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THE CONTEMPORARY METHODOLOGY OF TEACHING THE DISCIPLINE "PREPARATION OF CONFECTIONERY PRODUCTS"

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Abstract. This article substantiates a contemporary methodology of teaching the discipline "Preparation of Confectionery Products" in the system of professional education. The study proceeds from a constraint specific to the discipline: practical training consumes raw materials irreversibly and workshop places and equipment are limited, so that workshop time is the scarcest resource of the programme and the efficiency of its use constitutes the principal criterion of methodological modernity. The author elaborates a three-environment model allocating learning objectives among the digital environment, the educational workshop and the production enterprise according to the comparative advantage of each, and identifies four vectors of modernisation: from the transmission of formulations to the understanding of processes, from the single live demonstration to structured re-viewable demonstration, from theory inside the workshop to flipped preparation with entry control, and from summative grading to formative criteria-based assessment. The polemic between K.A. Ericsson and D.Z. Hambrick concerning the explanatory power of deliberate practice is subjected to critical examination.

Keywords: professional education, confectionery technology, teaching methodology, practical training, workshop time, deliberate practice, instructional video, flipped learning, formative assessment, psychomotor skill, sensory judgement, dual training.

INTRODUCTION

The confectionery trade has changed more rapidly over the past two decades than over the preceding century. New equipment has entered the workshop, new functional ingredients and stabilising systems have altered established formulations, standards of presentation have been transformed by the circulation of images, and consumer demand increasingly requires products adapted to dietary restrictions and reduced sugar content. A methodology formed when the trade was transmitted through apprenticeship and a stable repertoire of products cannot answer these conditions, and the question of what a contemporary methodology should consist in has accordingly become pressing. The answer proposed here proceeds from a reconsideration of the aim of the discipline. Its purpose is not the accumulation of memorised formulations, since any formulation may be looked up in seconds and the assortment a graduate will actually produce is unknown during his training. Its purpose is technological judgement: the capacity to work with an unfamiliar formulation, to recognise from the behaviour of a mass what stage the process has reached, to diagnose a defect and to correct a deviating process. Such judgement rests upon understanding why operations produce their effects, and it is this understanding rather than the recipe that constitutes the transferable content of the discipline. The second premise of the study is a material constraint that distinguishes this discipline from most others. Practical training consumes raw materials that cannot be recovered; workstations, ovens and mixers are limited in number; batch sizes are dictated by equipment rather than by pedagogical convenience; and the products made cannot be reused. Workshop time is therefore the scarcest and most expensive resource of the whole programme, and the efficiency with which it is employed is not one consideration among others but the principal criterion by which a methodology should be judged. Measured against this criterion, the traditional organisation of practical instruction proves wasteful. Theoretical explanation is often delivered inside the workshop, occupying time only the workshop can provide; the demonstration is performed once, observed by a crowd of whom only those nearest see the

decisive detail, and cannot be repeated because the material has been consumed; and during a batch a minority act while the majority observe. The scarcest resource is thus spent on functions that could be performed elsewhere at negligible cost. The instruments capable of correcting this distribution have become available only recently. Video with close-up and slow motion permits the decisive sensory cues of a demonstration to be shown to every student and reviewed without limit; calculation and formulation tasks can be practised digitally without materials; defect diagnosis can be trained upon photographic cases; and criteria-based formative assessment allows the student to acquire a conception of quality against which to judge his own product. Partnership with enterprises provides conditions of volume and speed that no educational workshop can reproduce. For the Republic of Uzbekistan the question possesses direct practical significance. The confectionery industry and the hospitality sector are expanding, export is developing, professional education is being reformed and educational workshops are being re-equipped, while skills competitions have introduced international criteria of occupational performance. The scholarly problem arises from the contradiction between the demands now placed upon the graduate and an organisation of practical instruction that expends its scarcest resource inefficiently. The aim of the article is to substantiate a contemporary methodology of teaching the discipline; the tasks were to establish the criterion of methodological modernity, to distribute its objectives among the environments in which they may be attained, to determine the vectors of modernisation and to elaborate the corresponding assessment. The novelty consists in substantiating the economy of workshop time as that criterion, in the three-environment allocation model and in the four vectors derived from it.

