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DEVELOPING STUDENTS' CRITICAL THINKING IN TEACHING PHILOSOPHY THROUGH DIGITAL TECHNOLOGIES: A METHODOLOGICAL FRAMEWORK

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Abstract: The article substantiates an integrated methodological framework for developing students' critical thinking in the general philosophy course at Uzbek universities by means of digital technologies. Building on the TPACK model of teacher knowledge, the Delphi expert consensus on critical thinking, the theory of reflective thinking and the community of inquiry approach, the author proposes a framework of four interrelated digital "layers": digital text annotation for close reading, argument mapping, online communities of inquiry and gamified formative assessment aimed at recognising reasoning errors rather than recalling facts. The layers are arranged into a four-stage semester sequence "read – map – discuss – assess" and distributed across the topic blocks of the philosophy course. An assessment design based on argument maps, annotation records and discussion transcripts is described, and the conditions and limitations of implementing the framework are discussed.

Keywords: critical thinking, teaching philosophy, digital technologies, TPACK, argument mapping, social annotation, community of inquiry, gamification, formative assessment

Annotatsiya: Maqolada O'zbekiston oliy ta'lim muassasalarida falsafa fanini o'qitishda raqamli texnologiyalar yordamida talabalarning tanqidiy fikrlashini rivojlantirishning yaxlit metodik modeli asoslanadi. O'qituvchi bilimlarining TPACK modeli, tanqidiy fikrlash bo'yicha Delfi ekspert konsensusi, refleksiv tafakkur nazariyasi va "tadqiqotchilar hamjamiyati" yondashuvi asosida muallif o'zaro bog'langan to'rtta raqamli "qatlam"dan iborat modelni taklif etadi: matnni chuqur o'qish uchun raqamli annotatsiya, argumentlarni xaritalash, onlayn tadqiqotchilar hamjamiyati hamda faktlarni eslashga emas, balki mantiqiy xatolarni aniqlashga yo'naltirilgan geymifikatsiyalangan formativ baholash. Qatlamlar "o'qish – xaritalash – muhokama – baholash" tarkibidagi to'rt bosqichli semestr ketma-ketligiga birlashtirilib, falsafa kursining mavzuiy bloklari bo'yicha taqsimlangan. Argument xaritalari, annotatsiya qaydlari va muhokama matnlariga tayanuvchi baholash tizimi tavsiflanadi, modelni joriy etish shartlari va cheklovlari muhokama qilinadi.

Kalit so'zlar: tanqidiy fikrlash, falsafa fanini o'qitish, raqamli texnologiyalar, TPACK, argumentlarni xaritalash, ijtimoiy annotatsiya, tadqiqotchilar hamjamiyati, geymifikatsiya, formativ baholash

Аннотация: В статье обосновывается целостная методическая модель развития критического мышления студентов средствами цифровых технологий при преподавании общего курса философии в вузах Узбекистана. Опираясь на модель знаний преподавателя TPACK, дельфийский экспертный консенсус о критическом мышлении, теорию рефлексивного мышления и подход «сообщества исследователей», автор предлагает модель

из четырёх взаимосвязанных цифровых «слоёв»: цифровой аннотации текста для вдумчивого чтения, картирования аргументов, онлайн-сообщества исследователей и геймифицированного формирующего оценивания, направленного не на воспроизведение фактов, а на распознавание логических ошибок. Слои объединены в четырёхэтапную семестровую последовательность «чтение – картирование – обсуждение – оценивание» и распределены по тематическим блокам курса философии. Описана система оценивания, основанная на картах аргументов, записях аннотаций и текстах обсуждений, рассмотрены условия и ограничения внедрения модели.

Ключевые слова: критическое мышление, преподавание философии, цифровые технологии, TPACK, картирование аргументов, социальная аннотация, сообщество исследователей, геймификация, формирующее оценивание

Introduction

Imagine a first-year engineering student opening a philosophy textbook the night before a seminar. The chapter on the theory of knowledge offers a sequence of names and definitions: rationalism, empiricism, the a priori, the a posteriori. The student memorises the definitions, reproduces them the next morning and receives a satisfactory mark. Formally the lesson has achieved its aim; in substance, the student has not encountered a single argument, has not weighed a single objection and has never been asked why anyone should believe that knowledge comes from experience rather than from reason. Philosophy, the discipline that gave birth to the very idea of examining one's beliefs, has become one more subject to be memorised.

This picture is particularly relevant for Uzbekistan, where philosophy is taught as a compulsory general education subject to students of all fields, from medicine and economics to computer science and agriculture. For most of them the philosophy course is the only place in the curriculum where reasoning itself – its structure, assumptions and errors – becomes the object of study. The Concept for the Development of the Higher Education System until 2030 sets the task of training specialists capable of independent and creative thinking [1], while the "Digital Uzbekistan – 2030" strategy envisages the broad introduction of digital technologies into education [2]. These two directions meet in the philosophy classroom: the digital tools universities are now acquiring can either support the development of critical thinking or merely decorate the old practice of reproduction.

