причин данной проблемы — это слабая мотивация изучения физики, снижение значимости ее для учащихся. Число абитуриентов, выбравших физику как один из предметов ЦТ, неуклонно падает (2017 г. — 30 132, 2018 г. — 25 553, 2019 г. — 24 800, 2020 г. — 19 900).

Другой, на наш взгляд, причиной является недостаточное количество часов на изучение физики в современной средней школе. В советской школе на изучение физики в течение пяти лет выделялось 560 часов, в настоящее время — 367 часов на базовом уровне и 507 часов на повышенном уровне. Это очень мало, учитывая, что в старших классах рассматриваются сложные темы, которые трудно объяснить за один урок. Ведь содержание и объем учебного материала практически не изменились с советских времен. В 7 и 8 классах изучается эмпирический вводный курс. С 9 класса начинается систематическое изучение физики: механика, молекулярная физика и термодинамика, электричество и магнетизм, колебания и волны, оптика, элементы специальной теории относительности, атомная и ядерная физика. Получается, что в результате снижения часов нагрузка на учащихся возросла.

Попытки уменьшить объем изучаемого материала приводят еще к большему падению качества физического образования. Как, например можно изучать термодинамику, устройство тепловых машин, не изучая при этом адиабатный процесс? Пути решения этой проблемы — это либо увеличивать количество часов на изучение физики, либо коренным образом пересматривать содержание школьного физического образования.

Еще одна причина — появление новых информационных технологий. Речь, конечно, идет не об оснащении интерактивными досками, проекторами, компьютерами кабинетов физики, создании основанных на этих технологиях инновационных методик обучения, а о неконтролируемом тотальном использовании учениками гаджетов и интернета в учебном процессе, что не только снижает уровень подготовки выпускников по всем школьным дисциплинам, но и отрицательно влияет на их память, развитие логического мышления и т. п.

D. A. LAVRENTIEV, M. P. KONTSEVOY

Belarus, Brest, BrSU named after A. S. Pushkin

CDF-MODELING OF LINGUISTIC DATA BASED ON THE COMPUTER ALGEBRA SYSTEM «MATHEMATICA»

Computable Document Format (CDF) makes it possible to create dynamic multimedia interactive content [1].

The integration of CDF with Wolfram Language, CAS Mathematica, Wolfram Language and Wolfram|Alpha extends the potential of the material to the interactive application functionality and provides the user with content management tools in real time. The built-in capability to perform computations based on the content type (textual, numerical, symbolic, tabular, graphic, cartographic) enables analysis of the material and acquisition of new knowledge from the information provided [2]. Files

in the CDF format can be inserted into web pages and viewed directly in a browser as full-screen documents, their contents are updated when interacting with the user's graphic elements. Free CDF-Player contains Mathematica runtime library, the contents of the document may be generated in response to a user action by means of any algorithms or visualizing functions. This makes CDF convenient to visualize material operating with volumes of diverse data, including linguistic data [3]. The general algorithm for creating an interactive linguistic CDF-model in Mathematica using arbitrary dataset excluding traditional programming would be as follows:

- generation of an arbitrary dataset by means of the built-in generator within syntactic constructs that are described in the documentation, copying of a pre-written code;
- graphical representation of the generated dataset according to the selection from the list of embedded objects. Computation and copying of the pre-written code;
- symbolic computations through the selection of the required functions and through the syntax rules;
 - visualization and copying of the pre-written code;
 - adding various elements to the graphical representation;
- transforming the graphical representation into the interactive model based on the choice of control elements, dataset, modifying variables, initial values, value ranges. Computation and copying of the pre-written code.
 - design of the interactive model and addition of an initialization option;
 - converting the interactive model to CDF.



Picture 1

Teaching lexical aspect of speech activity can be effectively implemented through the Word Clouds (Picture 1) interactive model. It provides a visible way to systematize lexical material predominantly on its introduction and consolidation phases, which greatly facilitates memorizing new vocabulary. The simplicity of this model makes it easy to integrate into the learning process. The model may serve as a tool for composing exercises focused on the development of receptive and productive lexico-

grammatical skills; dialogue composition on the basis of proposed lexemes, as an example.



Picture 2

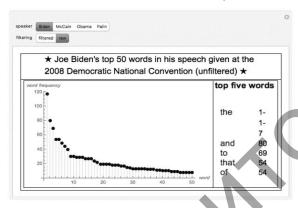
The Languages in South American Countries (Picture 2) multimedia sample model is suited to familiarization of students with regional varieties of the English language. Demonstration of subject-specific vocabulary right on the geographic map, provision of semantic analogies, translation of expressions into the students' first language enables to form cross-cultural knowledge base, as well as providing a way for stepping out of the target

language conceptual system. This model can also be realized in the form of a creative research project based on a subject-specific vocabulary topic.



Picture 3

levels and the multifunctionality of the models themselves extend the range of their use.



Picture 4

Both the acquisition of topical vocabulary and control of the receptive vocabulary formation level can be accessed through the use of the Wordfinder Puzzle (Picture 3) interactive model. This model operating as a puzzle game may act as a means of stimulating and motivating students to study the foreign language. In the course of task completion, students not only master the required lexical material, but also improve their self-learning skills and attention span. The capability of CDF to be optimized for learners of different skills

The 2008 Convention Speeches (Picture 4) sample model provides teachers with an opportunity to organize text analysis interactive activities in text comprehension classes. Having processed the language data, the model represents the list of the words most frequently used in the given work in form of a graph. On the basis of the information received, students can thoroughly explore lexical and grammatical, structural and semantic, stylistic and cultural aspects of a text within a discussion organized by the teacher.

CDF-models are interesting both as an interactive illustrative material and as an object of study within research or educational activity. Such samples may be of concern as a basis for particular computer simulations based on symbolic computation.

REFERENCES

- 1. Computable Document Format [Electronic resource]. Mode of access: https://www.wolfram.com/events/virtual-conference/2012/files/BrochureCDF.pdf/. Date of access: 15.03.2021.
- 2. Концевой, М. П. CDF-моделирование в компьютерной алгебре [Электронный ресурс] / М. П. Концевой // Математическое и компьютерное моделирование : сб. материалов VIII Междунар. науч. конф., Омск, 20 нояб. 2020 г. Омск : Изд-во Омского гос. ун-та, 2020. С. 217–218.
- 3. Wolfram Demonstrations Project [Electronic resource]. Mode of access: http://demonstrations.wolfram.com/. Date of access: 15.03.2021.