaceful society requires each individual to be able to recognise the signs that this peace is under threat and to take action to prevent its destruction.

Developing anticipatory thinking is a challenge for teachers. To support them in this task, training courses, workshops should be organised, where teachers can not only learn about the methods and forms of developing anticipatory thinking competences but also understand the importance of this task – for the future of all of us and the world. Teachers should recognise that in educating for peace, supporting the acquisition and development of anticipatory thinking competence is crucial. Anticipating and preventing certain events are key to building order and peace.

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