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TECHNOLOGY OF PROFESSIONAL AND METHODOLOGICAL TRAINING BASED ON ADAPTIVE EDUTAINMENT

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Abstract. This article develops a technology for organising the professional and methodological training of pre-service English language teachers through adaptive edutainment. The study aims to substantiate a technological solution that integrates diagnostic evidence, professional teaching situations, and game-informed learning activity within a single didactic cycle. The conceptual design study employed content analysis of scholarly sources, comparative analysis, pedagogical modelling, and functional decomposition. The resulting technology comprises five stages: diagnosis; goal setting and individual route selection; edutainment activity; immediate feedback and correction; and reflection with professional transfer. Learners' language proficiency, the quality of their methodological decisions, motivation, and learning behaviour are defined as adaptation variables. Assessment criteria are proposed for the motivational-axiological, cognitive-methodological, operational, digital-didactic, and reflective-adaptive components of professional readiness. The technology treats edutainment not as a collection of external rewards but as a professional learning mechanism for modelling classroom situations, making pedagogical decisions, and analysing their consequences. Its empirical effectiveness should be examined through a subsequent controlled educational experiment.

Keywords: adaptive learning, edutainment, professional and methodological training, pre-service English teacher, individual learning pathway, gamification, pedagogical diagnosis, feedback, reflection, professional transfer.

The professional preparation of a future English language teacher cannot be reduced to the development of language proficiency. A graduate must be able to define lesson objectives, select content and teaching methods, account for learner differences, design communicative



situations, interpret assessment evidence, and evaluate his or her own teaching. These requirements call for professional and methodological training to be organised as an integrated system of knowledge, practical action, pedagogical decision-making, and reflection. Uzbekistan's Concept for the Development of Higher Education until 2030 identifies the wider use of digital technologies and modern software, improvement of educational quality, and adaptation of international experience to national practice as strategic tasks [1].

General digitalisation alone does not solve the problems of language teacher education. When a digital environment does not respond to a student's initial preparation, errors, interests, and professional decisions, it delivers the same content and pace to everyone. A task may therefore be too simple for one student and unnecessarily difficult for another. Adaptive learning addresses this mismatch by modifying content, difficulty, support, pace, and feedback according to evidence about the learner.

Edutainment combines educational content with engaging activity, narrative, problem situations, simulations, and game mechanics. However, the addition of points, rankings, or badges does not in itself produce professional competence. Gamification has been defined as the use of game design elements in non-game contexts [2], whereas game-based learning requires a deliberate relationship between game activity and learning objectives [3]. An edutainment element is therefore pedagogically valuable only when it serves a specific component of methodological competence and influences the quality of the learner's pedagogical decision.

The CEFR Companion Volume strengthens the role of communicative activity, collaboration, mediation, and plurilingualism in language education [4]. This position requires pre-service teachers to be trained not as performers who reproduce a ready-made lesson scenario, but as professionals who mediate meaning, manage interaction, and select solutions appropriate to different learners. UNESCO's AI Competency Framework for Teachers likewise connects a human-centred mindset, ethics, AI foundations and applications, AI pedagogy, and professional learning [5].



Adaptive learning and edutainment are often implemented separately. The former is mainly used for individual recommendation and control, while the latter is used to increase engagement. Professional and methodological training requires diagnosis, a teaching situation, a methodological decision, immediate feedback, and reflection to operate within the same cycle. A fragmented use of these elements may increase activity without improving the quality of lesson planning or instructional judgement.

The purpose of this study is to develop and substantiate the goals, principles, stages, adaptation mechanism, and assessment criteria of an adaptive edutainment technology for the professional and methodological training of pre-service English language teachers. The research question was formulated as follows: how can data-informed adaptation and professionally oriented edutainment activities be integrated into a coherent didactic sequence that supports methodological decision-making, lesson design, and reflective self-evaluation?

The study follows a conceptual design methodology. Its purpose is not to claim the statistical effectiveness of an implemented intervention, but to construct a pedagogical technology that can be tested in a subsequent experiment. Accordingly, no invented percentages, means, effect sizes, or significance levels are reported as empirical findings.

