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Tsymbal, I.V.

PSYCHOLOGICAL CONDITIONS OF IMPROVING READING COMPETENCE OF MODERN SPECIALISTS

Tsymbal, I.V. Psychological conditions of improving reading competence of modern specialists. The article emphasizes the importance of developing the reading competence of modern specialists and describes the psychological conditions for improving the efficiency of work on professional literature in a foreign language. The author groups cognitive styles of work on foreign scientific texts; taking into account these styles contributes to more productive work on such texts. The presented results of the implementation of the program of psychological trainings on improving the effectiveness of work on foreign scientific texts aimed at developing readers' individual psychological characteristics (such as memory, concentration of attention, sustainable internal motivation for the reading of scientific literature in foreign language, achievement motivation, level of self-organization) confirm the appropriateness of implementation of this program to increase the effectiveness of working on foreign scientific texts.

Key words: cognitive styles, reading competence, cognitive style of work on foreign scientific text, motivation, psychological training, index of effective reading.

Цымбал І.В. Психологічні умови удосконалення читальної компетенції сучасних спеціалістів. В статті підкреслена важкість розвитку читальної компетенції сучасних спеціалістів і обозначені психологічні умови підвищення ефективності роботи з професійною літературою на іноземному мові. Виділені когнітивні стилі роботи з іноземними науковими текстами, урахування яких сприяє більш продуктивному читанню даних текстів. Представлені результати впровадження програми психологічних тренінгів по підвищенню ефективності роботи з іноземними науковими текстами, направленої на розвиток індивідуальних психологічних характеристик читачів (пам'яті, концентрації уваги, стійкої внутрішньої мотивації к читанню наукової літератури на іноземному мові, мотивації досягнення успіху, рівня самоорганізованості), підтверджують доцільність використання розробленої програми для підвищення результативності читання іноземних наукових текстів.

Ключові слова: когнітивні стилі, читальська компетенція, когнітивний стиль роботи з іноземним науковим текстом, мотивація, психологічний тренінг, коефіцієнт ефективності роботи з текстом.

Introduction. Modern world of the science sets new requirements to scientists. Every successful specialist has to know at least one foreign language in order to participate in international conferences, write theoretical articles to present results of actual researches in different fields of sciences and share his or her work with peers. They need to process different scientific literature as quickly as possible and find the necessary information, so psychologists search new ways of fast and effective reading.

The analysis of last publications. Reading of foreign scientific texts is a complicated process for readers to comprehend the meaning of a text, it requires mental stress and concentration of attention. A.-E. Dalcq, A. Englbart & E. Uyttebrouck [4], J. Otero, J. A. Leon & A. C. Graesser [12], P. Van Den Broek [14], and others researched peculiarities of scientific texts reading but the problem of studying the psychological characteristics of scientific texts reading in foreign languages remains little studied in psychological domain.

We refer to the individual-psychological characteristics of readers that influence the comprehension of foreign scientific texts, the motivation to learn foreign languages and to work on foreign scientific texts, multiple intelligence, cognitive styles and learning styles.

Howard Gardner's theory [7] found its continuation in the writings of T. Armstrong [1], L. Campbell, B. Campbell [3], M. Fleetham [6] and others, who studied how the inclusion of multiple intelligence influences the educational process.

According to Dunn&Dunn, learning style is «the way in which each learner begins to concentrate on, process, absorb, and retain new and difficult information» [5]. To wide extent, the learning style is described as factors, behavioral scenarios, and settings that facilitate learning in given situation. David Kolb's model [10], Peter Honey's model, and Alan Mumford's model, Dunn & Dunn's model [5] have been the basis of many studies on the influence of learning styles on improving readers' learning.

The influence of cognitive styles on the formation of reading competence was studied by S. Bondar [2], M. Holodnaja [8], T. Pletago [11] and other psychologists. In particular, S. Bondar [2] found that readers with impulsive cognitive style have a high reading speed, with a field independent style – and a reader with reflective style – a low reading speed. In our research we study the ways to improve the reading competence by taking into account individual psychological features of readers.

