1. НАУКА – ПРАКТИЦІ

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DIFFERENTIAL EDUCATION OF GIFTED

Summary.

The article is devoted to the analysis of studies related to the organization of learning gifted students. First of all, it is noted that there are important reasons for the organization of differentiated learning of gifted students. At the same time, differentiated learning gifted is characterized by both positive signs and negative ones. First of all, the creation of optimal opportunities for training at the level of requirements that corresponds to the level of abilities of students is positive. Among negatives most often indicate problems of a moral character, which, as a rule, accompany differentiated learning gifted.

In line with the aforementioned article, data are presented that relate to the students' perception of the quality of class activities when they are subjected to ordinary and in-depth requirements. After that, emphasis is placed on the options that are offered in practice to students of primary and high school. Among the techniques of differentiated learning in the regular class is called the use of independent training. It is also proved that academic competitions of students can be used as a tool for differentiating learning in school. Based on the results of the analysis, data are presented on the effect of multilevel learning and the results of the practice of differentiated learning are summarized.

The next block in the article is devoted to the social efficiency of accelerating and grouping students according to their abilities. An important place is given to teaching methods in accelerated classes. The development of students, their abilities and social connections in specialized classes for gifted ones is also considered. The data of self-esteem and social status of students who studied in normal and accelerated mode are given.

A lot of place in the article is devoted to the analysis of the practice of teaching gifted in ordinary schools, in particular, the differentiation within the school and class. In connection with the indicated points to the value of the adaptation of general educational practice to the specifics of gifted. As an example, the teaching of mathematically gifted students in a heterogeneous class is described. The practice of teaching students who are capable of studying natural subjects in a heterogeneous class is similarly described. Typically, these classes use coaching strategies and co-op training. There is now a widespread practice of creating clusters of gifted in a heterogeneous class. In clusters, of course, you can use both the strategy of enrichment and acceleration. No less widespread is the practice of jumping gifted students through the class.

The main place in the article is dedicated to the use of information technology in the teaching of gifted.

The article ends with the consideration of the participation of gifted students in extracurricular activities. The results of engaging in gifted and regular students are compared.

Keywords: *differentiation learning; differentiated gifted learning; homogeneous and heterogeneous classes; enrichment and acceleration; cluster; jump through the class; information technology.*

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The article [1] describes the initial development and psychometric evaluation of an instrument for use with secondary students to measure various perceptions about class activities. The instrument – Student Perceptions of Classroom Quality (SPOCQ) – focuses on meaningfulness, challenge, choice, self-efficacy, and appeal, constructs central to learning and deeply rooted in gifted education. The article reports content and construct validity evidence, reliability estimates, and demographic group comparisons from a diverse national sample of students in grades 7–12 ($N = 7411$). The article also details differences between advanced and general education students' perceptions of their classroom environments. SPOCQ can be useful to those interested in classroom research, as well as those aiming to improve teaching and learning by considering students' perceptions of class activities.

The research on talent development demonstrates both the importance of outside-of-school experiences and the contribution of specific kinds of experiences to the development of high levels of academic talent. Currently, secondary school programs for the gifted are not built on this research. It is critical that schools coordinate with and utilize other institutions in their talent development programs for gifted children, develop the means by which students can readily partake of outside programs, and create policies and remove obstacles in order to facilitate children's participation in outside-of-school programs [2].

It is possible to distinguish between structural and integral forms of curriculum provision for highly able students. Both these forms offer advantages and disadvantages, while there are also particular problems associated with enrichment. Three common forms of differentiation under the integral umbrella are by inputs, by outputs, or by developmental differentiation. Of these, developmental differentiation is the most appropriate. Its theoretical context can be matched to the needs which able students are reported to have. Translated into a practical methodology for use in schools and colleges, six types of cognitive process pedagogies which provide the appropriate curriculum enrichment can be identified: Games and simulation, cognitive study skills, real problem solving and investigative learning, collaborative learning, experiential learning and language experience methods. These facilitate the development of higher order cognitive and metacognitive skills and offer challenge in all content areas [3].

