ENHANCING TECHNICAL EDUCATION THROUGH NI MULTISIM SOFTWARE

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NI Multisim is a powerful circuit simulation software widely used in technical and engineering education. It helps students understand theoretical concepts by allowing them to design, simulate, and analyze electronic circuits in a virtual environment. Through NI Multisim, learners can easily visualize circuit behavior, measure voltages and currents, and test different components without the need for physical laboratory equipment.

The software plays an important role in teaching subjects such as electronics, electrical engineering, digital systems, and control systems. It improves practical skills, supports problem-based learning, and reduces the gap between theory and practice. NI Multisim also saves time and costs, increases safety in laboratories, and allows students to experiment freely without the risk of damaging real components. Currently, the teacher of electronics and circuits is faced with the task of further increasing the student's interest in this subject, achieving lesson effectiveness, further developing student’s thinking, comprehension, free and independent thinking skills, creating the opportunity to see invisible processes, and modeling electrical processes.

The use of modern technologies in educational practice is a structural element of the modernization of the education system. In modern conditions, the technologization of educational processes allows you to achieve the expected result with less effort and time, improves the quality of teaching, and increases its efficiency. The use of information and communication technologies is also a pedagogical process, which involves changes in the activities of students and teachers, the introduction of innovations, and the full use of interactive methods in the educational process. The use of the interactive electronic software environment “NI Multisim” in the process of electronics and circuits classes in higher education brings a new level of quality to the educational process. This not only makes it easier for the teacher to prepare for and conduct lessons, but also creates new opportunities.

To achieve a guaranteed result in teaching electronics and circuits, the information and educational system of teaching must have a preparatory environment.

In this case, the technical environment must include: a computer room, computers connected to the Internet and the interactive “NI Multisim” program.

There must be educational and methodological manuals, educational and control electronic educational materials, and methodological instructions for the full use of the programs, which have the ability to manage “NI Multisim”. To create such an environment, attention should be paid to the following:

- a personal computer, devices for their operation and the “NI Multisim” program;
- educational and methodological manuals, educational and control electronic educational materials necessary for use in the educational system;

- the teacher of electronics and circuits himself must have a high level of knowledge of the computer, its additional devices, interactive educational programs and the Internet. To this end, it is necessary to widely use the information and communication and modern interactive “NI Multisim” software environment in teaching electronics and circuits.

One of the distinctive features of the “Multisim” software environment is the intensive use of the computer mouse. The keyboard is used for typing, entering numbers, and quickly calling commands.

In electronics and circuits classes, any electrical circuits (circuits) can be assembled using the “NI Multisim” program.

In this case, students work individually, in large and small groups, and in collaboration. Working in the NI Multisim program gives students aesthetic pleasure and further increases their interest in science. Using game methods, students can easily master difficult topics on their own. If this is also used in lecture classes in the “NI Multisim” programs, it will give good results. The consistent use of these programs will ensure that even low-learning students master the subject well. As a result, it is possible to create an opportunity for all students to achieve effective lessons in electronics and circuits.

The fact that some students do not master the subject well is not because they do not know it well, but because they have symptoms of shyness and fear. The “NI Multisim” program helps students overcome such traits. This program can be widely used to ask students about past lessons, assemble electrical circuits, observe processes in the circuit, obtain various desired values, draw graphs, and analyze the results. It is worth noting that during the experiments, if the electrical laboratory and practical classes lack equipment or the laboratory stands are faulty, it is possible to conduct the experiment through a virtual laboratory.

The uniqueness of such methods is that they are implemented only through the joint activities of students and teachers. Such a collaborative process has its own characteristics. Namely:

-ensuring the continuity of student’s interest in science during the learning process;

-creating the opportunity for students to think independently, create and research during the lesson;

-strengthening student’s interest in science and their desire to acquire knowledge independently, creatively approaching each issue.

With the “NI Multisim” program, you can create, model and study simple or complex analog and digital devices.

It allows you to build electrical circuits, accurately obtain the desired results in a short time and attractively display graphs. When conducting classes in electronics and circuits based on the NI Multisim program, students' independent thinking develops.

The theoretical knowledge obtained in lecture classes is consolidated. They acquire the skills to analyze the results obtained through work performed in laboratory classes. This increases students' interest in science and scientific research.

Due to the high demand for distance learning in the current era, the Multisim program can be effectively used in all classes in electronics and circuit science. It constantly develops students' interest in scientific activities and teaches them to use their time efficiently.

With the “NI Multisim” program, it will be possible to develop independent educational activities of future specialists, ensure the integration of educational and scientific work, involve students in scientific research, and on this basis, train qualified specialists and improve their quality.

In conclusion, NI Multisim software plays a significant role in teaching technical subjects by enhancing students’ understanding of both theoretical and practical concepts. It provides an interactive learning environment where students can design, simulate, and analyze electronic circuits efficiently. By using NI Multisim, learners gain hands-on experience without the limitations of physical laboratories, which improves safety, reduces costs, and saves time.

Furthermore, the software helps bridge the gap between theory and practice, develops problem-solving skills, and increases student engagement in technical education. Therefore, integrating NI Multisim into the teaching process contributes to more effective, modern, and high-quality technical education.

REFERENCES:

1. Nurmukhamedova, T. U., Ulashov, S. R., & Kholmonov, S. Q. (2020). PRINCIPLES OF CREATING VIRTUAL LABORATORIES IN ENGINEERING EDUCATION. In Актуальные проблемы инфотелекоммуникаций в науке и образовании (АПИНО 2020) (pp. 387-391).

2. Xolmonov, S., & Abdullayev, A. (2023, January). TEXNIKA FANLARINI O ‘QITISHDA INNOVATSION TEXNOLOGIYALARNI QO ‘LLASH. In INTERNATIONAL CONFERENCES (Vol. 1, No. 2, pp. 717-721).

3. Холмонов, Ш. К., & Нурмухамедова, Т. У. (2024). ДИСТАНЦИОННОЕ ОБУЧЕНИЕ И ДИСТАНЦИОННАЯ ЛАБОРАТОРИЯ В ИНЖЕНЕРНОМ ОБРАЗОВАНИИ. Ta'limning zamonaviy transformatsiyasi, 7(4), 198-205.

4. Karshiboyevich, K. S., & Usmonovna, N. T. (2023). REMOTE LABS IN HIGHER ENGINEERING EDUCATION: ENGAGING STUDENTS WITH ACTIVE LEARNING PEDAGOGY. Journal of new century innovations, 43(3), 143-147.

5. Qarshiboyevich, X. S., & Abdurahmonovich, A. D. (2024). TEXNIKA FANLARINI O ‘QITISHDA ZAMONAVIY AXBOROT KOMMUNIKATSIYA TEXNOLOGIYALARINI QO ‘LLASH. Ta'limning zamonaviy transformatsiyasi, 7(4), 206-211.

6. Kholmonov, S. (2024). THE IMPACT OF DIGITAL EDUCATION PLATFORMS ON THE QUALITY OF EDUCATION. Indexing, 1(1).

7. Qarshiboyevich, X. S., & Usmonovna, N. T. (2023). ZAMONAVIY ELEKTRON O'QUV USLUBIY TA'MINOTINI TA'LIM JARAYONIDA QO'LLASH ORQALI O'QITISH SAMARADORLIGINI OSHIRISH. Ta'lim innovatsiyasi va integratsiyasi, 11(1), 77-80.