The source base covered four areas: professional and digital competence in teacher education; adaptive and differentiated learning; gamification and game-based learning; and formative assessment and reflection. International frameworks, including the CEFR Companion Volume, UNESCO's AI Competency Framework for Teachers, DigCompEdu, and the UDL Guidelines, were used to define the goals and constraints of the technology [4–7]. The TPACK framework informed the integration of content, pedagogy, and technology [8].

Content analysis was used to identify functions required of the technology. Comparative analysis clarified the distinct roles of adaptive learning, gamification, game-based learning, and edutainment. Pedagogical modelling established relationships among entry diagnosis, objectives, content, activity, feedback, correction, and final reflection. Functional



decomposition transformed the general model into observable stages, decision rules, and learning actions.

Five design constraints were adopted. Adaptation should not depend on a test score alone. A game element should not replace the learning objective. Automated recommendations should not remove the teacher’s pedagogical control. Language difficulty and methodological difficulty should be managed separately. Evidence from the learning process and the quality of the final product should be considered together. These constraints are consistent with the recognition of learner variability in UDL [6], principles of formative feedback [9; 10], and the needs for autonomy, competence, and relatedness described in self-determination theory [11].

For future empirical evaluation, a quasi-experimental design is proposed. Experimental and comparison groups should complete pre- and post-assessments based on the criteria developed in this study. Depending on distributional assumptions, between-group differences may be examined using an independent-samples t-test or Mann–Whitney U test, and within-group change using a paired-samples t-test or Wilcoxon signed-rank test. Quantitative evidence should be triangulated with microteaching videos, reflective journals, platform logs, and expert rubric scores. This paragraph describes a future protocol and should not be interpreted as a completed experiment.

Results

The conceptual analysis produced an adaptive edutainment technology for professional and methodological training. The technology collects evidence about the learner, selects an individual route, places the learner in a game-informed professional situation, changes the level of support or complexity in response to performance, and supports the transfer of the acquired method to a new teaching context.

Structural Components of the Technology

Table 1.

Components and pedagogical functions of the adaptive edutainment technology



Component	Content	Pedagogical function	Observable evidence
Goal-oriented	Professional readiness components and expected outcomes	Aligns learning activity with competence outcomes	Goal map and performance criteria
Diagnostic	Language proficiency, methodological knowledge, motivation, digital skills, and learning behaviour	Identifies the entry state and individual needs	Test, questionnaire, scenario task, and platform log
Content	Language teaching methodology, lesson design, assessment, digital tools, and inclusive solutions	Connects professional knowledge with teaching situations	Micro-lesson plan, task bank, and resource choice
Activity	Quest, scenario, simulation, role, case, and team mission	Provides practice in methodological decision-making and collaboration	Decision sequence, completed product, and collaboration trace
Adaptive	Rules for changing difficulty, support, pace, format, and role	Manages the individual learning pathway	Recommendation history and changes in the next task
Assessment and reflection	Rubric, peer assessment, rapid feedback, portfolio, and reflective journal	Compares performance with criteria and supports transfer	Rubric scores, comments, revised product, and reflection

The central unit of the technology is not an isolated game element but a professional teaching situation. A student may, for example, be asked to design a speaking lesson for a mixed-proficiency class. The student selects the objective, instructions, timing, grouping strategy, scaffolding, and assessment method. The system records the coherence and justification of these decisions and, when necessary, offers an example, cue, or additional resource. The student then tests the scenario in microteaching and revises it after feedback.



Table 2.

Stages of professional and methodological training based on adaptive edutainment

Stage	Student activity	Teacher and system activity	Stage outcome
1. Diagnosis	Completes language and methodological tasks and evaluates personal needs	Collects entry evidence and identifies strengths and development needs	Initial learner profile
2. Goal and route	Chooses a professional goal and accepts a personalised task sequence	Links the goal to criteria and determines task level and support	Individual learning route
3. Edutainment activity	Makes methodological decisions in quests, cases, role-play, simulations, and microteaching	Provides the situation, manages time and resources, and organises collaboration	Methodological product and activity trace
4. Feedback and correction	Analyses errors, revises the product, and selects needed support	Provides immediate feedback and changes difficulty or support	Corrected decision or product
5. Reflection and transfer	Justifies decisions and plans their use in a new context	Uses a rubric and guiding questions and defines the next goal	Reflective conclusion and professional transfer

The stages do not end in a linear sequence. Evidence produced during reflection and transfer updates the learner profile and becomes input for the next diagnostic cycle. The technology therefore operates through a recurring sequence of diagnosis, activity, evidence, correction, and a new goal. Adaptivity is realised through the repeated operation of this cycle.