The art of discussion – allowing people to meet face-to-face to talk about a topic or issue – may be a diminishing form of communication in the electronic era. It also may be the loss of the opportunity to advocate or shape and enhance colleagues' perceptions about a topic or issue. An important and complex concept such as differentiated curriculum needs the confrontation of ideas that flow in a discussion to underscore its value and define its meaning. While differentiation is a prevalent topic for professional development, this setting usually relies on lecture rather than discussion as the primary mode of communication. Advocating for differentiation may be best accomplished in a discussion group structured to uncover the factors that thwart, as well as promote, differentiation of curriculum. The following issues about differentiation can be used to stimulate discussion and advocacy efforts. The accompanying questions and charts can be used to structure advocacy efforts for the issue about differentiation within the discussion group [4].

All students are entitled to a respectful and meaningful education in this decade of No Child Left Behind, and yet attention to the gifted wanes with the emphasis on standards-based education and testing. Educators of the gifted have wrestled with this dilemma for many decades, even as early as the 1920s when Leta S. Hollingsworth, noted "mother of gifted education", first studied the issue of what constitutes a respectful and challenging education for the gifted. Since that time, educators have agreed that gifted students need an educational plan that is tailored to their own unique needs and abilities. Differentiated instruction addresses the needs of the gifted in the diverse, mixed-ability classrooms of today by adapting the content, process, or product with regards to the varying interests and readiness levels of the students. Independent study, a differentiation technique recommended for use with the gifted, offers students input into their own learning while providing challenge and critical thinking skills [5].

Curriculum differentiation has been a central strategy in gifted education, allowing gifted students to explore and pursue different and higher level activities beyond regular classroom instruction [6].

The study [7] examines Title 1 heterogeneous classroom teachers' instructional behavior change through implementing well-designed research-based curriculum units and attending regular professional development activities across 3 years. Employing an experimental design, this study compares experimental and comparison teachers' behavioral changes as measured by an observation scale of differentiated teaching strategies across 3 years. The results show that experimental teachers received statistically significant and educationally important higher ratings than comparison teachers on differentiated strategy use and effectiveness across 3 years. The study corroborates the research literature that shows that teachers' instructional improvement takes 2 years to manifest its effectiveness and to shape belief in student learning benefits. This study suggests several areas of practical application. One area is in the reality versus the myth of professional development. These data suggest the need for multiple years of professional development, interspersed with observations that track the frequency and efficacy of targeting instructional behaviors. Thus, educational reformers must be clear about what change they want teachers to achieve and set about a 2- to 3-year plan for making it happen at the school level. This study also lends support to more systematic

approaches to encouraging differentiation. It highlights the need for monitoring classroom implementation. The use of a well-validated observation tool such as the Classroom Observation Scale – Revised provides a venue for ongoing instructional monitoring and improvement. Moreover, embedding content pedagogy in actual curriculum for training reduces the chance for inaccurate teacher inferencing about how to employ a strategy effectively.

The study [8] examined the differentiated curriculum method of tiered instruction for improvement of academic achievement in a secondary science course. The study consisted of a control group of 7 midrange instruction classrooms and a treatment group of 7 tiered instruction classrooms, totaling 293 ninth-grade students. The students in the treatment classrooms were grouped based on prior skills and background knowledge of the subject for the instruction unit. The treatment group's high background learners showed significant gains over the control equivalent group. The results of this study showed a significant difference between the scores of low background knowledge learners who did or did not receive tiered instruction, indicating that tiered instruction may be especially beneficial to this level of learner. The treatment group's high background learners showed significant gains over the control equivalent group.

Although the academic gains associated with acceleration and peer ability grouping are well documented, resistance to their use for gifted students continues because of concerns that such practices will cause social or emotional harm to students. Results from the broad research indicate that grade skipping, early school entrance, and early admission to college have socioaffective benefits for gifted students who are selected on the basis of demonstrated academic, social, and emotional maturity, but may be harmful to unselected students who are arbitrarily accelerated on the basis of IQ, achievement, or social maturity. There is little research on the socioaffective effects of peer ability grouping. The limited evidence indicates strong benefits for highly gifted students and possibly for some minority or disadvantaged gifted students. Robust evidence does not exist to support the idea that heterogeneous classroom grouping per se significantly increases the risk for adjustment problems among moderately gifted students. M. Neihart [9] presented recommendations for best practice based on the available evidence.

