LINGUO-DIDACTIC POTENTIAL OF PROBLEM-BASED LEARNING IN DEVELOPING THE COGNITIVE COMPETENCE OF PHILOLOGY STUDENTS

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Abstract: This article examines the linguo-didactic potential of problem-based learning (PBL) as a means of developing the cognitive competence of philology students. Building on the constructivist tradition and on Uzbek research into problem-based teaching (muammoli ta'lim), the study proposes a four-component model of cognitive competence, a typology of four philological task formats, a four-stage lesson procedure and analytic assessment rubrics. A quasi-experimental design for verifying the model is outlined, and practical recommendations for university teaching are formulated.

Keywords: problem-based learning, cognitive competence, philological education, critical thinking, metacognition, scaffolding, task typology, technological map

INTRODUCTION

The Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030 sets the task of moving university teaching from the transmission of ready-made knowledge towards the formation of competences that graduates can apply independently [1]. For philology faculties this task has a particular meaning. A future philologist is expected not only to command a language, but also to reason about language and text: to analyse a construction whose grammatical status is disputed, to compare rival readings of a literary passage, to defend one translation decision against another. In seminar practice, however, the explanatory-illustrative format still prevails: the teacher presents a finished analysis and students are asked to reproduce it. Such a format develops recall and imitation, while the operations of analysis, evaluation and argument remain largely untrained.

Problem-based learning (PBL) offers a different logic. In the model systematised by H.S.Barrows and R.M.Tamblyn, learners begin not with a lecture but with an ill-structured problem, and the knowledge they acquire is organised around the effort to resolve it [2]. The model was designed for medical education, and its transfer to philology is not automatic. A clinical case is ultimately answerable to an external fact - the actual condition of the patient - whereas a literary text, or an ambiguous sentence, may admit more than one well-grounded interpretation. This difference does not

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weaken the case for PBL in philology; rather, it requires that the method be adapted to the interpretive openness of the philological object.

Uzbek pedagogical science is well prepared for such an adaptation. B.L.Farberman described the “problem situation” as the starting point of activating instruction and noted that its effect depends on how skilfully the teacher constructs the difficulty [3]; N.S.Saidahmedov placed problem-based methods within the wider system of pedagogical technologies and their planning documents [4]; O‘.T.Tolipov and M.U.Usmonboyeva proposed a staged structure for applying such technologies in the classroom [5]. These studies, however, recorded mainly general outcomes - activity, participation, retention of applied knowledge. The specific question of how PBL forms the cognitive competence of philology students, and how this competence can be measured separately from linguistic competence, has not yet been treated systematically.

The aim of the article is to substantiate the linguo-didactic potential of PBL for forming the cognitive competence of philology students and to propose a reproducible model of task design and assessment. To reach this aim, the following objectives were set: to define the structure of cognitive competence as it appears in philological work; to identify the mechanisms through which a problem-based task activates each of its components; to develop a typology of philological problem tasks and a lesson procedure; and to outline an experimental design for verifying the model.

METHODS

The study is theoretical and design-oriented. Its methods include analysis and synthesis of the international and Uzbek literature on problem-based learning and cognitive development, comparative analysis of PBL models, pedagogical modelling, and the design of a quasi-experimental verification procedure. The literature was read not as a list of separate positions but as a line of development in which each author takes up a question left open by the previous one.

This line begins with J.Dewey, for whom thinking starts from a “felt difficulty” and moves through suggestion, hypothesis and testing towards a warranted conclusion [6, p. 72]. J.Bruner turned this account of thinking into a principle of instruction: knowledge reached through guided discovery is retained and transferred better, provided that problems are ordered so that each one builds on the structures formed by the previous one [7]. The question of who guides this discovery was answered by L.S.Vygotsky’s concept of the zone of proximal development, which defines the teacher’s role as support offered just beyond what the learner can do alone [8, p. 86]. H.S.Barrows and R.M.Tamblyn gave these ideas an institutional form in the small-group, tutor-facilitated case [2], and J.R.Savery and T.M.Duffy restated that form as a set of constructivist design principles - anchoring learning in a larger authentic

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problem, giving learners ownership of the process, and requiring reflection on both content and method [9].

Once the model existed, the question shifted to why it works. G.R.Norman and H.G.Schmidt linked its effect to the activation of prior knowledge, elaboration in discussion and learning in a context close to that of application [10]. C.E.Hmelo-Silver then specified the learning activities behind these effects: building a representation of the problem, diagnosing one's own knowledge gaps, and constructing knowledge collaboratively [11]. This optimistic account was challenged by P.A.Kirschner, J.Sweller and R.E.Clark, who argued that minimally guided instruction overloads novices' working memory [12]. The reply of C.E.Hmelo-Silver, R.G.Duncan and C.A.Chinn shifted the debate decisively: well-designed PBL is not minimally guided, because it relies on structured scaffolding that is gradually withdrawn [13]. It is this scaffolded variant of PBL that the present study adopts.

