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HISTORY OF IRT REACTOR DEVELOPMENT

Practical applications of nuclear energy for military and civilian purposes had begun with the structure of research reactors. After lunching the F-1 reactor and establishing nuclear weapons programs, I.V. Kurchatov accelerated theoretical and experimental research at the Institute of Atomic Energy (IAE) in Russia to develop research reactors designed for various purposes. The first integrated nuclear experimental research program in the USSR had been devoted for reactor testing in addition to the investigations of nuclear fuels and materials as a part of an MIR reactor and a hot materials science laboratory in April 1952. The first light water-cooled reactor of VVR-2 type which designed to use enriched uranium with a channel-free core and served as a prototype for the sequentially developed VVR-S reactors has been developed in 1954 at the Research Institute. In 1957 and at the Research Institute; the first research reactor of a temperate and water-cooled swimming pool IRT in the USSR was built. in 1957 at the IAE.

The IRT 1-MW nominal power reactor was developed under the umbrella of the Research Reactors and Reactor Technologies section. V. V. Goncharov was the division head and an assistant to I.V. Kurchatov, and the top of the planning office was P. I. Shavrov. The senior scholars whom would top accredited for the event of IRT were V. V. Goncharov, Yu. Nikolaev and Yu. F. Chernilin, while the primary director of the reactor was Cherniline. L. A. Goncharov calculated the ferroconcrete shielding of the reactor tank and experimental horizontal channel campaigns. The actual start of the IRT reactor occurred on November 26, 1957, under the direct supervision of A. P. Aleksandrov. All this happened within the presence of F. Perrin, who was the most important nuclear energy commissioner in France. This was specifically recorded within the logbook. V. Vertogradskii and B.G. Golubev and that I.I. Larin and A.F. Yashin, who were colleagues within the IRT, made a big contribution to start-ups and utilization of IRT capabilities (up to 2 MW).

The development of water-cooled and moderated research reactors VVR-2, VVR-S and IRT reactors (generating 2 MW) at that time was considered as a formidable scientific and engineering breakthrough for USSR reactor building capabilities. Kurchatov described in detail the construction of the IRT and the experiments planned in his lecture "Nuclear Radiation in Science and Technology", which was prepared and delivered in June 1958 at the University of Albania (Tirana).

In his lecture, Kurchatov wrote: “During my students’ years, the source of the immense and endless energy dispersed by stars, specifically the sun in space, was enthusiastic for scientists. the solution to the present majestic cosmic problem was found within the humble laboratories of physicists who were studying the structure of the littlest particles Matter - Atomic Nuclei After Rutherford's remarkable discoveries in 1919, an intensive study of the interaction, division, and fusion of atomic nuclei began. Gradually it became clear that the stellar energy source of space was precisely the energy emitted in nuclear transformations.

The prospects for human use of nuclear energy remained cloudy until 1939 when Han and Strassman discovered fission under corpuscular radiation. I remember how it became clear to me and other nuclear physicists, who were so few at the time, that the matter of obtaining nuclear energy might be solved. Several years later, Enrico Fermi, the son of neighbors, established the primary reactor [1].”

Kurchatov calls the famous Italian scientist, who left Italy fascist to US in time and established and began in December 1942 under the platforms of the Chicago Stadium the world's first reactor - SR-1. This was a zero-power reactor (critical collection of uranium and graphite). Later, Kurchatov wrote his own historical words that became known to the entire world and accompany most the publications and biographical versions dedicated to him: "I remember the thrill through which in Europe with a gaggle of colleagues managed to realize the interaction of the fission chain within the USSR within the uranium reactor and graphite."

Noting that atomic energy was used for the primary time to form atomic weapons, Kurchatov confidently presents his thinking that future nuclear and thermal atomic energy will only be used for peaceful purposes: "Unlimited nuclear powers were first wont to build destructive weapons. I'm convinced, even as all scientists do The Soviets, that sense - instinct altogether people - will triumph, and therefore the time when precious uranium and plutonium are going to be utilized in atomic engines that propel ships and peaceful aircraft and in power plants, bringing light and warmth to people's homes, isn't distant. an imposing future awaits us with perfection there's little question that within the next ten years, ways to realize a controllable fusion and electric power stations with deuterium, present in vast quantities of the world's oceans, are going to be found as fuel to be built. The creation of atomic reactors was important, not only because humankind had a replacement source of energy at its disposal. But Atomic reactors made it possible to supply various radioisotopes in large quantities. " Next, Kurchatov provides during a table, for instance, data on an idea to supply some radioisotopes within the USSR in 1958 and comments on their characteristics and possibilities of application and use (table 1):

Table 1: Production of Radioactive Isotopes in the USSR in 1958

Isotope	Quantity
Carbon-14	40
Phosphorus-32	1000
Sulfur-35	800
Calcium-35	100
Chromium-51	100
Iron-59	50
Antimony-124	23
Iodine-131	1000
Cobalt-60	200000
Thulium-170	5000
Iridium-192	800
Thallium-204	20
Strontium-90	50
Cesium-137	700
Gold-198	1000

Radioisotopes as atomic markers are getting increasingly more important as a versatile and powerful means of investigating previously unresolvable problems completely. Using the very fact that the radioactive and non-radioisotopes of a specific element are chemically identical, it's almost possible, without changing the mechanism of the method being studied, to introduce a couple of easily detectable objects with indicators sensitive to the quantities of radioactive radiation for additions and to research the kinetics of chemical and biological processes. Of particular importance is the possibility of investigating the kinetics of metabolic processes during a living organism without causing any harm to its normal biological activity. Diagnosing and treating various diseases including tumors, especially malignant tumors, using radioisotopes is an associated benefit. Treatment relies on the selective biological effects of radiation on tissue cells. Sick and healthy cells respond differently to radiation. Another more accurate method that scientists recently found is suspense with the assistance of nerve centers that control metabolic processes in diseased organs. Radioisotopes are widely wont to monitor technology and industry processes.

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BLENDED LEARNING AS AN APPROACH TO THE DEVELOPMENT OF EDUCATIONAL AND METHODOLOGICAL SUPPORT OF ACADEMIC DISCIPLINE

Abstract

A research study on the blended learning approach to the development of teaching aids for providing basic solutions for nuclear power plant construction – team project, has been conducted. Various tools such as smart tables and smart boards known to yield productive results by renowned and well-established tertiary institutions were employed in this research study. It is challenging to guarantee a perfect teacher-student knowledge transfer, which is expected in the traditional classroom approach. With the many case study assessments researched on, it has been realized that the traditional face-to-face lessons merged with online development and use of electronic booklets, organization of YouTube videos, presentation of digital content, adaptation of 3D animations, and the use of other educational tools are productive-guaranteed models of ensuring the arousing of student interest and encouraging innovative ways in the way students adapt knowledge as showed in table 1. This establishes a goal to develop an enthusiastic friendly and innovative mechanism to satisfy the expected outcome with key performance indicators. Such alternative methods provide students with options to align themselves