The study [10] involved 15 secondary-level teachers who taught fast-paced classes at a university-based summer program and similar regularly paced classes in their local schools in order to examine how teachers differentiate or modify instructional methods and content selections for fast-paced classes. Interviews were conducted with the teachers during the summer sessions with a brief survey used as supplemental data. Overall, teachers in this study used a varied set of instructional strategies and in-class activities for their fast-paced classes including lectures, presentations, group activities, demonstrations, frequent tests and quizzes, timed writing, essays, and discussion. The shorter time frame (3 weeks versus 9 months) and teachers' perceptions about students' academic abilities were the two major reasons given for the differentiated instructional strategies and content in the fast-paced classes. In the survey data, less repetition in course content, advanced-level readings and questions, and more independence in learning were found for the fast-paced classes. Yet, the teachers were not likely to move beyond the textbook for enrichment materials or individualize homework or assignments for students in their fast-paced classes. They also expressed concerns regarding depth versus breadth of the material covered in the 3-week courses.

Two years have passed since the first report on the project with primary school children at Törökszentmiklós. New results indicate [11] that participation in the project has accelerated the development of abilities, has led to mainly favourable personality changes and has promoted the formation of advantageous social structures in the classroom.

The study [12] examined the self-concept and social status of accelerated and nonaccelerated students in their first 2 years of secondary school in the Netherlands. In 357 students from 18 secondary schools, we measured self-concept, sociometric status, and behavior reputations at three times. Accelerated students had more positive self-concepts concerning school in general and mathematics than nonaccelerated students, but a less positive social self-concept. In girls but not in boys, the difference in social self-concept of accelerated and nonaccelerated students was no longer present at the end of the 2nd year. Accelerated students had a lower social status than nonaccelerants and were considered to be less cooperative, humorous, helpful, leading, and social. peer ratings were more negative for accelerated boys than for accelerated girls. In this study, the authors found that accelerated students have a more positive academic self-concept than their nonaccelerated classmates. They also found, however, indications that accelerated students, especially boys, in their first two years in secondary school (Grades 7 and 8 in the U.S. secondary educational system), have a more negative social status than their classmates. Many empirical studies and practitioners' experiences with gifted students point at the benefits of acceleration and the negative consequences of not accelerating a child. So, to abolish acceleration is not a realistic option. We should, however, take into account that accelerated students might have a more negative social status than their classmates. Knowledgeable teachers, with a positive attitude toward accelerated students, should be alert about possible prejudices of classmates and should aim for an accepting, tolerating climate in the classroom.

After introducing a differentiation model for the benefit of gifted pupils in regular schools, the article [13] discusses some important findings of the research

project “High giftedness in education”, carried out at the ISOR, the Educational Research Department at the University of Utrecht. Data from survey research indicate what special provision has been made for gifted pupils in secondary schools in the Netherlands. Further data summarize experiences with the differentiation model at two different types of secondary school. Finally, some adaptations of the differentiation model are outlined.

Funded by the Jacob K. Javits Gifted and Talented Education Act, the Mustard Seed Project’s major goal was to train teachers to differentiate curricula for gifted students in the general education classroom. The study [14] addressed the changes in classroom practices and the factors that influenced these changes. Changes were measured using the Classroom Instructional Practices Scale. The sample included 1 urban and 5 rural sites, 8 principals, 74 teachers, mentor teachers, and 18 community representatives. Throughout the two years of implementation, majority of teachers at each site made changes. Changes in classroom practices and influencing factors, were determined from interviews, field notes, formal and informal observations, and a final survey. Participants cited staff-development activities, leadership, mentoring, resources, and project support as extremely beneficial.

Differentiation provides one method by which teachers can provide appropriate challenges at appropriate levels for all learners in a heterogeneously grouped mathematics classroom, where the range of abilities and interests can be wide. C. F. Reed [15] considers a heterogeneously grouped high school geometry class where differentiation is practiced. Students who demonstrated mastery of the concepts and skills still under study are invited to move into a differentiated option closely linked to the current class material. Three differentiation opportunities are presented and discussed. The first opportunity is an extension and application of current class work. The second is an investigation of open-ended questions. The third is a consideration of student-selected problems.