As well as learning styles and cognitive styles we intend to define specific cognitive styles of work on foreign scientific texts and examine how readers with each reading style succeed in processing of foreign scientific texts. Therefore, taking into account of the features of perception, multiple intelligence, learning

style and cognitive styles will help to a reader to better understand oneself and their personal psychological peculiarities, open their creative and scientific potential; promote successful mastery of a specialty, contribute to formation or development of his educational and cognitive motivation etc.

Teacher or trainer will take into account the dominant types of intelligence, learning style and cognitive styles in order to better understand the potential of students, their interests and needs; to form educational subgroups depending on the type of activity at the training (homogeneous or mixed); create a positive learning atmosphere in the group.

Hence, **the research objective** is to define reading styles of work on foreign scientific texts and their impact on a successful reading.

The basic material and results of research. During our experiment held among four-year students of Igor Sikorsky Kyiv Polytechnic Institute we made a correlation and cluster analysis of the study of their multiple intelligence, learning and cognitive styles, as well as their motives of learning of foreign languages and working on foreign scientific texts, and identified five main clusters.

Consequently, on the basis of the obtained results, we could distinguish five cognitive styles of work on foreign scientific texts: "Scientific – Field independent", "Linguistic – Impulsive", "Theoretical – Reflective", "Pragmatic – Intuitive", "Active – Field dependent".

We have assumed that cognitive styles of work on foreign scientific texts are individual methods and techniques used by the reader while working on these texts according to reader's motivation.

Therefore we tested students-future specialists and found out types of their multiple intelligences, learning styles and motives of learning or foreign languages and of working on foreign scientific texts. Due to some questions took from Honey&Mumford Learning Styles Questionnaire, we also found out readers' dominant cognitive styles.

The results of the frequency analysis showed that the highest percentage among the readers who participated in the experiment (27 %) has the "Scientific – Field independent" style of work on foreign scientific texts, 25% of readers – "Theoretical – Reflective", 20 % of respondents – "Linguistic – Impulsive", 17% of readers – "Pragmatic – Intuitive", and 11% of readers – "Active – Field dependent" style of work on foreign scientific texts.

In Table 1 you can see description of main reader's peculiarities according to their predominant cognitive style of work on foreign scientific texts: the way they work on texts and process information, some peculiarities of their attention etc.

Table 1

Main cognitive styles of work on foreign scientific texts and their description

Cognitive styles of work on foreign scientific texts	Reader's psychological peculiarities according to the style
Scientific – Field independent	<ul style="list-style-type: none"> - Reading of foreign scientific texts for the purpose of obtaining topical scientific information; - study of internal sources of information; - hypothetical-deductive approach in semantic text processing; - analysis by synthesis; - detailed analysis of the material.
Linguistic – Impulsive	<ul style="list-style-type: none"> - Reading of the foreign scientific texts for the purpose of enriching scientific vocabulary; - rapid hypothesis and decision making; - low concentration of attention, bigger volume and less self-control; - difficulty in separating essential information from the insignificant.
Theoretical – Reflective	<ul style="list-style-type: none"> - Reading of the foreign scientific texts for the reasons of professional self-improvement, studying and working abroad; - construction of a logical sequence of events; - analysis and synthesis of problems; - predominance of observing on the action; - stable attention; - easiness of separation of essential information from the insignificant.
Pragmatic – Intuitive	<ul style="list-style-type: none"> - Reading of the foreign scientific texts for the motive of duty; - love for experiments and learning; - predominance of the instinctive reaction on the logical analysis; - ability to implement their own projects, to take risk.
Active – Field dependent	<ul style="list-style-type: none"> - Reading of the foreign scientific texts for obtaining financial and/or other reward; - independence in actions; - love of risk; - distracted attention; - orientation on external factors in the processing of new data.

Readers with "Scientific – Field independent" style work on foreign scientific texts because they love their work and feedback for learning more; they study internal sources of information (knowledge and experience); carry out a hypothetical-deductive approach to semantic text processing; analyze and achieve analysis by synthesis; easily work on texts; make less mistakes in writing and or editing; prefer a detailed analysis of the material.