The adaptation mechanism uses four groups of evidence: readiness, performance quality, motivational state, and learning behaviour. Readiness is not measured by a language test alone; comprehension of a methodological situation and the ability to justify a teaching decision are also included. Performance quality is evaluated with analytic rubrics, motivational state through short self-report prompts, and learning behaviour through attempts,



requests for help, time on task, and revision activity.

Table 3.

Rules for adaptive decision-making

Observed condition	Adaptive response	Methodological rationale
Adequate language proficiency but weak methodological decision	Keeps the language level stable and provides a decision tree, model, or methodological cue	Separates language difficulty from methodological difficulty
Methodological knowledge is present but application is weak	Replaces another theory test with a microteaching task, case, or timed simulation	Supports transfer from knowledge to professional action
High performance on two consecutive tasks	Increases task complexity and learner independence	Maintains optimal challenge and perceived competence
Repeated error and multiple attempts	Breaks the task into smaller steps and offers an additional example or peer support	Provides scaffolding and formative correction
Declining activity or task abandonment	Changes the activity format, role, or collaboration mode and restates the purpose	Supports autonomy, relatedness, and goal awareness
High performance but superficial reflection	Introduces a contrasting case, a why-question, and an evidence-based justification task	Develops metacognition and professional transfer

These rules operate as pedagogical recommendations rather than deterministic judgements. The teacher may accept, modify, or reject a recommendation. This control is consistent with human-centred AI and the preservation of teacher agency [5]. Students should also see why a recommendation was generated. For example, the system may state that a model was offered because the criterion for clarity of instruction was not met in two consecutive tasks. Explainable adaptation supports trust and self-regulation.

System of Edutainment Activities

Edutainment activities should model professional action. Points and badges are



secondary indicators of progress. The primary mechanics are meaningful choice, consequence, limited resources, role, collaboration, repeated attempts, and a visible development pathway. This position is consistent with research emphasising the need to tailor gamification to learner characteristics and educational context [12; 13].

Table 4.
Edutainment activities for professional and methodological training

Activity	Professional task	Game mechanic	Final product
Lesson design quest	Aligns objectives, stages, methods, and assessment	Levels, conditional choices, time, and resources	Justified lesson plan
Methodological detective	Identifies the cause of a problem in a lesson episode	Evidence collection, hypotheses, and an error trail	Diagnostic conclusion and correction
Classroom management simulation	Makes a pedagogical decision in an unexpected situation	Role, time pressure, and decision consequences	Decision protocol
Assessment studio	Creates a CEFR-aligned task and analytic rubric	Mission, expert role, and peer review	Assessment task and rubric
Microteaching challenge	Conducts a short lesson and redesigns it	Stages, attempts, and video feedback	Micro-lesson and reflective report
Inclusive classroom scenario	Creates alternative routes for learners with different needs	Personas, choices, and limited resources	Differentiated task set

The engaging character of these activities comes from their professional content. Students act as school teachers, methodologists, assessors, or lesson designers. Every activity ends with a usable methodological product. Edutainment thereby becomes a simulation mechanism for repeated professional practice in a safe environment rather than decorative entertainment added to a lesson.



The outcome of the technology is evaluated through five components of professional and methodological readiness. Each component is represented by observable indicators. A three-level scale may be used: at the high level, a decision is independent, justified, and transferred to a new situation; at the medium level, a decision is generally correct but requires a model or partial assistance; at the low level, the decision remains fragmented, relationships among criteria are not explained, and sustained support is required.

Table 5. Criteria and indicators for assessing professional and methodological readiness

Criterion	Main indicators	Assessment instrument
Motivational and axiological	Interest in the profession, task completion, responsibility, and learner-centred values	Motivation scale, observation, and reflective journal
Cognitive and methodological	Knowledge of language teaching principles, methods, and technologies; theoretical justification of decisions	Test, concept map, and scenario question
Operational	Lesson design, instruction, interaction management, and formative assessment	Microteaching, case, and analytic rubric
Digital and didactic	Purposeful tool selection, content creation, safety, and ethical judgement	Digital portfolio and practical task
Reflective and adaptive	Error analysis, use of feedback, strategy change, and transfer	Reflective report, revised product, and interview

For an integral score, indicators within each criterion may be rated from 0 to 3 and averaged. A final judgement should not, however, rely only on the overall score. High motivation does not automatically indicate high-quality methodological decisions. Component profiles should therefore be reported separately and used to determine individual corrective support.