The Chemistry/Physics Program at Evanston Township High School was designed to provide an environment for the rigorous teaching of advanced science and mathematics to accelerated students. This type of student makes up the bulk of students in the Advanced Placement Chemistry and Physics classes. However, there is a small number of students who master class materials quickly and easily and display unusual scientific insight. The authors consider these students to be gifted, and it is this group on whom they have reported in the article [16]. The authors discuss various options they have utilized to keep students in the Chemistry/Physics Program highly motivated and challenged.

Structured tinkering is a systematic approach to the modification of the basic school curriculum to meet the needs of gifted and talented pupils. The approach builds on curriculum planning techniques and classroom differentiation techniques, and encourages individual teachers to determine the areas and methodologies for curriculum improvement. It foregrounds the role of the teacher and provides them with the skills to engage in critical reflection and systematic data collection so as to make informed choices on behalf of their class or department. D. Eyre [17] explores the rationale for the development of such an approach, gives details of its methodology and highlights some of its outcomes.

When the author [18] spoke recently on the topic of cooperative learning with teachers who work with gifted students, he got the distinct impression tomato throwing was imminent. The experience certainly reinforced the discord that seems to exist between proponents of cooperative learning and those who advocate for the gifted and talented. At best, educators of the gifted have been cautioned to approach the cooperative learning bandwagon with “caution”. Is this trepidation warranted? Are the goals of cooperative learning inconsistent with the needs of gifted students? Is cooperative learning simply misunderstood or truly a mismatch?

Because research has found that differentiation of instruction for gifted students does not typically occur within the general classroom, collaboration between gifted and general education teachers is critical in order to ensure appropriate services to students with high abilities. Gifted education teachers are now being called upon to provide services to their students in the regular education environment. This fundamental change in setting mirrors mandated changes in special education, wherein students with disabilities are increasingly served in the general education classroom. The article [19] provides a new definition of collaboration within the context of gifted education and expands on the utilization of coteaching as a collaborative strategy. Five models of coteaching originally developed for meeting the needs of students with disabilities were adapted, and examples of their use with gifted students in the general education classroom are provided.

The authors [20], in recognition of the need to develop the thinking skills, creativity and high-end learning of all young people, propose an innovative technique towards this goal, enrichment clusters. Renzulli and his co-authors point out that “enrichment clusters should be viewed as vehicles through which students can increase their knowledge base and expand their creative and critical thinking skills, cooperative group work skills, and task commitment by applying their time and energy to self-selected problems or areas of study”.

Enrichment clusters, a component of the Schoolwide Enrichment Model, are multigrade investigative groups based on constructivist learning methodology. Enrichment clusters are organized around major disciplines, interdisciplinary themes, or cross-disciplinary topics. Within clusters, students are grouped across grade levels by interests and focused toward the production of real-world products or services. When the enrichment clusters model was first articulated by

Joseph Renzulli, it was modeled after the ways in which knowledge utilization, thinking skills, and interpersonal relations took place in the real world. Thus, all work was directed toward a common goal – the creation of a product or service. Enrichment clusters have been successful in developing creative producers in the 20th Century [21].

After many years of neglect, the subject of giftedeness as a topic of research has once again received more attention in German speaking countries since the end of the 1970s. The somewhat hesitant, systematic study of highly gifted children and adolescents, especially the question of how to identify and encourage them, was accompanied over the years by controversial and exhaustive educational policy debates. Emphasis on aspects such as equality of opportunity and elitist education has, inter alia, contributed considerably to the fact that the interests of gifted children-even if discussions have aroused increasing public interest, i.e. discussion of giftedness has became socially acceptable – have only slowly begun to be emphasized. It is probably for this reason that little attention has been paid to grade skipping. The students in the study [22] who skipped a grade coped as a group quite well with work in the higher grade, depite a low level of support from the schools.

Although public and professional opinion on grade skipping is quite negative, there are no German studies that support this view. Schools, parents and grade skippers themselves reported next to no academic problems; if there were emotional and social problems, it was not clear whether they were actually caused by this form of acceleration, by individual, private problems or by an unsympathetic environment. This is an area that calls for more research. Attempts to increase the number of grade skippers in grammar schools were not successful [23].