Readers with "Linguistic – Impulsive" style work on foreign scientific texts for the purpose of enriching their vocabulary with new words and specific terms; learn foreign languages for self-development; quickly hypothesize and make decisions, and in a situation of alternative choice can instantly decide; have a low concentration of attention, and less self-control; quickly give answer, but more often than others make mistakes; during reading, it is hard for them to separate essential information from the insignificant.

Readers with «Theoretical – Reflective" style learn foreign languages and work on foreign scientific texts for the motives of professional self-improvement, in order to study or work abroad; tend to create a logical sequence of events; like to analyze and synthesize problems; like patterns and rules; are thoughtful and cautious; prefer to observe and not act; before making any decision, they prefer to consider all aspects of the problem and collect as much information as possible; have stable attention, slowly make decisions and weigh for a long time all pros and cons; are capable to read slowly and thoughtfully; during the reading it is easy for them to separate essential information from the insignificant.

Readers with "Pragmatic – Intuitive" style learn foreign languages and work on foreign scientific texts through the motive of duty; seek to test new ideas in practice; work fast and confidently on ideas that they are fond of them, like to experiment and to learn, they get down by themselves to business; get pleasure realizing their projects and independently taking on new experiments that are considered as a challenge; react more instinctively than logically analyzing; are capable to implement their projects, to take a risk.

Readers with "Active – Field dependent" style learn foreign languages and work on foreign scientific texts for the purpose of obtaining financial and/or other reward; act independently; prefer to do it first, then think; like to take risks; they have the dispersed attention; do not like activities that require long-lasting tension; when perceiving information, they pay more attention to the background and less – to the details; are guided by external factors while processing new data.

The tests for comprehension of foreign scientific texts and observing the participants at the beginning of the experiment showed that:

1) the best results were shown by readers with "Scientific – Field independent" style of work on foreign scientific texts, due to the speed of text processing and the percentage of correctly execute completed tasks after them;

2) readers with "Theoretical – Reflective" style showed good results at the expense of a higher percentage of correct answers to control questions, but the speed with which they were working on texts was less than the speed of readers with "Scientific – Field independent";

3) readers with "Pragmatic – Intuitive" style of work coped with the task faster than others, but the percentage of correct answers to control test was the lowest;

4) readers with "Linguistic – Impulsive" style the best of all coped with the tasks for comprehension of the lexical-thematic basis of the text, and readers with "Scientific – Field independent" – with predicting of the content of the text;

5) the best results of control foreign scientific text comprehension showed the readers with "Scientific – Field independent" and "Theoretic – Reflective" styles of work on foreign scientific texts, and the worst ones – with "Pragmatic – Intuitive" style.

Therefore, in order to improve the efficiency of teaching readers to work on foreign scientific texts, we provide adaptation of their cognitive styles of work on foreign scientific texts through the development of sustainable internal motivation for the learning of foreign languages and reading of scientific literature in a foreign language and the achievement motivation, development of memory and concentration of readers' attention, formation of their self-organization.

For each style, we have developed practical guidelines for more effective work on foreign scientific texts.

Then we consider the behavioral features of readers who have a particular cognitive style of work on foreign scientific texts, and give recommendations for a more effective learning of a foreign language and work on foreign scientific texts.

Readers with "Scientific – Field independent" style of work on foreign scientific texts are recommended to work on foreign scientific texts for the purpose of writing scientific articles and abstracts in a foreign language, preparing of reports at international conferences; to process texts based on previous experience; make exercises for probabilistic prediction of the text content.

Readers with "Linguistic – Impulsive" style of work on foreign scientific texts are recommended to select articles, "rich" on special terms and new words; to make heuristic cards ("memory cards") to better remember the keywords and terms; develop concentration of attention; for faster and more concentrated reading, use pencil, etc., to follow the words in the text; do not hurry with the decision and regulate the time spent on the preparation of the task.

Readers with "Theoretical – Reflective" style of work on foreign scientific texts are recommended to participate in project work with detailed reading of scientific texts in a foreign language; give more time for reflection and decision making.

Readers with "Active – Field dependent style" of work on foreign scientific texts are recommended to develop internal motivation for the learning of foreign languages and work on foreign scientific texts; to provide more visual material, large pieces of text should be given in structured form with a large number of schemes, tables, lists, etc.; do exercises on perception and comprehension of the sentence as a whole semantic structure.

