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ANALYSIS OF PHYSICS AND ENGLISH INTEGRATION PROBLEM IN SECONDARY SCHOOL

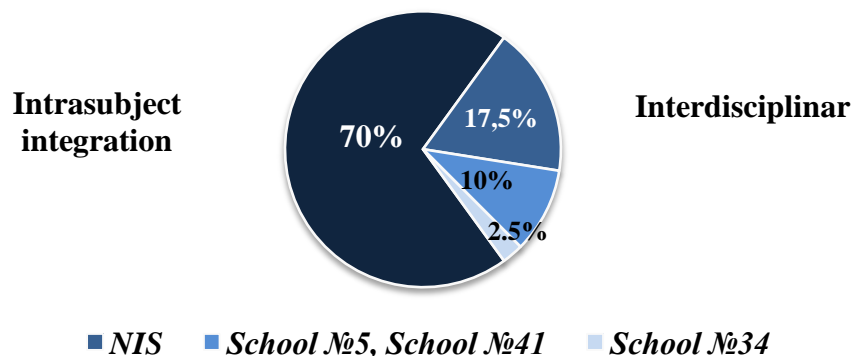
Currently, in the framework of the Roadmap – 2020 a schedule of transition to English language learning in high school is developing. Since 2017-2018 high school will begin to study subjects such as "Physics", "Computer Science", "Chemistry", "Biology" in English. And by 2020 it is planned to complete the transition into the new content of education [1]. The first step is to analyze the current state of interdisciplinary integration in teaching the subjects of physics and math in English; to explore the practical experience of teachers in this field, to find out the attitude of teachers to the need of creating the methods of Physics studying at school in terms of integration with English. Also at the current stage of CLIL (Content and Language Integrated Learning) implementation into the educational process there's needed to be clear and focus on the degree of teachers' readiness to such changes in the system of secondary education.

To determine the relevance and elaboration of the pedagogical integration problem in modern practice of teaching in the secondary school, the questionnaire for teachers was developed. The survey involved 40 teachers of physics-math subjects. For the research the following schools of various types were chosen: School №41 of Sport direction, traditional School №5, School №34 of Innovative type, Nazarbayev Intellectual School in Chemical and Biological direction.

Let's refer to the analysis of questionnaire results. Most of interviewed teachers (70%) indicated intradisciplinary integration as the most effective level of integration in their classroom. In secondary schools teachers hardly use interdisciplinary links during the courses on their subjects.

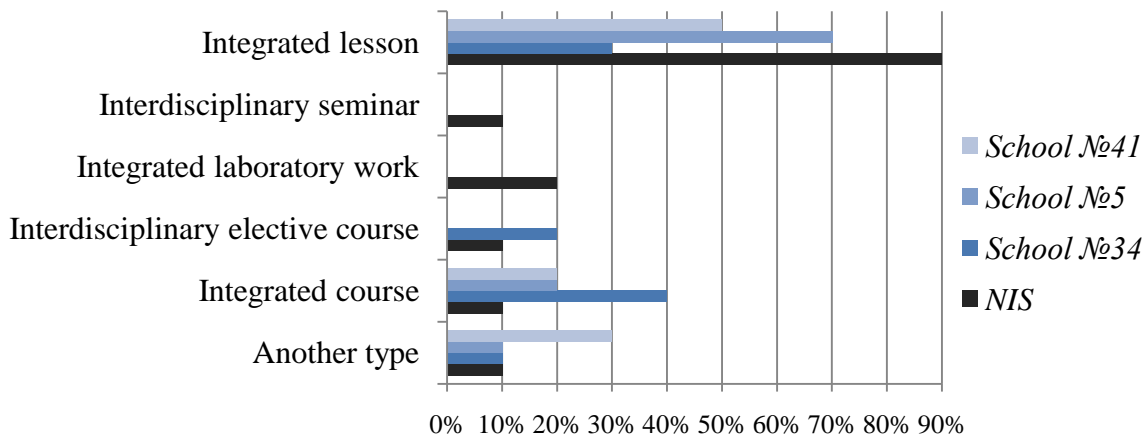
At the same time, in NIS all interviewed teachers consider interdisciplinary integration as more effective method of learning, than intrasubject integration, which accounts for about 17,5% of the total respondents.