Providing gifted and talented students with appropriate and intellectually stimulating learning opportunities that further their talent development can be a major challenge. This challenge can range from locating more advanced curriculum materials to helping gifted students explore an area of interest. While this challenge is particularly daunting for those in isolated areas or with limited resources, technology has enabled parents and educators to expand gifted students' learning options with minimal expense. Although most users primarily view the Internet as a repository of knowledge that is easily accessible through a search engine such as Google, the Internet's simple capacity to connect users is an equally important strength [24].

Google has been the search engine of choice for most Web surfers for the past half decade. More recently, the creative founders of the popular search engine have been busily creating and testing a variety of useful products that will appeal to gifted learners of varying ages. The purpose of this column [25] is to share information about three of these products that can be downloaded and used free of charge.

Your school has just eliminated the gifted and talented pull-out program due to budgetary constraints. Therefore, all gifted and talented students will now be taught in the general education classroom. One of your kindergarten students, Sean, is academically gifted and is advanced beyond his peers in math, social studies, and science. He is computer literate. Sean is constantly playing computer games and uses the computer for his classroom and homework assignments. Although this student is gifted, he also has a disability. His low vision requires assistive technology to aid him in reading text. You query this predicament: "How can I meet Sean's educational needs while simultaneously reaching out to the needs of the other students in my class?" [26].

Just when you thought it was safe to remove your Internet training wheels, new technologies explode onto the information highway. Podcasts and blogs have hit the Internet with full force, and educators can capitalize on students' fascination with these new technologies to increase motivation and learning opportunities. The purpose of the column [27] is to describe how to easily create, post, and receive podcasts and blogs using software that can be downloaded for free from the Internet.

When gifted students enter the workforce, they will be expected to search Web sites, locate information, and compare it with information found in nonelectronic sources. In order to adequately prepare these students to be successful, teachers of the gifted must learn to harness the power of Web sites and create learning environments that mirror contemporary society. Web sites are a rich resource that can be used to facilitate the learning, sharing, and creating of information. Not since the invention of the printing press has a development such as the Internet had such a revolutionary impact on how information is shared. More than ever before, individuals can share information on a global scale. Unfortunately, Web sites are underused in gifted education classrooms [28].

Students of all ages enjoy creating electronic presentations where they can share their interests and knowledge. At an early age, they can quickly learn to create sophisticated-looking presentations that often rival those of professional presenters. One of the more popular presentation software programs available to students is Microsoft's PowerPoint®. Unfortunately, most users of the program fail to explore the creative options that Microsoft has slowly been incorporating into the program. Instead, they stay with the built-in, user-friendly templates and default settings that result in each presentation depicting a clone of the previous. The article [29] shares one of the most underutilized features of PowerPoint: the hyperlink function.

The author [30] watched a social studies teacher present a lesson on the Civil War by means of a PowerPoint presentation. Slide by slide flashed on the screen, filled with bulleted lists of information that the teacher read to her students word for word. Students were staring at their handout pages with glassy eyes,

lulled into a state of comatose compliance by the thought that all they had to do was study the handout for the test later that week. It strongly reminded him of his eighth-grade history teacher, more years ago than he care to admit, who had a similar teaching style, albeit without the visual component. We would walk into the classroom, sit down, and take out our notebooks. She would start talking and we would write furiously, trying to take down her notes word for word, for we would be expected to regurgitate those facts in the test coming up in the following week.

Geography is rapidly becoming more interactive, especially with the advent of the Global Positioning System (GPS) and Geographic Information Systems (GIS) and their adoption in the public and private sectors. The days of two-dimensional maps are quickly being replaced by geographic images that are stored electronically in computers and handheld devices, which also house layers of information that are available with the click of a button. This change in the way information is stored, retrieved, and used is transforming business, industry, and government, allowing for a more efficient use of time and money, and in some cases, saving lives. In order to prepare gifted learners to lead in the future, which will likely require competence in technological skills, social studies educators and teachers of the gifted should utilize GPS and GIS in their teaching, allowing students to use real-world information to address authentic problems [31].

The book itself is one of the foundations of modern education. But, today there is a new book available to educators, one that integrates new technologies. Today's technology enhanced book is called an electronic book, or eBook. EBooks are textual documents that have been converted and "published" in an electronic format and are displayed on eBook readers, devices, or computers using eBook software programs. This new form of book is a relatively recent addition to book styles and offers students, teachers, and schools an additional tool for the teaching of reading and the integration of reading into content areas. Using the technology resources of computers and Internet access that are already present in homes, classrooms, and libraries, parents, educators, and students can begin using eBooks with little or no cost [32].

Training of divergent thinking, which is commonly regarded as an important component underlying creativity, often involves the administration of a large number of moderated sessions. One exploratory study [33] examines a computer-based divergent thinking training program with respect to its effectiveness in enhancing ideational fluency and originality on the basis of practice. Two training versions were developed: (a) a training of verbal creativity and (b) a training of functional creativity. Both training versions consisted of 9 sessions with 8 divergent thinking tasks each. Two training groups (consisting of 11 participants each) and a control group (n = 14) were matched for creativity, intelligence, age, and gender; the groups were tested in a pre-posttest design. The computer training was found to effectively enhance the intelligent-independent aspect of ideational fluency (d = 0,54), whereas no training effects with respect to the originality of ideas were observed. The findings point to the usefulness of a computer-based training to enhance creativity-relevant abilities.

In the study [34], the authors surveyed the participation rates of academically talented students across 9 areas: dance, solo instrument, choral music, band, athletics, student government, academic clubs, ethnic/cultural clubs, and an "other activities" category. Participants consisted of 2 independent cohorts (Cohort 1, N = 842; Cohort 2, N = 290) attending a summer program. Results indicated that athletics was the activity in which males and females reported greatest participation across cohorts. Significant differences in rates were found for participation in athletics, choral music, and dance in the direction of gender-stereotypical expectations. Differences were also found among ethnic groups and across grade levels in certain activities. The authors concluded that the results contradict the nonathletic stereotype sometimes associated with students who are academically talented.

Based on survey responses from 230 students enrolled in a summer gifted program at a university, the study [35] gives a description of gifted students' participation in extracurricular activities in and outside of school. Findings show that gifted students were more involved in competitions, clubs, or other extracurricular activities in mathematics than in other subject areas and were the least involved in computer science activities. Sports were the most frequent extracurricular and outside-of-school activities, as well as playing and working with computers. The data reveal some gender-stereotypical tendencies regarding participation in and outside-of-school activities and gender-typical patterns of support from parents. Grade and course differences were also found. Contributions this study makes to the existing literature are to assess the consonance of children's participation in outside-of-school and extracurricular activities with their talent area and to document empirically parental involvement and independent home study for gifted adolescents.

About 9,000 West German students representing the whole range of academic aptitude were examined [36] at the beginning of their 13th school year. A general scholastic aptitude test was administered, and school marks and information on the pupils' extracurricular interests and activities recorded. A group of highly gifted students was defined in terms of exceptional performance both in school and on the scholastic aptitude test. The extracurricular activities of this group were compared with those of the representative group. The popular hypothesis that superior cognitive giftedness and outstanding achievement in school go with an 'impoverishment' of extracurricular activities was not supported: In most areas a larger percentage

of the highly gifted than of the reference group were actively involved. Furthermore, the range of individual activities was somewhat broader among the top students than among the representative group.

Conclusions. The analysis shows that despite a lengthy discussion, the lack of an unambiguous answer to the ratio of the positive and negative effects of differentiated gifted learning, the creation of optimal conditions for their development is increasingly used, as circumstances allow, to differentiate learning, namely, the formation of specialized schools, classes and clusters, using both enriched and accelerated learning strategies.

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ДИФЕРЕНЦІЙОВАНЕ НАВЧАННЯ ОБДАРОВАНИХ

Анотація.

Статтю присвячено аналізу досліджень, які пов'язані з організацією навчання обдарованих учнів. Насамперед зазначається, що існують вагомі причини для організації диференційованого навчання обдарованих учнів. Водночас у статті визначено, що диференційованому навчанню обдарованих притаманні як позитивні ознаки, так і негативні. До позитиву передусім належить створення оптимальних можливостей для навчання на рівні вимог, які відповідають рівню здібностей учнів. Серед негативу найчастіше вказують на проблеми морального характеру, які зазвичай супроводжують диференційоване навчання обдарованих.

Ключові слова: *диференціація навчання; диференційоване навчання обдарованих; гомогенні та гетерогенні класи; збагачення і прискорення; кластер; перестрибування через клас; інформаційні технології.*

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