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THE CHAIN OF LEARNING OBJECTIVES: INTEGRATION OF OBJECTIVES IN AUTOMOTIVE ENGINEERING EDUCATION

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Abstract: This article examines the issue of interconnection of learning objectives in automotive engineering education. In the context of increasing complexity of modern vehicles, a balanced integration of theory and practice is essential in training specialists.

The article highlights the importance of aligning strategic, tactical, and operational learning objectives within a competency-based approach. Using the course “Technology of Vehicle Maintenance” as an example, it demonstrates that an integrated educational process helps students develop diagnostic skills, analytical thinking, and professional responsibility.

The research results confirm that the continuity of learning objectives plays a crucial role in training competitive automotive engineering specialists.

Keywords: educational integrity; continuity of learning objectives; automotive engineering education; competency-based approach; vehicle maintenance technology; integration of theory and practice; professional development; higher technical education.

Аннотация: В данной статье рассматривается вопрос взаимосвязи учебных целей в образовании по автомобильной инженерии. В условиях усложнения современных транспортных средств важным является гармоничное сочетание теории и практики при подготовке специалистов.

В статье освещается значение согласования стратегических, тактических и операционных учебных целей в рамках компетентностного подхода. На примере дисциплины “Технология технического обслуживания автомобилей” показано, что целостный образовательный процесс способствует развитию у студентов диагностических навыков, аналитического мышления и профессиональной ответственности.

Результаты исследования подтверждают, что преемственность учебных целей имеет важное значение в подготовке конкурентоспособных специалистов автомобильной инженерии.

Ключевые слова: образовательная целостность; преемственность учебных целей; образование в области автомобильной инженерии; компетентностный подход; технология технического обслуживания автомобилей; интеграция теории и практики; профессиональное становление; высшее техническое образование.

Modern roads are full of traffic. Every hour, thousands of vehicles move along cities and highways, transporting people, goods and the rhythm of modern life. But behind every reliable

engine start-up, smooth gear shifting and safe journey, there is a factor more important than steel and electronics - education. This is not just formal education, but education based on integrity, consistency and coherence of purpose.

The real power of professional training in the field of automotive engineering lies not in the amount of knowledge provided, but in how consistently and logically the learning objectives are connected from theory to practice.

Education as a chain: every link is important

It is known that the chain of learning objectives in automotive engineering education is a continuous process that transforms theoretical knowledge into complex engineering skills in students, and then into practical solutions. Education can be compared to a chain. Each discipline, each subject, each practical exercise is a link in this chain. If one of these links is weak or disconnected, the entire system loses its stability.

In automotive education, theory without practice turns into abstraction. Practice without theory becomes mechanical repetition. True competence is formed only on the basis of clearly defined and interconnected educational goals.

Higher education institutions are not information-distributing organizations, but an environment in which a professional personality is formed. The strategic goal - training a competitive and responsible engineer - should be reflected in each tactical and operational goal of the curriculum. This is called the integrity of educational goals.

From knowledge to skills: "Technology of technical service of automobiles" as an example

Let's consider the subject "Technology of technical service of automobiles".

At the theoretical stage, students learn about the periodicity of technical service, diagnostic methods, the principle of operation of systems, ignition timing, lubrication processes and cooling systems. These concepts create a cognitive basis. However, the real transformation occurs in laboratory conditions.

When the student opens the hood, checks the timing belt, measures the ignition timing or assesses the condition of the engine oil - theoretical knowledge turns into practical experience. Now he not only understands the technical service procedure, but also performs it.

At this moment, education moves from memorization to professional formation.

This process is carried out according to the following step-by-step structure:

-Understanding the principle;

-Analysis of the system;

-Practical application;

-Evaluation of the result.

Such consistency makes education a developmental process, not a fragmented one.

The bridge between theory and responsibility

Automotive education has a unique ethical dimension. An incorrect diagnosis is not just a technical error, but a threat to safety. An incorrectly configured system can harm the environment. Every professional decision has consequences beyond the workshop. Therefore, educational consistency is not a pedagogical convenience, but a social necessity.

When a student studies the ignition timing in theory and adjusts it in practice, he learns not only technical skills, but also responsibility. Educational integrity ensures an understanding of the "why" behind the question "what?".

Competence is the true result of education

Competence is the true result of education, not just memorizing knowledge, but also the ability to apply it in practice.

Modern education has moved from a knowledge-based model to a competency-based model. Competence in automotive engineering includes:

- Accurate diagnostics;
- Analytical thinking;
- Technical decision-making;
- Reporting and communication skills;
- Safety culture. These competencies are formed not through individual lessons, but through a systematic combination of goals, content and assessment. When learning objectives are aligned with institutional tasks and professional standards, education becomes a path of holistic development, not a collection of fragmented disciplines.

An engineer is not created - he is formed

In the training of an engineer, theoretical knowledge alone is not enough. His professional level is formed through practical training, laboratory work, production practice and solving real technical problems in the educational process. Analytical thinking, responsibility, decision-making skills and teamwork skills are also gradually developed.

A real engineer is not a ready-made result, but a specialist who is achieved through a combination of education, experience and practical work. In this sense, engineering education is not just a process of imparting knowledge, but also a process of professional formation of a person.

This process requires:

- Strategic approach (Who are we training?);
- Tactical planning (What competencies should be developed?);
- Operational clarity (What should the student be able to do after each lesson?).

If the goals are fragmented, the professional identity is also fragmented. If they are consistent, the graduate will enter the field not with a diploma, but with confidence and competence.

Modern challenges and the need for integration

Today's vehicles are being digitized. Electronic control units, on-board diagnostic systems and sensor networks require analytical thinking and interdisciplinary knowledge. Traditional lecture methods alone are not enough.

Problem-based learning, simulation tools, case studies and diagnostic practices must be integrated into the learning process. However, integration is effective only on the basis of consistent goals. Innovation without coordination is superficial. Innovation with coordination is transformational.

Assessing the effectiveness of educational integrity

Assessing the effectiveness of educational integrity is the process of determining how effectively all components of the educational process (goal, content, method, form and result) work together in harmony.

The main focus here is not only on the final grade of the student, but also on the effectiveness of the entire education system. That is, it is studied to what extent the integration of theory and practice is ensured, how consistently the learning objectives are implemented, and what competencies are formed in students.

Experience shows that when educational objectives are closely linked:

- Practical results are significantly improved;
- Diagnostic accuracy increases;
- Students demonstrate the ability to solve problems independently;

- Professional confidence increases.

These are not theoretical conclusions, but the specific results of the pedagogical design.

Educational integrity directly affects professional quality.

Conclusion: Education is a living system

Automotive education is not just about technology. It is about educating analytically thinking and responsible professionals who can ensure safety, efficiency and sustainability. The integrity of educational goals is the internal logic that connects knowledge to skills, skills to competence, and competence to professional responsibility.

When theory supports practice, goals determine the result, and each lesson serves a common professional vision - education becomes not a process of teaching, but a process of transformation. And this is precisely the transformation that is crucial in the ways that modern technologies are shaping.

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