**Figure 1. The results of teachers' questionnaire.
Question №3. "What type of pedagogical interation do
you consider as the most effective in your classes?"**



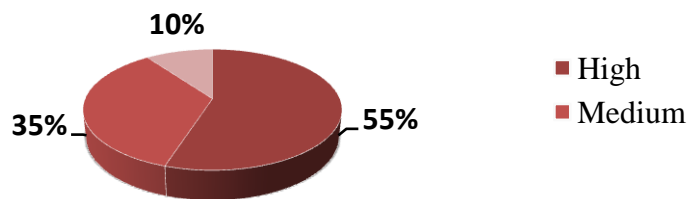
According to the survey, the most frequently used type of pedagogical integration is integrated learning. A variety of different forms of integration used by teachers of Physics and Mathematical sciences, according to a survey, presented in the diagram below (Fig.2).

Fig.2. The results of teachers' questionnaire. Question №4. "Which type of interdisciplinary interaction do you prefer to use?"



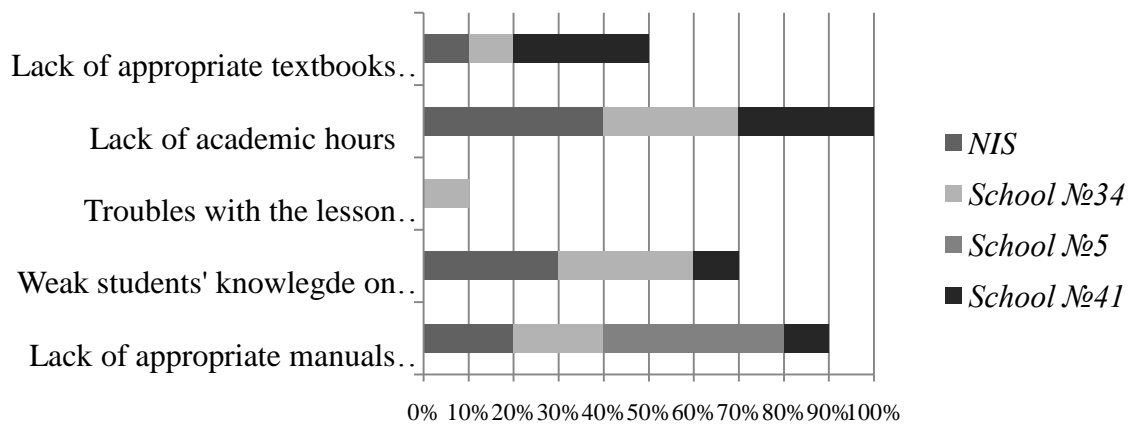
Despite the fact that laboratory work contributes to the development of children' holistic scientific worldview, and that's what the main goal of interdisciplinary integration is, teachers of these schools don't use an integrative approach in their laboratory practice. Integrated laboratory works were indicated by only 20% of the total teachers. Moreover, all of these teachers are teachers of NIS.

Figure 3. The results of teachers' questionnaire. Question №5. "Estimate an effectiveness of your integration types"



As factors hindering the process of pedagogical integration, first of all, teachers identify the lack of academic hours, poor knowledge on integrated subjects, lack of appropriate methodological literature (Fig.4.).