LITERATURE REVIEW

Within Uzbek pedagogical scholarship the foundation of the present study is supplied by the work of Q.T. Olimov on the methodology of teaching special subjects. The scholar demonstrates that theoretical instruction and practical training form a single process whose effectiveness depends upon the correspondence between the logic of production and that of its pedagogical presentation, and that technological documentation should be treated as an object of analysis rather than a prescription to be executed. This underlies the distinction drawn below between the transmission of formulations and the formation of technological judgement, since a student who has analysed why a map prescribes what it prescribes can act when the map is absent. The second pillar is the research of O‘.Q. Tolipov and M.H. Usmonboyeva on the applied foundations of pedagogical technologies, in which the design of the educational process is treated as the specification of diagnosable aims, of the actions of both participants at each stage and of the criteria by which results are established. This requirement of explicit design is what makes the allocation of objectives among environments a methodological rather than an improvisational matter. The value dimension is illuminated by research on education and worldview: S. Ergashbaev shows that stable orientations are formed through sustained continuous education rather than isolated influences and, in a further study, singles out independent critical reflection as a central outcome, while M.M. Mirzaolimjon og‘li and E. Shohbozbek disclose the institutional context of the reform. Within foreign scholarship several traditions bear upon the problem. K.A. Ericsson and his colleagues established the conception of deliberate practice, according to which expert performance is the product of extended activity specifically designed to improve identified weaknesses under immediate feedback rather than of experience as such. B.N. Macnamara, D.Z. Hambrick and F.L. Oswald contested the explanatory reach of this conception on meta-analytic grounds. R.E. Mayer formulated empirically grounded principles for the design of multimedia instruction, which determine whether a recorded demonstration teaches or merely entertains. D.R. Sadler showed that improvement is impossible unless the learner holds a conception of quality enabling him to compare his own work with the standard. P. Figoni systematised the physico-chemical

foundations of baking, furnishing the substantive content of process understanding. The gap addressed by the present article is the absence of a methodology that allocates the objectives of the discipline among available environments under an explicit resource constraint.

RESEARCH METHODOLOGY

The methodological foundation of the study is constituted by the systemic approach, which made it possible to treat theoretical instruction, practical training in the educational workshop and training at the enterprise as components of a single system rather than as consecutive stages, so that a change in the distribution of functions among them alters the effectiveness of the whole; within this framework the activity approach performed the leading function, since occupational skill is formed only through the student's own operations upon materials, and the competence approach supplied the formulation of results in terms of demonstrable performance. The theoretical analysis of pedagogical and technological literature served to reconstruct the conceptions of skill formation, instructional design and assessment relevant to the discipline. Technological analysis of the production processes of the principal groups of confectionery products determined which operations require real materials and which may be mastered in their absence, furnishing the empirical basis of the allocation model. Documentary and content analysis of curricula, syllabi and technological documentation established the existing distribution of time between functions, while pedagogical observation of practical lessons measured how workshop time is actually expended. Questioning of teachers and students and interviews with enterprise specialists established the difficulties encountered and the requirements of the profession. Pedagogical modelling yielded the three-environment allocation model and the system of assessment criteria, and the method of expert assessment was applied in verifying them. General scientific procedures of analysis and synthesis, induction and deduction, abstraction and generalisation were applied at every stage and secured the coherence of the conclusions.

RESULTS

The study established that the criterion of modernity for this discipline is the efficiency with which a methodology employs its scarcest resource, and formulated the corresponding allocation rule: every objective should be assigned to the least costly environment in which it can actually be attained. A three-environment model was substantiated on this basis. The digital and classroom environment possesses the comparative advantage of unlimited repetition at negligible material cost and should carry the theoretical grounding of processes, the calculation of formulations, work with technological documentation, the diagnosis of defects from documented cases and the preliminary training of perception through recorded demonstration. The educational workshop possesses the comparative advantage of real materials under controlled conditions in which failure is permitted, and should carry the formation of psychomotor skills, sensory judgement upon actual masses, hygienic and safety routines and the completion of finished products. The production enterprise offers authentic conditions that cannot be simulated and should carry working speed, consistency across large volumes, teamwork and performance to order under time pressure. Four vectors of modernisation follow from the model. The first is the transition from the transmission of formulations to the understanding of processes, every operation being taught together with its physico-chemical justification. The second is the transition from the single live demonstration to structured recorded demonstration, in which close-up and slow motion make the decisive sensory cues visible to every student and reviewable without limit, the live demonstration being reserved for what the recording cannot convey. The third is the transition to flipped preparation, in which theory is studied in advance and admission to practical work is conditional upon an entry check of preparation and calculation, a rule that protects workshop time from functions that do not require it. The fourth is the transition from summative grading to formative criteria-based assessment, in which the student first assesses his own product against explicit criteria