Discussion

The main distinction of the proposed technology is that adaptation and edutainment are organised as one professional activity cycle rather than as two attached tools. The adaptive component determines who needs which form of support, difficulty, or activity. The



edutainment component turns this adjustment into a professionally meaningful situation involving choice and consequences. Without adaptation, the same quest may be ineffective for students with different levels of preparation. Without a professional situation, an adaptive system may be reduced to selecting the next test item.

The technology translates the integration of pedagogical, content, and technological knowledge in the TPACK framework into practical tasks [8]. Students do not merely name a digital tool; they justify its suitability for a language objective, learner characteristics, interaction pattern, and assessment purpose. This process is aligned with DigCompEdu areas concerning digital resources, teaching and learning, assessment, learner empowerment, and the development of learners' digital competence [7].

The motivational design does not depend on the short-term effect of external rewards. Self-determination theory associates more sustainable motivation with support for autonomy, competence, and relatedness [11]. Students are therefore allowed to select roles or task variants, master complex activity in manageable stages, and produce methodological products with peers. Points and rankings should not become controlling devices that reduce autonomy.

Immediate feedback activates the adaptive cycle. Shute argues that effective formative feedback should be specific, timely, and directed at the task [9]. Nicol and Macfarlane-Dick connect feedback with student self-regulation [10]. In this technology, feedback does more than identify an error: it recalls the criterion, suggests the next action, and gives the student an opportunity to revise the product. Assessment thus functions as information for managing learning rather than as control applied only at the end.

The action-oriented approach and mediation descriptors in the CEFR Companion Volume provide an important basis for designing professional situations [4]. A pre-service teacher practises not only the explanation of grammar or vocabulary but also the facilitation of meaning-making, management of group interaction, and mediation of content in different forms. Adaptive edutainment makes it possible to repeat such complex activity, receive feedback, and try again within a safe simulation.



Several risks must be managed during implementation. Platform logs do not fully reveal a learner's intention and should be interpreted together with teacher observation and student reflection. Excessive competition may weaken collaboration; team missions and individual progress maps are preferable to a single public ranking. AI-generated recommendations should not be treated as neutral or infallible; their reasons should be visible, and the final pedagogical decision should remain with the teacher. Low-technology alternatives are also needed to address differences in internet access, devices, and digital skills.

The principal limitation of this study is that the model has not yet been tested empirically. No causal claim about effectiveness can therefore be made. The next research stage should establish the content validity of the task bank, adaptation rules, and rubrics through expert review; estimate inter-rater reliability; and conduct an intervention lasting at least one semester. Learning outcomes, motivation, self-regulation, collaboration, and professional transfer should be measured. Platform logs should be used to explain the learning process rather than treated as outcomes in themselves.

Conclusion

1. The adaptive edutainment technology was designed as a recurring didactic cycle consisting of diagnosis, individual route selection, professionally situated activity, immediate correction, reflection, and transfer.

2. Adaptation extends beyond language proficiency. The quality of methodological decisions, motivational state, and learning behaviour also inform the individual route. Separate management of language and methodological difficulty reduces the risk of inappropriate recommendations.

3. The primary purpose of edutainment is to model authentic classroom situations, reveal the consequences of methodological choices, and provide opportunities for repeated attempts. Quests, cases, role-play, simulations, and microteaching have didactic value when they result in a professional product.

4. Professional and methodological readiness is assessed through motivational-



axiological, cognitive-methodological, operational, digital-didactic, and reflective-adaptive criteria. Reporting component profiles in addition to an overall score supports more precise individual correction.

5. The proposed technology is a theoretical and design result. Its practical effectiveness requires expert validation, reliable assessment rubrics, and a controlled pedagogical experiment. Future research should examine change in learning outcomes, motivation, self-regulation, collaboration, and professional transfer.

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