Vol. 1, Issue 1

PEDAGOGY OF SUCCESS AND THE TEACHER'S INNOVATIVE CULTURE AS CONDITIONS FOR INTRODUCING INNOVATIVE TECHNOLOGIES INTO CHEMISTRY TEACHING

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The information society changes the logistics of education: as the volume of information grows, its exchange must accelerate accordingly, and students now obtain knowledge not only from the teacher but also from the internet, the media, textbooks, and each other [1]. Under these conditions the world pedagogical system is shaped by three trends: innovation, dynamics (ever faster renewal of knowledge), and diversity of institutions, curricula, and funding sources. The instructor ceases to be a mere source of information and becomes a coordinator who directs students to information sources and organises group work. For a chemistry teacher this raises a practical question: how to introduce new technologies without losing the strengths of established teaching.

Pedagogical innovation is a comparatively young notion. Schumpeter introduced the term in economics in the 1930s; it entered education in the 1950s, and domestic pedagogy adopted it only in the late 1970s [2]. In education a novelty does not mean total renewal; it means the capacity of something to give a genuinely new result that serves the learner's growth. Innovation is also a multi-stage process: the linear model of the educational innovation process has six stages, from a new idea, usually born of fundamental or applied research, through a product or model, practical verification, and wide application, to a fully developed product [3].

Pedagogy of success supplies the motivational logic for introducing such innovations. A learner grows through success and stagnates through failure, so the teacher's task is to let every learner experience a victory of his or her own. Rysbaeva distinguished four groups of methods for motivating learners: emotional (praise, game-based learning, a success situation) [4], cognitive (problem posing, brainstorming, creative tasks, reliance on life experience), volitional (self-assessment and growing inner responsibility), and social (helping others, interest in a group result, peer review). Buzan's TEFCAS formula adds that an unexpected result of an action is not a failure but information, which the learner analyses and corrects before acting again; to err is part of learning, and stopping is the only real failure. The same source stresses the ambivalence principle: traditional and new methods both have strengths and weaknesses, and the teacher should combine the strong sides of both rather than set them against each other [5].

Success pedagogy works only in the hands of a teacher whose own culture is open to novelty. Researchers note a shift from the "teacher-guardian" model to the "teacher-

manager" model, that is, from authoritarian management to democratic relations [6]. Surveys of university instructors show how far this culture is from universal: only 14% hold an active-positive attitude and initiate novelties, while 23% take a research-critical position and accept an innovation only after verifying its effectiveness themselves [7]. Four levels of innovative activity are distinguished (adaptive, reproductive, heuristic, and creative), and the development of a novelty passes through creation, mastering, and implementation, when the novelty spreads through open lessons, publications, video recordings, and mentoring [8].

Among the technologies open to such a teacher are interactive lessons and quizzes, whose gamification makes participation more attractive than ordinary control work [9], project-based and problem-oriented learning, virtual reality, cloud-based learning, and the flipped classroom, in which theoretical foundations are studied independently at the asynchronous home stage from videos and lecture notes sent in advance, while the synchronous classroom stage is devoted to tasks and discussion [10]. We tested the flipped classroom on two colloid-chemistry topics, "Disperse systems" and "Surface phenomena," with two groups of 15 students each. In the flipped group the share of students scoring 8–10 points (quality of knowledge) reached 66.7% and 73.3% for the two topics, against 33.3% and 26.7% in the traditional group. These results are consistent with the logic of success pedagogy: when theory is mastered at home, classroom time goes to experiments and discussion, where more students can experience personal success. Introducing innovations therefore depends less on the technology itself than on the teacher's readiness to design lessons in which every student can succeed.

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