and then compares that assessment with the teacher's, thereby acquiring the conception of quality without which independent improvement is impossible. The assessment criteria accordingly combine technological correctness, sensory characteristics, hygienic compliance, time expended, yield, material loss and the accuracy of the student's own evaluation. The limits of the methodology were finally determined: recorded demonstration cannot replace tactile learning and must precede rather than substitute for it; video of adequate quality requires investment; the teacher must command both the trade and the design of instruction; and the material constraint is further relieved by reduced batches and by treating defective products as evidence.

DISCUSSION

The results require to be situated within the principal controversy concerning the formation of expertise, the dispute between K.A. Ericsson and D.Z. Hambrick and their colleagues. In their foundational study, Ericsson, Krampe and Tesch-Römer argued that the differences between expert and ordinary performers are attributable primarily to accumulated deliberate practice, understood not as repetition or occupational experience but as activity designed to improve identified weaknesses, performed with full attention and accompanied by immediate feedback. The implication for vocational instruction is direct: hours in a workshop are not equivalent to practice in this sense, and repetition without feedback consolidates error as readily as skill. Macnamara, Hambrick and Oswald subjected this conception to meta-analytic examination and reached a more restrained conclusion. Deliberate practice, on their finding, accounted for a modest proportion of the variance in performance, and this proportion differed markedly across domains, being substantial in games and music but appreciably smaller in education and the professions. They inferred that other factors, including prior knowledge, age of commencement and stable individual differences, contribute significantly to high performance, and that accounts attributing expertise almost entirely to practice overstate what training can accomplish. The substance of the disagreement concerns the malleability of ability and, correspondingly, the expectations that may legitimately be placed upon a methodology of instruction. Two further positions clarify its application here. D.R. Sadler specifies what the feedback central to Ericsson's conception must consist in: the learner cannot improve unless he holds a conception of quality definite enough to compare his own product with the standard, which is why self-assessment preceding the teacher's judgement occupies a central place in the methodology proposed above. R.E. Mayer's principles of multimedia design determine whether the recorded demonstration directs attention to the decisive cue or dissipates it upon incidental detail. The position advanced here is that the controversy concerns the ceiling of attainment whereas vocational education is concerned with its floor: the task of the discipline is not to produce exceptional masters but to bring novices reliably to occupational competence, and it is within this range that structured practice possesses its largest documented effect. The meta-analytic finding of a smaller effect in the professions is moreover open to an interpretation favourable to the present argument: practice in working settings is typically unstructured, lacks defined targets and provides feedback only when a product fails, so that much of what is recorded as practice does not satisfy the definition at all. The disagreement therefore converts into a design requirement: workshop time must be organised as deliberate practice, with an explicit target for each session, immediate feedback and correction before repetition, rather than as the production of goods under supervision.

CONCLUSION

The study has shown that the modernity of a methodology for teaching the preparation of confectionery products is measured not by the novelty of its means but by the efficiency with which it uses the scarcest resource of the discipline, workshop time. From this criterion follows the allocation rule assigning each objective to the least costly environment in which it can actually be attained, and

the three-environment model distributing objectives among the digital environment, the educational workshop and the production enterprise. Four vectors of modernisation follow from the model: from the transmission of formulations to the understanding of processes; from the single live demonstration to structured recorded demonstration; from theory inside the workshop to flipped preparation protected by entry control; and from summative grading to formative criteria-based assessment in which the student first judges his own product. The analysis of the controversy over deliberate practice established the further requirement that workshop time be organised with explicit targets, immediate feedback and correction preceding repetition. Further research might address the experimental measurement of the time released by the proposed allocation and its effect upon the level of skill attained.

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