Readers with the "Pragmatic – Intuitive" style of work on foreign scientific texts are recommended to develop internal motivation for the study of foreign languages and work on foreign scientific texts; give more time to make a decision.

We devised a program of psychological trainings that consists four parts and each of them aims to form and develop different psychological aspect of participants: their memory and attention focusing; motivation for learning foreign languages and reading of foreign scientific texts; achievement motivation; self-organisation. Besides, this program was created according to predominant cognitive styles of work on foreign scientific texts [13].

Results of the implementation of the program of psychological trainings. In the experimental group, has grown the percentage of readers who learn a foreign language in order to: become a competent, competitive specialist and full developed person; communicate with foreign specialists; make more money. The percentage of readers who said, that they were learning a foreign language, in order to continue studying or working abroad; for obtaining a reward (good marks etc), from the motives of duty has fallen.

As for the readers of the control group, during the year we did not observe an increase in the level of internal motivation to learn foreign languages, but on the contrary, the importance of utilitarian motives and motives of duty increased.

In the experimental group, the number of readers with achievement motivation increased by 22.3%, the number of readers motivated to avoid failures – respectively, decreased. This redistribution in subgroups is due to the awareness of the readers, motivated to avoid failures, of their ability to focus their efforts on achieving their goals.

The effectiveness of work on foreign scientific texts is determined by the formula: the reading speed is multiplied by the percentage of correct answers to the text, divided by 1000. During our experiment, the participants prepared a written resume in a foreign language, the maximum score for this task – 10 points. The total result was divided on 100.

The value of the Index of Effective Reading (IER) is in the range of 2.5 – 10. We accepted that with the value of IER = 2.5 – 4.9 the efficiency of work on a foreign scientific text is low, with the value of IER = 5.0 – 7.49 is sufficient, and at the value of IER = 7.5 – 10.0 – high.

Figure 1 shows the dynamics of the average value of IER in the experimental and control groups.

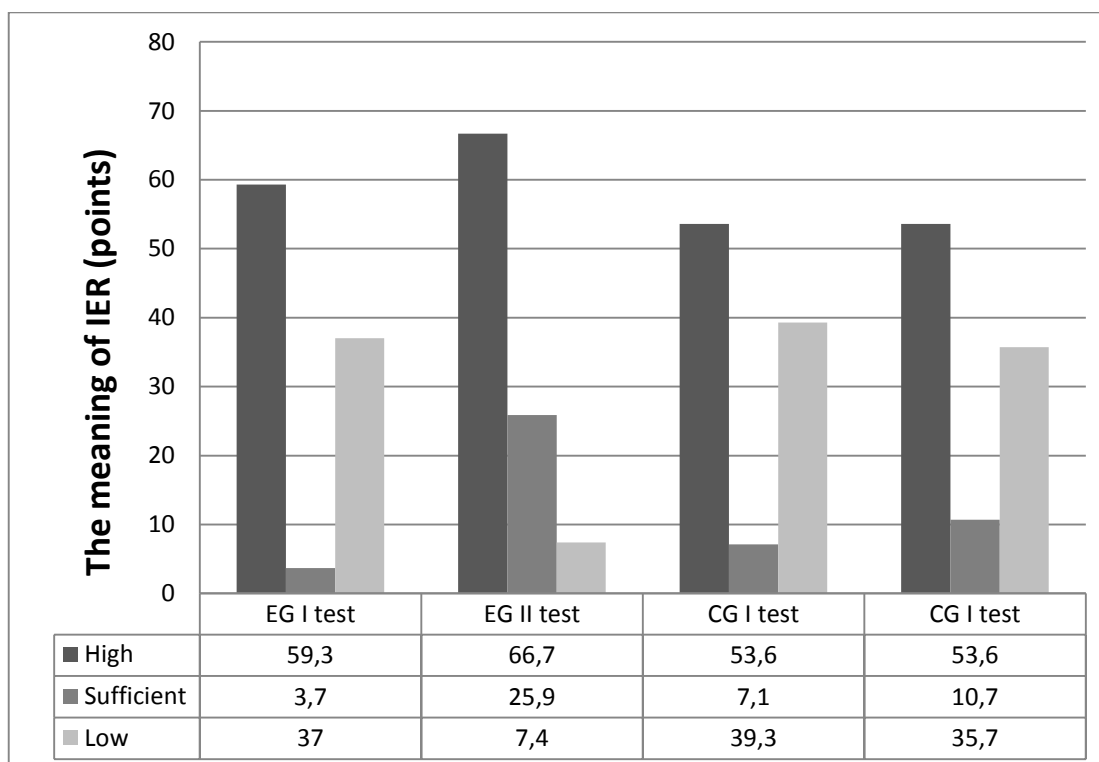


Figure 1. Dynamics of the Index of Effective Reading in experimental and control groups, %

Consequently, the redistribution of the average value of IER in the experimental group (EG) was due to an increase in the speed of work on the text (reduction of regression) and due to an increase in the percentage of text assimilation. The differences are significant at the level of $p < 0.05$.

In the control group (CG), only one student had a change in the IER value from the low to an sufficient level and, according to the sign test, this difference was not statistically significant ($p < 0.1$).

Conclusions. As a result of the study, the following conclusions were made.

1. Analysis of the results of the implementation of the Program of psychological trainings for improving the work on foreign scientific texts proves its effectiveness. This is confirmed by the fact that in the experimental group, in contrast to the control, between the results of the first and second tests were recorded statistically significant differences in the Index of Effective Reading.

2. The effectiveness of the Program of psychological trainings was manifested in positive changes in the experimental group with a high and sufficient value of the IER. In the experimental group, after a set of psychological trainings, we noticed an increase in the number of readers with cognitive and educational motives and motives of personal and professional self-improvement and reduction of the number of readers with utilitarian and motives of duty.

3. At the end of the experiment, readers of the experimental group, without the help of the translation Internet resources, comprehended the sense of the scientific texts in a foreign language of medium and high levels of difficulty.

We consider the problem of work on foreign scientific texts extremely important and relevant, since scientists have to work on professional literature every day for writing articles and abstracts.

The further researches suggested to be done on the investigation and development of the study of psychological peculiarities of writing competence in a scientific foreign language.

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Цимбал І.В. Психологічні умови вдосконалення читацької компетенції сучасних фахівців. У статті підкреслено важливість розвитку читацької компетенції для професійного вдосконалення сучасних фахівців та урахування індивідуальних психологічних характеристик читачів, таких як учінневий стиль, когнітивний стиль, множинний інтелект, задля успішної роботи з іншомовними науковими текстами.

Проведений кореляційний та кластерний аналіз дозволив виділити основні п'ять когнітивних стилів роботи з іншомовними науковими текстами. Автор подає опис основних характеристик кожного стилю та пропонує практичні рекомендації для більш продуктивного читання фахової літератури іноземною мовою.

Розроблена програма тренінгових занять з підвищення ефективності роботи з іншомовними науковими текстами спрямована на формування та розвиток індивідуальних психологічних характеристик учасників експерименту: розвитку пам'яті та концентрації уваги; стійкої внутрішньої мотивації до опрацювання наукової літератури іноземною мовою і мотивації досягнення успіху; підвищення рівня самоорганізованості. Програма розроблена з урахуванням когнітивних стилів роботи з іншомовними науковими текстами.

Представлені результати емпіричного дослідження впливу когнітивних стилів роботи з іншомовними науковими текстами на ефективність читання фахової іноземної літератури.

Результати впровадження програми тренінгових занять з підвищення ефективності роботи з іншомовними науковими текстами в експериментальній групі показали позитивну динаміку показника – коефіцієнта ефективності роботи з текстом. Отже, проведений формувальний експеримент підтвердив доцільність використання розробленої програми тренінгових занять для підвищення результативності опрацювання іншомовних наукових текстів.

Ключові слова: когнітивні стилі, читацька компетенція, когнітивний стиль роботи з іншомовним науковим текстом, мотивація, психологічний тренінг, коефіцієнт ефективності роботи з текстом.

Відомості про автора

Цимбал Інна Валеріївна, викладач, Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського», м. Київ, Україна.

Tsybal, Inna V., teacher, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine.

E-mail: i.tsybal2017@gmail.com