PROSPECTS OF IMPLEMENTING BILINGUAL EDUCATION FOR THE TRAINING OF FUTURE SCIENCE TEACHERS

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Summary: The article considers the prospects of introducing bilingual education for the training of future qualified teachers of natural science education. The aspects of bilingual education application have been highlighted. The introduction of bilingual education in higher education institutions at the level of elective disciplines or integrated courses has been analysed. The main elements of the content of these disciplines in a foreign language for the training of science teachers have been studied. The attitude of students of Ternopil Volodymyr Hnatiuk National Pedagogical University to the prospect of introducing bilingual professional disciplines has been investigated. The prospect of developing educational and material support for bilingual training of future science teachers has been identified.

Keywords: bilingual education, future teachers, professional foreign language, specialist in the sphere of Natural Sciences, education.

Formulation of the problem. The new State standard of basic secondary education in Ukraine is based on the principles of personality-oriented, competence-based and activity-based approaches. The competence-based approach promotes the formation of key and subject competencies. One of them is communication in foreign languages. This involves the ability to properly understand what is said in a foreign language, to express and interpret concepts, thoughts, feelings, facts and opinions (through listening, speaking, reading and writing) in a wide range of social and cultural contexts; the ability to mediate and intercultural communication. This competence can be developed through bilingual education [1, 2].
Unfortunately, secondary and higher education in Ukraine is not properly adapted to the bilingual system. The educational reform is intended to remedy this situation. The Ministry of Education and Science of Ukraine plans to introduce bilingual education in secondary school. This means that students will be taught in Ukrainian and English in the subjects they choose to study [3].

However, there is an urgent need to train qualified teachers who speak foreign languages and can teach natural sciences professionally.

Research analysis. Bilingual education is an active practice in many developed countries of the world. Among them are J. Pun, X.Jin [4], N. Meyerhöffer, D.C. Dreesmann [5], Tran Trung Hieu [6] and others.

The relevance and application of bilingual education is also being investigated by many Ukrainian scientists. Among them are T. Bodnarchukn [7], A. Stepaniuk, T. Olendr [8], Yu. Shiyka [9] and others.

Having scrutinized these studies, the following general definition was determined: bilingual education is education in which two languages are used – the mother tongue (first) and second (foreign) [8].

Based on the analysed publications, it can be concluded that there is a wide range of opportunities to apply various models of bilingual education in the educational process. And, accordingly, the importance of training qualified teachers who will ensure the implementation of the competence approach through bilingual education [10].

Both foreign and native authors point to a large number of advantages of the bilingual education system: the transition to multicultural education, the opportunity to obtain the necessary, relevant knowledge, increased communication skills, and broadened thinking. The disadvantages are related to the lack of awareness of the structure and models, misunderstanding of the goals of the bilingual system, and intuitive implementation [11].

The aim of the article is to study the implementation of bilingual education as an effective method of training qualified natural science teachers.

Presentation of the material. Bilingual education involves a wide range of models for improving knowledge, skills and abilities in the use of bilingual education. Each educational institution can choose the best type and adapt the principle for studying natural sciences to the expected results. Analysing the peculiarities of foreign implementation can serve as a valuable example for Ukraine, because it will simplify the stages of adaptation of its use in the educational process. Canada has extensive experience in bilingual education. Most Canadian educational institutions provide instruction in the dominant language of the province, sometimes introducing bilingual courses. A feature of bilingual education in Canada is immersion programs. They ensure the organization of the educational process in stages with adaptation moments to effectively introduce learning in a language that is not the native language of the students [9, 12].

National and international researches have displayed a positive correlation between the introduction of a bilingual education system for studying professional disciplines. In particular, improvement of communicative interaction, training of thinking, improvement of cognitive development, formation of professional skills necessary for teachers, increase of opportunities for self-education and professional development were noted [13].
The negative impact of bilingual education was observed in the case of improper implementation in the educational process, low student motivation, staff shortages, and low-quality educational and methodological support.

Bilingual education for the training of qualified science teachers in higher education institutions of Ukraine is represented by educational programs, selective and integrated courses, as well as educational and methodological materials in foreign languages. The most common foreign languages used for bilingual education are English, Polish, and German. The purpose of educational and methodological materials for bilingual education is to form and develop skills and abilities to perceive and reproduce foreign information, to expand students’ theoretical and practical knowledge and capabilities in a foreign language, and to increase their vocabulary of professional and general scientific vocabulary. The structure of such courses provides consideration of the main areas of modern natural science [13, 14, 15, 16].