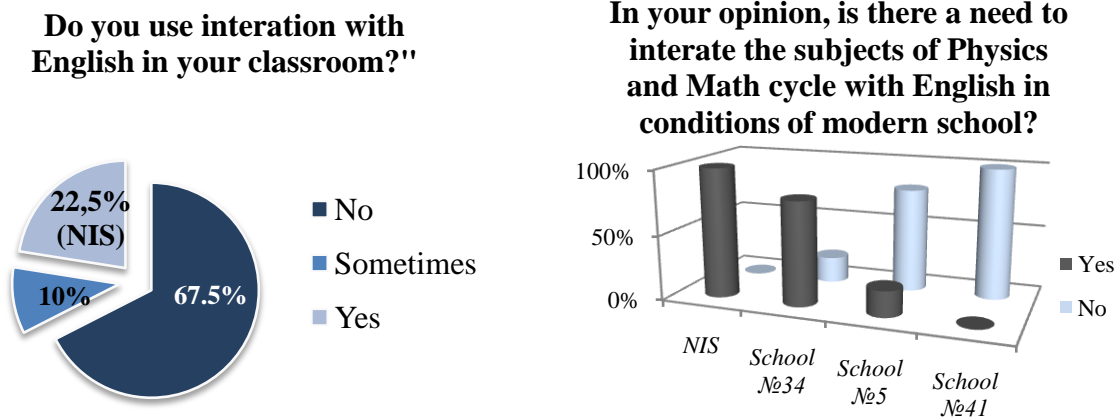
Figure 4. The results of teachers' questionnaire. Question №6 "What is the biggest obstacle for a realization of integrative processes in your classes?"



According to the teachers' survey, the main factor hampered to interdisciplinary integration in NIS is the lack of teaching hours, while teachers of other secondary schools need the manuals and handbooks related with the integrated curriculum. Based on the foregoing, we can conclude that the problem of interdisciplinary integration is considered by many teachers of Physics, Math and Computer Science, however paid attention is not enough, and the effectiveness of integration forms is evaluated by teachers as low.

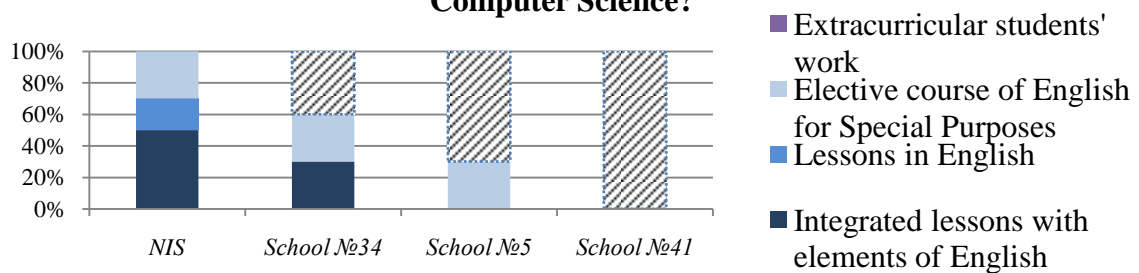
The questions №7-10 of the developed questionnaire were aimed at identifying a teachers' interest to a problem of the integration Physics-Math subjects with English, and their awareness of the need of preparing students' for life in a modern multilingual information space. The results of teachers' answers are given in the table below (Fig.5.).

Figure 5. The results of teachers' questionnaire



Only 22, 5% of total teachers use integration with English in their teaching practice. This number includes only NIS teachers. The vast majority of secondary schools' teachers never carried out lessons integrated with English; moreover, they don't recognize the need of CLIL. At School 34 and School 5 the Physics and Math teachers sometimes include elements of English in their lessons.

Fig.6. Question №10 "In your opinion, which forms of work are the most effective for multilingual information communicative competence development during the course of Physics/ Math/ Computer Science?"



Currently the modern world is becoming more globalized. School graduates will be forced to live and work in conditions of multilingual space. In these circumstances, it becomes important to establish an innovative model of school education that combines the best traditions of Kazakhstan education system with the European experience in the sphere of education.

Based on established research, it has been founded that the integration of subjects, such as Physics, Math, and Computer Science with English best realized in NIS, by comparison with other Pavlodar secondary schools. Today,

Nazarbayev Intellectual Schools are an experimental platform for the implementation, development, testing and monitoring modern educational programs for different levels of secondary education.

However, as shown by the teachers' survey, most schools aren't ready for such change. The problem of teachers' training is extremely actual today, because teachers should learn not only foreign language, but also acquire methods of teaching their subject. The problem of educational process organization in integrative basis continues to be relevant and needs further development.

References

1. Conference on the development of trilingual education on 2015-2020 from November 26, 2015. <http://nao.kz/blogs/view/>