The second line of analysis concerns the outcome. Following Sh.S.Sharipov, competence is understood as a demonstrated capacity to mobilise knowledge, skills and personal qualities for a concrete task [14]. To describe the cognitive side of this capacity, the revised taxonomy of L.W.Anderson and D.R.Krathwohl was used, which separates the process dimension (analyse, evaluate, create) from the knowledge dimension [15]. P.A.Facione's expert consensus added that critical thinking includes both skills and the disposition to use them [16], and D.F.Halpern showed that such skills do not transfer between domains unless learners are taught to see the structural similarity of problems [17]. J.H.Flavell's distinction between metacognitive knowledge and metacognitive monitoring completed the picture by explaining how learners control their own reasoning [18]. Finally, J.J.Jalolov's methodological tradition, in which linguistic competence is defined as command of the language system, made it possible to draw a clear line between linguistic and cognitive competence [19].

The design logic of the model follows the backward design principle of G.Wiggins and J.McTighe: the desired outcome is specified first, and every decision about material, task framing, scaffolding and assessment is derived from it [20]. The verification procedure is based on the typology of quasi-experimental designs of W.R.Shadish, T.D.Cook and D.T.Campbell [21].

RESULTS

1. Didactic principles of philological PBL

The comparative analysis yielded five principles that govern the design of problem-based tasks in philology. (1) *Authentic problem anchoring:* each task rests on a real interpretive or analytical difficulty found in genuine linguistic or literary material, not on an exercise whose difficulty is merely procedural. (2) *Structured sequencing:* tasks are ordered so that each consolidates the analytical tools needed for

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the next. (3) *Productive cognitive conflict:* the difficulty of a task slightly exceeds the learner's current repertoire but stays within the zone of proximal development. (4) *Collaborative verbalisation:* learners must state and defend their reasoning orally or in writing. (5) *Reflective closure:* every task ends with reflection on both the solution and the path that led to it.

2. Structural model of cognitive competence

Cognitive competence of a philology student is defined as a cross-cutting capacity that is exercised in every content area - morphology, literary interpretation, translation, academic writing - but is not reducible to any of them. It is also logically independent of linguistic competence: a student may have accurate grammar and a wide vocabulary and still be unable to build an argument about a linguistic phenomenon. The model distinguishes four components, each specified by observable criteria and assessed at three levels (low, intermediate, high) (Table 1).

Table 1

Components of the cognitive competence of philology students

Component	Content	Formation criteria	Leading mechanism
Analytical-interpretive	Decomposing a text into structural and semantic elements and building a textually grounded interpretation	Completeness of identified elements; accuracy of relations between them; textual (not impressionistic) grounding	Construction and integration of a text representation
Evaluative-critical	Judging the validity and evidential support of a claim or interpretation - one's own or another's	Detecting weakly supported claims; separating evidence from assertion; weighing readings by explicit criteria	Comparative evaluation under uncertainty
Argumentative-constructive	Constructing and communicating an original argument supported by textual evidence	Logical coherence; relevance and sufficiency of evidence; originality relative to class material	Externalisation of reasoning under dialogic challenge
Metacognitive-regulatory	Monitoring and adjusting one's own analytical process during the task	Naming the strategy used; noticing one's own errors without prompting; changing	Self-directed monitoring

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		strategy within the same task	

he mechanisms in the last column were matched to the components on the basis of the reviewed literature. The analytical-interpretive component corresponds to the process by which a reader constructs and integrates a mental representation of a text, as described by T.A.van Dijk and W.Kintsch [22]. The evaluative-critical component is activated when several defensible solutions compete and none is obviously correct [17]. The argumentative-constructive component grows when reasoning must be made explicit and defended before peers [11], and the metacognitive-regulatory component develops through deliberate monitoring of one's own thinking [18]. An important consequence for philology follows from the openness of the text: here argument does not merely justify an answer found in advance - it is often the very means by which the interpretation is reached. This generative role of argument is what makes PBL especially suitable for philological material.

3. Typology of philological problem tasks

Four types of philological problems were identified, and for each a task format was designed and mapped to the components it primarily develops (Table 2). The formats are sequenced across the course in three phases, with scaffolding gradually reduced.

Table 2

Problem types, task formats and their place in the course

Problem type	Task format	What students do	Main components / phase
Structural-analytical	Competing-analysis task	Test two published analyses of a contested form against a small corpus of authentic sentences	Analytical, evaluative / initial phase
Comparative-translational	Translation-justification task	Compare existing translations of a resistant passage by explicit criteria (meaning, register, reader) and justify their own version	Evaluative-critical / initial (simplified) and intermediate phase
Interpretive-hermeneutic	Textual-crux task	Resolve a recognised interpretive difficulty in a literary passage and defend the reading against a counter-reading	All four components / intermediate and final phase

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Problem type	Task format	What students do	Main components / phase
Historical-evolutionary	Evidence-reconstruction task	Reconstruct missing stages of a diachronic development from incomplete attested forms or variants	All four, under maximal uncertainty / final phase

The ordering follows J.Bruner's spiral principle [7] and M.L.Gick and K.J.Holyoak's finding that transfer requires repeated work on problems that differ in surface content but share a structure [23]. In the initial phase tightly bounded problems are solved with maximal support; in the intermediate phase support is faded; in the final phase students integrate all four components with minimal external structure.

4. Lesson procedure and technological map

Each task follows a four-stage procedure developed from the model of O'.T.Tolipov and M.U.Usmonboyeva [5]. At the *problem presentation* stage the teacher introduces the difficulty and a worksheet that directs attention to relevant textual features without revealing how they bear on the answer. At the *hypothesis formation* stage small groups propose provisional solutions. At the *evidence search and testing* stage groups return to the text or corpus, look for confirming and disconfirming evidence and revise their hypotheses. At the *verification and reflection* stage groups present and defend their solutions, then each student answers short reflection questions: which textual feature changed your view; would your first hypothesis have survived without discussion; would your strategy work on another text?

For implementation the procedure is written into a *texnologik xarita* (technological map), the lesson-planning format already familiar to Uzbek teachers [4]. For a 45-minute competing-analysis lesson, for example, the map allocates about 5 minutes to problem presentation, 10 minutes to hypothesis formation in groups of three or four (with the roles of evidence collector, spokesperson and reflection keeper), 20 minutes to corpus-based testing - during which the teacher asks process questions instead of confirming or rejecting answers - and 10 minutes to group reports and individual written reflection.

5. Assessment tools

Assessment uses analytic rubrics that give a separate low/intermediate/high judgement (coded 1/2/3) for each of the four components, so that the result is a profile rather than a single score. Each level is illustrated by anchor examples of student work in order to calibrate raters. To avoid confusing cognitive and linguistic competence, the rubrics deliberately exclude grammatical and lexical accuracy, which is assessed

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separately in the language strand of the curriculum. The same rubrics serve a formative function during ordinary lessons, gradually shifting from teacher feedback to student self-assessment, and a summative function at the diagnostic stages of the experiment.

6. Design of experimental verification

Because philology students study in fixed academic groups, random assignment of individuals is not feasible; a nonequivalent control-group pretest-posttest design is therefore used [21]. The experiment covers one semester and has three stages. At the ascertaining stage both groups complete a battery of four performance tasks - one for each problem type - scored by two trained raters, with inter-rater agreement checked before full scoring. At the formative stage the experimental group is taught through the sequenced task model, while the control group studies the same content in the same time through explanatory-illustrative instruction. At the control stage a parallel battery with new material is administered. Group differences are analysed by analysis of covariance with the pretest score as covariate, and effect sizes are reported alongside significance. Fidelity of implementation - adherence to the map, number of sessions delivered and quality of facilitation - is monitored following C.L.O‘Donnell [24], so that a weak result can be attributed either to the model or to its delivery.

DISCUSSION

The results show that the potential of PBL for philology lies not in the method as such but in the correspondence between the type of task and the component of cognitive competence it trains. This answers, at least in part, the critique of P.A.Kirschner, J.Sweller and R.E.Clark [12]: the proposed model does not leave students without guidance. Worksheets, roles, process questions and phased fading of support keep the cognitive load within reach, which is precisely the condition named by C.E.Hmelo-Silver and her colleagues [13].

A second issue concerns the culture of the Uzbek university classroom. J.G‘.Yo‘ldoshev and S.A.Usmonov stress that an imported technology succeeds only if it fits the role expectations of teachers and students [25], and these expectations have traditionally assigned the teacher a directive role. The model therefore does not remove the teacher’s authority. The teacher keeps control over the choice of problems, their sequence and the criteria by which solutions are judged, while the analytical work of solving the problem is transferred to students step by step. In this sense the introduction of PBL into philology continues the national tradition of *muammoli ta’lim* rather than replacing it.

The model also generates a testable, differentiated prediction. Since collaborative externalisation and self-monitoring are the mechanisms most specific to PBL and least engaged by conventional teaching, the largest advantage of the experimental group is expected for the argumentative-constructive and metacognitive-regulatory components, and a smaller but positive advantage for the analytical-interpretive and

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evaluative-critical components, which traditional guided analysis also exercises to some degree. If the empirical data contradict this pattern, the mechanism account itself, and not only the statistics, will need revision. The main limitations of the design are its single-institution scope, the one-semester time frame and the dependence of results on the facilitation skill of individual teachers.

CONCLUSION

The study leads to the following conclusions. First, PBL rests on foundations - Dewey's reflective thinking, Bruner's discovery learning, Vygotsky's zone of proximal development - that are general to human cognition, and these foundations converge with the Uzbek tradition of problem-based teaching. Second, the cognitive competence of philology students can be described as a four-component construct (analytical-interpretive, evaluative-critical, argumentative-constructive, metacognitive-regulatory) that is distinct from linguistic competence and can be measured through component-level criteria. Third, a reproducible design model has been proposed: four task formats tied to four philological problem types, a four-stage lesson procedure, three-phase sequencing with fading support, analytic rubrics and a technological map.

On this basis the following recommendations are offered to teachers and curriculum designers: to adopt a hybrid, scaffolded version of PBL compatible with the credit-hour system; to train teachers in the facilitator role before implementation; to use the technological map as the standard planning and quality-control tool; to replace holistic marks for "critical thinking" with component-level rubrics; and to introduce problem tasks as a sequenced, semester-long system rather than as isolated activities. Further research should verify the model empirically, examine the durability of gains beyond one semester and test it in other institutions and in fields such as specialised translation and corpus linguistics.

References

1. O‘zbekiston Respublikasi Prezidentining 2019-yil 8-oktabrdagi “O‘zbekiston Respublikasi oliy ta’lim tizimini 2030-yilgacha rivojlantirish konsepsiyasini tasdiqlash to‘g‘risida”gi PF-5847-son Farmoni. Retrieved from https://lex.uz

2. Barrows, H.S., & Tamblyn, R.M. (1980). Problem-Based Learning: An Approach to Medical Education. New York: Springer.

3. Farberman, B.L. (2000). Ilg‘or pedagogik texnologiyalar. Toshkent: Fan.

4. Saidahmedov, N.S. (2003). Yangi pedagogik texnologiyalar. Toshkent: Moliya.

5. Tolipov, O‘.T., & Usmonboyeva, M.U. (2006). Pedagogik texnologiyalarning tatbiqiy asoslari. Toshkent: Fan.

6. Dewey, J. (1910). How We Think. Boston: D.C. Heath.

(cc) BY

7. Bruner, J. (1966). Toward a Theory of Instruction. Cambridge, MA: Harvard University Press.

8. Vygotsky, L.S. (1978). Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press.

9. Savery, J.R., & Duffy, T.M. (1995). Problem based learning: An instructional model and its constructivist framework. Educational Technology, 35(5), 31-38.

10. Norman, G.R., & Schmidt, H.G. (1992). The psychological basis of problem-based learning: A review of the evidence. Academic Medicine, 67(9), 557-565.

11. Hmelo-Silver, C.E. (2004). Problem-based learning: What and how do students learn? Educational Psychology Review, 16(3), 235-266.

12. Kirschner, P.A., Sweller, J., & Clark, R.E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. Educational Psychologist, 41(2), 75-86.

13. Hmelo-Silver, C.E., Duncan, R.G., & Chinn, C.A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). Educational Psychologist, 42(2), 99-107.

14. Sharipov, Sh.S. (2021). Kompetensiyaviy yondashuv asosida mutaxassis tayyorlash sifatini oshirish. Pedagogik ta'lim, (2), 4-9.

15. Anderson, L.W., & Krathwohl, D.R. (Eds.). (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.

16. Facione, P.A. (1990). Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction. Millbrae, CA: The California Academic Press.

17. Halpern, D.F. (2003). Thought and Knowledge: An Introduction to Critical Thinking (4th ed.). Mahwah, NJ: Lawrence Erlbaum.

18. Flavell, J.H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. American Psychologist, 34(10), 906-911.

19. Jalolov, J.J. (2012). Chet tili o'qitish metodikasi. Toshkent: O'qituvchi.

20. Wiggins, G., & McTighe, J. (2005). Understanding by Design (2nd ed.). Alexandria, VA: ASCD.

21. Shadish, W.R., Cook, T.D., & Campbell, D.T. (2002). Experimental and Quasi-Experimental Designs for Generalized Causal Inference. Boston: Houghton Mifflin.

22. van Dijk, T.A., & Kintsch, W. (1983). Strategies of Discourse Comprehension. New York: Academic Press.

23. Gick, M.L., & Holyoak, K.J. (1983). Schema induction and analogical transfer. Cognitive Psychology, 15(1), 1-38.

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24. O‘Donnell, C.L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. Review of Educational Research, 78(1), 33-84.

25. Yo‘ldoshev, J.G‘., & Usmonov, S.A. (2004). Pedagogik texnologiya asoslari. Toshkent: O‘qituvchi.

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