Modern Media Technologies in Teaching German Language to STEM-Students

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The pilot project “Etalon” at MPEI:

- a program of in-depth study of highly specialized and general disciplines;
- started at MPEI in the spring semester of 2019;
- at the moment, the program is presented in MPEI bachelor courses of the Institute of Thermal and Nuclear Energy, the Institute of Energy Efficiency and Hydrogen Technologies, as well as the Institute of Electric Power Engineering;
- the project involves an in-depth study of foreign languages throughout the course of studies at MPEI, obtaining an international certificate of proficiency in a foreign language, and participating in international programs.
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IT penetration of education:

• the reorganization of educational and methodological work,
• increasing the requirements for the teacher and changing their role,
• increasing importance of the student’s personality and their individual characteristics,
• changing the scope of the educational institution,
• enhancing the presence of information resources used.
Open source German-language materials for STEM (Science, Technology, Engineering and Mathematics) students, developed by a nonprofit foundation Siemens Stiftung, were selected as the study material.

The organization’s goal is to promote “sustainable social development, which is crucially dependent on access to basic services, high-quality education and an understanding of culture” [https://www.siemens-stiftung.org/foundation].

On the media portal one can find a wide range of free digital educational materials – from worksheets to supplies for interactive whiteboards and exciting educational games. The basic methods of exercise construction are inquiry-based learning, inclusive learning and Service-Learning [https://medienportal.siemens-stiftung.org/de/home].
Blocks of tasks complementing the video on the portal

I) In accordance with the task stage:
• pre-demonstration (students’ acquaintance with difficult lexical and grammatical material before watching the video);
• post-demonstration (intended to consolidate vocabulary and grammar material).

II) Depending on the level of the language:
• lexical, or vocabulary-focused (work with isolated words),
• grammar-oriented (work with sentences),
• textual (text related work).
A. Vocabulary-Focused Exercises

Guidance papers for the video on the topic “Energy” titled “Electric current from solar cells – Apparatus and materials”
B. Grammar-Oriented Exercises

Worksheet “How the heat pack stores heat – A salt that changes between solid and liquid states”
C. Textual Exercises

Worksheet A2.1 “What are conductors and dielectrics?”

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Shortcomings of the considered materials:

- the apparent simplicity of the tasks does not require significant cognitive efforts for their implementation, however, the lack of a linguistic methodological basis makes them limited suitable for direct application in the educational process;

- consistent presentation of informative material with the almost complete absence of a single systematic approach to the language part;

- lack of access to speaking practice and a small number of tasks for speech production in general;

- unclear language progress and expected level of the target group.
Tasks for planning the educational process in the “Etalon” groups of MPEI:

• higher requirements for the volume of material to be assimilated; the seme analysis of new lexical units is necessary;

• more emphasis needs to be placed not on individual lexical units, but on clichéd phrases occurring in relevant professional communication;

• intermediate is accepted as the starting level of education, so it is necessary to subsequently lead the students to an advanced level;

• the use of video and experimental materials should be an obligatory part of the lesson in a foreign language.
Advantages of the methodology:

the possibility of using a foreign language as a means of professional communication is most effectively realized, increasing the motivation of students, the need for training and stimulating progress by increasing the amount of emotional investment;

an integrated approach to the syllabus and its language form allows developing intercultural communication skills, awareness and comprehensiveness of the approach to learning, opening students access to a wide range of specialized literature in a foreign language, increasing competence and oral communication skills.
Thank you for your attention!

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