Having investigated the research of international and native scholars on the components of bilingual education, the main elements of the content of educational disciplines in a foreign language for the training of science teachers have been identified: professional skills; educational problem situations and interactive tasks; language and speech material (Tab. 1).

### Table 1

<table>
<thead>
<tr>
<th>Skills and abilities in the types of speech activity</th>
<th>Expected outcomes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaking</td>
<td>explanation of biological terms and phenomena in a foreign language; preparation of materials on natural subjects; conveying the content of a listened-to or read text on a professional topic; speaking on professional topics; giving systematic descriptions.</td>
</tr>
<tr>
<td>Reading</td>
<td>understand detailed texts; identify the content and relevance of messages on professional topics; extract information, opinions and points of view from highly specialized sources.</td>
</tr>
<tr>
<td>Writing</td>
<td>to take the necessary material; to make abbreviated and extended plans of a report, explanations of the material; to summarise and evaluate information from foreign sources; to write an essay or report.</td>
</tr>
<tr>
<td>Listening</td>
<td>understand normative spoken language; listen to and understand lectures and discussions on professional topics; to understand lively conversation of native speakers on professional activities.</td>
</tr>
</tbody>
</table>

Retrieved from [18].

The teacher's skills are directly proportional to their professional skills, and this determines how the students perceive, analyse and understand the learning material. Bilingual education involves accessibility, motivation and assistance in improvement in academic subjects and in a foreign language [16].

The material of teacher training disciplines should be aimed at deepening professional special and general communication skills in the process of professionally oriented study of the chosen language.

Most of the programmes, resources and scientific research that have practical value for use in science classes are presented in foreign languages, most often in English. For their practical use, knowledge of a foreign language and terms in the science context is required.
Academic disciplines or elective courses must include tasks that involve the development of interactive tasks or problem situations using foreign sources. In this way, future teachers will be able to improve their skills of information analysis and the ability to use interactive learning methods in the educational process for example, the introduction of innovative teaching technologies in science education, such as augmented and virtual reality. Since the programs of these technologies are in English, it is advisable to use them in practical work [17].

As already mentioned, one of the significant advantages of bilingual education is the development of future teachers' own communication skills for teaching subjects fluently. Educational and methodological materials for training should include texts, discussion questions and current discoveries in the field of natural sciences for the development and improvement of oral speech, structured presentation of ideas [15, 18].

To achieve the research goal, a survey of students of the Faculty of Chemistry and Biology, Faculty of Geography, Faculty of Physics and Mathematics of Ternopil Volodymyr Hnatiuk National Pedagogical University has been conducted to analyse their attitude towards the introduction of bilingual education.

It has been found that 72.5% of the respondents understand what bilingual education is and have a positive attitude, while the rest are partially aware or have a negative attitude. Among the advantages of bilingual education, students highlight the integration of education into global practice; continuing education or improving qualifications in foreign institutions; fluency in the language, special scientific terms, concepts; the ability to study a foreign language and a professional subject at the same time. 58.9% of respondents consider it appropriate to teach professional subjects in a foreign language. In their opinion, this is an opportunity to integrate the study of language and professional subjects. However, 41.1% of students indicate that they are not ready for bilingual education, pointing the importance of the selectivity of such courses and the adaptation of teaching aids for effective study.

Students identify English, German, Polish, and Estonian as the most relevant foreign languages for bilingual education (Fig. 1).

All survey respondents pointed out that there is a shortage of staff, and therefore that bilingual education can only be introduced in schools after qualified teachers have been trained.

**Fig. 1.** Foreign languages that students consider appropriate for bilingual education
Conclusions. A wide range of possibilities for application in the educational process is revealed by bilingual education for the training of qualified teachers who will ensure the implementation of a competence-based approach in accordance with the requirements of the New Ukrainian School.

It has been analysed that bilingual study of Natural Sciences contributes to the professional development, professionalization and professional formation of teachers; development of multiculturalism of all participants in the educational process; expansion of opportunities for the introduction of interactive and innovative teaching methods.

It has been found that in higher education institutions of Ukraine there is a gradual introduction of bilingual education through selective or integrated courses. However, the issue of developing and adapting the educational content and the content of disciplines in accordance with the competencies of the natural science education sector remains controversial.

The analysis of the results of an anonymous survey of students illustrates the interest in the implementation of bilingual education, which is considered promising for their own professional training. In particular, the desire to study professional disciplines in a foreign language, to master foreign professional terminology and the ability to present research results at the world level was investigated.

References:


