COMPETENCE-ALIGNED CONTENT DESIGN FOR THE ELECTRICIAN PROFESSION: AN ORGANIZATIONAL-PEDAGOGICAL MODEL WITH A TWO-CIRCUIT ASSESSMENT SYSTEM

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Abstract. Mismatches between the competences formed in technical and vocational education and those required at the workplace remain a structural obstacle to workforce development, and the obstacle is sharpest for high-risk manual trades whose occupational standards are still being elaborated. This thesis presents an organizational-pedagogical model that aligns the content of training for the profession 30710502 “Electrician” with authentic labour functions and qualification requirements. Constructed through a design-based logic, the model couples eight functional blocks, five auditable implementation conditions, four integrated teaching methods, and a two-circuit assessment system that appraises programme quality and learner readiness on separate registers. A monitoring-corrective feedback loop converts the architecture from a static curriculum into a self-correcting system. The work contributes a transferable, standard-anchored content-design template for technical professions and a methodological basis for raising the quality of electrician training; empirical validation is identified as the next stage.

Keywords: *vocational education, competence-based training, electrician profession, organizational-pedagogical model, descriptor–competence matrix, two-circuit assessment, reflective and simulation-based learning.*

Introduction. The relevance of the problem addressed here follows from a simple asymmetry: a vocational system is judged by the labour market, yet it is governed by curricula that are written and then left largely unchanged. When the tasks performed on the job evolve faster than the documents that prescribe training, graduates accumulate credentials that employers discount, and the cost of re-training is displaced onto enterprises. This asymmetry is especially consequential in transition economies that are simultaneously rebuilding their qualifications systems. In Uzbekistan, where a national qualifications framework is being reconstructed and occupational standards for many manual trades have yet to be drafted, the alignment of training content with labour functions has become both a pedagogical and a policy priority within the country’s development strategies.

The problem acquires a particular severity in the electrician’s trade. Here content cannot be reduced to a catalogue of topics, because the work demands that knowledge, manual operation, diagnostic judgement, and safety discipline be developed and certified together, under conditions in which error may be not merely inefficient but dangerous. The significance of solving this problem is therefore twofold — it concerns the employability of

graduates and the physical safety of practice. Accordingly, the aim of this study is to design an organizational-pedagogical model capable of aligning the content of electrician training with labour functions and qualification requirements, and of sustaining that alignment over time through an explicit assessment and feedback mechanism.

Object, subject and methods. The *object* of the research is the process by which the content of vocational education for the electrician profession is designed and organised. The *subject* is the set of organizational-pedagogical conditions, teaching methods, and assessment mechanisms through which that content is brought into correspondence with labour functions and qualification descriptors. Methodologically the study follows a design-based research strategy: rather than testing a ready intervention, it constructs and justifies a pedagogical artefact. Four operations were combined — analysis and decomposition of professional standards and the legal-regulatory base into discrete labour functions; competence mapping, in which functions are rendered as measurable descriptors and cross-referenced with curriculum elements, practical tasks and assessment tools through a descriptor–competence matrix; pedagogical synthesis of the model’s architecture and methods; and the design of an assessment apparatus, including an error taxonomy with a safety-based critical-error rule. The validity claimed at this stage is design validity — internal coherence, traceability to standards, and feasibility — while empirical effectiveness is reserved for a subsequent phase.

Scientific analysis and results

The principal result is an eight-block architecture that holds the normative, design, process, and outcome dimensions of content within a single regulated system (Figure 1). The foundation layer imports external legitimacy from standards and converts it into measurable targets; the design layer is where the descriptor–competence matrix performs its alignment work; the process layer enacts content as authentic professional activity; and the outcome layer certifies attainment. The decisive feature is the eighth, monitoring-corrective block, whose feedback path obliges any misalignment surfaced in assessment or employer feedback to re-enter design rather than accumulate as drift. It is this control loop, and not the inventory of blocks, that distinguishes the model from a conventional curriculum document.

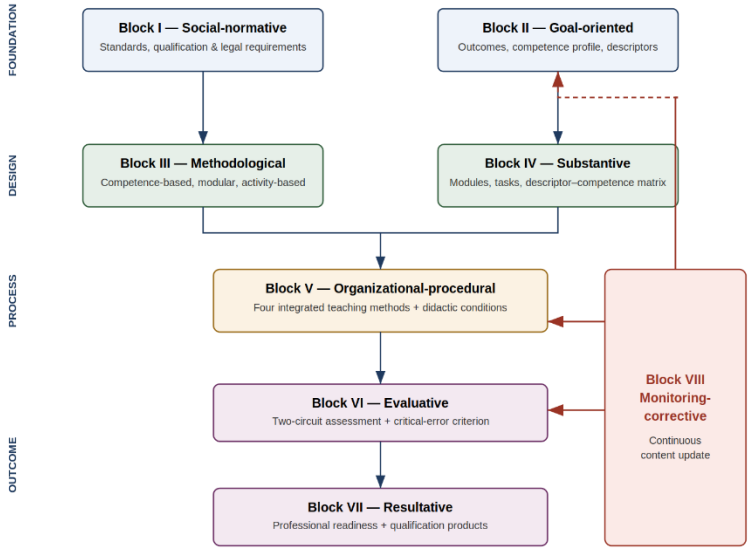

Figure 1. Eight-block architecture of the organizational-pedagogical model, grouped into four layers and closed by a monitoring-corrective feedback loop.

The process layer is realised through four integrated methods, configured to the labour functions of the trade rather than offered as novelties. A project-constructive method moves the learner from reproducing a given algorithm to planning the work; a situational-diagnostic method develops fault analysis and evidence-based decision-making; a simulation-practical method allows hazardous or rare operations to be rehearsed safely; and a reflective-corrective method, grounded in the experiential learning cycle, requires learners to analyse their own performance and plan correction. Each method terminates in a documented artefact that serves at once as a learning activity and as assessment evidence, dissolving the usual boundary between teaching and examination. Sequenced cumulatively, the four methods drive the learner along an ascending trajectory of readiness — reproductive, productive, partially exploratory, and adaptive-creative — defined by growing autonomy and task complexity rather than by accumulated marks.

Assessment in the model is deliberately bifurcated, and this two-circuit logic constitutes the study’s second core result (Table 1). The first circuit appraises the quality of the educational content against expert criteria; the second appraises the learner’s readiness across four competence dimensions. Keeping the two on independent registers prevents a weak programme from being concealed behind lenient grading and supplies the monitoring-corrective block with two clean evidentiary streams. The assessment is completed by an error taxonomy in which safety violations are treated categorically: regardless of the quality of the surrounding work, a safety-related error is designated a critical error and mandates re-performance after a corrective exercise — encoding the professional principle that, in electrical work, an otherwise competent performance containing a safety breach is a failed performance.

Table 1. *Structure of the two-circuit assessment system.*

Circuit	Object of appraisal	Criteria / dimensions	Use of results
Circuit 1	Quality of educational content (expert evaluation)	Normative compliance; professional relevance; structural coherence; feasibility; assessment validity; adaptability	Programme improvement
Circuit 2	Learner professional readiness (competence assessment)	Motivational-value; cognitive; practical-operational; reflective-adaptive — resolving into four readiness levels	Validation of individual competence

The author’s scientific approach

The conceptual contribution advanced here can be stated as three propositions. First, alignment is not a property that a syllabus possesses once it is well written; it is a condition that must be continuously regenerated, and is therefore best secured by a control loop in which the descriptor–competence matrix renders misalignment visible at the level of individual descriptors, tasks, and instruments. Second, the appraisal of programme quality and the certification of learner readiness are distinct epistemic objects and should be measured separately, since conflating them allows each to mask deficiencies in the other.

Third, in a high-risk trade safety must enter the assessment logic as a categorical criterion rather than as one weighted factor among many. Taken together, these propositions reframe content design in vocational education from the drafting of a document to the engineering of a self-correcting system.

Conclusion. The study yields three principal scientific results: an eight-block organizational-pedagogical model that unifies the design, enactment, assessment, and renewal of training content; a two-circuit assessment system that separates programme quality from learner readiness and feeds a monitoring-corrective loop; and an error taxonomy with a critical-error rule that embeds safety judgement directly into certification. Their practical significance lies in providing institutions with a concrete, standard-anchored template — organised around the descriptor–competence matrix — for converting occupational standards into teachable and assessable content, and in offering policymakers a mechanism that links the elaboration of trade standards to their pedagogical realisation. Because the architecture is designed to be trade-agnostic, it is in principle transferable to other technical professions facing the same alignment problem.

Future research will proceed from design to evidence. The immediate priorities are the empirical piloting of the model with learner cohorts and employer panels, the establishment of the reliability and validity of the two assessment circuits, and an examination of the architecture’s transferability to adjacent technical trades. Pursuing these steps would convert a coherent design into evidenced practice and contribute, in a concrete and transferable way, to the quality of technical-workforce preparation prioritised in national development strategy.

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