In the humanities, digital technologies are still used mostly as channels for delivering content: lectures are uploaded, presentations are shown and tests are moved online. This changes the medium but not the cognitive activity of the student. Meanwhile, the international literature offers well-developed conceptions of critical thinking, such as the expert consensus summarised by P. Facione [3], and well-described digital practices – social annotation, argument mapping, online discussion and game-based quizzing – each supporting particular components of reasoning. What is lacking is a framework that integrates these practices into a coherent course design aligned with the content of philosophy and with specific critical thinking skills. The TPACK model of P. Mishra and M. Koehler, which treats effective teaching with technology as the intersection of technological, pedagogical and content knowledge [4], provides a natural lens for such integration.

The aim of this article is to substantiate an integrated, TPACK-based methodological framework for developing students' critical thinking in the general philosophy course through digital technologies. The objectives are: to identify the theoretical foundations of critical thinking relevant to teaching philosophy; to analyse digital practices that support particular skills; to design

a framework of digital layers aligned with philosophical tasks; to organise these layers into a semester sequence; and to propose a consistent assessment design.

Literature review

The modern understanding of critical thinking as an educational aim goes back to J. Dewey, who described reflective thought as the active, persistent and careful consideration of any belief in the light of the grounds that support it and the conclusions to which it tends [5]. For Dewey such thinking begins with doubt or perplexity and proceeds through inquiry toward a justified conclusion. For the philosophy teacher this means that a lesson should start from a genuine problem rather than a ready-made answer; philosophical texts are valuable not as stores of correct definitions but as records of how thinkers worked through perplexity.

R. Ennis developed this line into a widely cited definition of critical thinking as reasonable, reflective thinking focused on deciding what to believe or do [6]. He distinguished critical thinking abilities, such as identifying conclusions and evaluating inferences, from dispositions, such as seeking reasons and remaining open-minded. The distinction matters here: digital tools can train abilities rather easily, but dispositions require an environment in which reason-giving becomes a habitual norm.

The most influential operationalisation of the concept is the Delphi Report prepared under the leadership of P. Facione [3]. A panel of experts, many of them philosophers, agreed that critical thinking is purposeful, self-regulatory judgement and identified six core skills: interpretation, analysis, evaluation, inference, explanation and self-regulation. The six skills serve as the target categories of the framework proposed below.

Whether and how critical thinking can be taught has been addressed most systematically in the meta-analysis by P. Abrami and colleagues [7]. Synthesising a large body of experimental and quasi-experimental studies, they concluded that critical thinking instruction is generally effective and that the strongest effects are associated with a combination of dialogue, authentic problems and mentoring by the teacher. The methodological implication is direct: no single tool is sufficient, and a digital framework should deliberately combine dialogical, problem-based and mentoring components.

The dialogical component is best represented by M. Lipman, founder of the Philosophy for Children movement, who argued that thinking is best developed in a "community of inquiry" where participants build on each other's ideas, ask for reasons, identify assumptions and correct one another's reasoning [8]. D. Garrison, T. Anderson and W. Archer transferred this idea to computer-mediated higher education [9]. Their model distinguishes cognitive, social and teaching presence and describes cognitive presence as a practical inquiry cycle: triggering event, exploration, integration and resolution.

The analytical component of philosophical reasoning has a classical model in S. Toulmin's layout of arguments, which includes a claim, data, a warrant connecting them, backing for the warrant, a qualifier and a rebuttal [10]. This layout underlies argument mapping – the visual representation of reasoning as a diagram. C. Twardy reported that students in a philosophy-based critical thinking course built around argument mapping software showed notable gains in critical thinking [11], and T. van Gelder argued from cognitive science that critical thinking improves through deliberate practice, which mapping makes more effective by making the structure of reasoning visible and open to feedback [12].

S. Deterding and colleagues defined gamification as the use of game design elements in non-game contexts [13]. The definition separates gamification from playing games: points, timers and immediate feedback can be attached to any task, including tasks that require reasoning. In

practice, however, quiz platforms in the humanities mostly check recall of terms and names, reinforcing the reproductive model described above. The revised taxonomy of L. Anderson and D. Krathwohl – remembering, understanding, applying, analysing, evaluating and creating [14] – offers a criterion for judging whether a digital activity remains at the level of recall. Finally, the DigCompEdu framework edited by C. Redecker describes six areas of educator digital competence, including assessment and facilitating learners' digital competence, and stresses that digital tools should transform pedagogy rather than reproduce it in a new medium [15].

The review shows that the necessary components exist, but separately: argument mapping research rarely addresses online discussion, community of inquiry research rarely addresses gamified assessment, and few works connect these practices with a general philosophy course for non-philosophy students. Uzbek methodological literature on teaching philosophy has focused mainly on the content and worldview aims of the course, while the integration of digital practices for critical thinking remains insufficiently developed. This gap defines the direction of the present study.

Methodology

The study is theoretical and methodological. Its basis is formed by the competence-based, activity-based and dialogical approaches. The competence-based approach directed attention to the skills students should demonstrate rather than the volume of material covered; the activity-based approach required each skill to be linked to a concrete philosophical task; the dialogical approach, grounded in Lipman and in the findings of Abrami and colleagues [8; 7], made reasoned exchange between students a central element.

The TPACK model [4] served as the organising principle. For each element of the framework three questions were asked: what philosophical content and task is involved; what teaching strategy develops the corresponding skill; and which digital tool supports this strategy without distorting the content. A tool was included only if all three questions could be answered convincingly.

Four methods were used. First, a comparative analysis of the literature on critical thinking, argument mapping, online communities of inquiry and gamification. Second, an analysis of the general philosophy course in Uzbek universities by its typical topic blocks: philosophy as a worldview and its history, including Eastern thinkers such as Farabi, Beruni and Ibn Sina; being; the theory of knowledge; consciousness and the human being; society; and ethics. Third, the six Delphi skills [3] were mapped onto the philosophical tasks of these blocks and onto available tools, which defined the four layers. Fourth, pedagogical modelling was used to construct the semester sequence and the assessment design.

Tools were selected by three criteria: accessibility (free or institutional versions, browser and mobile operation), functional fit (the tool must make a particular reasoning operation visible) and transferability (the skill must be applicable without the tool). On this basis Perusall, Hypothesis and Google Docs comments were considered for annotation; Rationale, Argunet, MindMup and Kialo for argument mapping and structured debate; Moodle forums and Padlet for asynchronous discussion; and Kahoot!, Quizizz and Mentimeter for gamified formative assessment.

A pedagogical experiment design was also outlined. It provides for experimental and control groups studying the general philosophy course, assessment of critical thinking before and after the semester through argument analysis tasks and rubric-based evaluation of argumentative essays, and content analysis of online discussions according to the phases of the practical inquiry cycle [9]. At present this design has been prepared only methodologically; quantitative results will be obtained at the next stage and are not presented here [the author's experimental data to be

inserted].

Results and discussion

The analysis showed that the main weakness of current digital practice in teaching philosophy is fragmentation. A teacher may use a quiz in one lesson, a forum in another and a mind-mapping tool in a third, but these activities share no common logic of skill development, and each tends to fall back to the lowest cognitive level the tool allows: the forum becomes a place for short opinions, the quiz a check of names and dates. Following the conclusion that dialogue, authentic problems and mentoring are most effective in combination [7], the author has developed a framework in which four digital layers are deliberately connected, each preparing material for the next.

The first layer is digital text annotation. Philosophy is learned through texts, and critical thinking begins with interpretation [3]. Perusall and Hypothesis allow students to attach comments, questions and replies to specific passages of a shared text, making reading visible and collective. In the framework, annotation is guided by a fixed set of tags: "claim", "reason", "assumption", "unclear term" and "objection". When students annotate a fragment of Plato's dialogues, a text by Kant or a passage from a translated treatise of an Eastern thinker, they must label the function of each sentence in the argument rather than merely highlight it.

The second layer is argument mapping. Based on Toulmin's layout [10] and the evidence of Twardy and van Gelder [11; 12], students reconstruct the annotated argument as a diagram of claim, reasons, warrants and objections. Rationale, Argunet or MindMup are used for individual or pair mapping, and Kialo for collective debates in which a thesis branches into pro and con arguments. The value of mapping lies in its strictness: a student cannot write vaguely about "Descartes' view on knowledge" but must decide which sentence is the conclusion, what supports it and which hidden premise is required. Unstated assumptions, which ordinary reading passes over, appear on the map as gaps to be filled.

The third layer is the online community of inquiry. Disputed points of the students' maps become triggering events for asynchronous discussion in Moodle forums or on Padlet, organised according to the practical inquiry cycle [9]: a triggering question; exploration through alternative interpretations and counterexamples; integration, in which students connect positions; and resolution, in which they formulate a defended conclusion or state precisely why the question remains open. Following Lipman [8], community norms are explicit: every post must give a reason, ask for one or evaluate one given by someone else.

The fourth layer is gamified formative assessment, where the framework departs from common practice. The game elements of Kahoot! and Quizizz – points, timers, leaderboards and immediate feedback [13] – are retained, but the questions change: instead of "Who wrote the Critique of Pure Reason?", students receive a short argument and must identify its reasoning error, its hidden premise or its type of inference. The arguments are taken, anonymised and with consent, from the students' own posts and maps, so the quiz returns the class's own reasoning to it as an object of evaluation. A mandatory discussion of answers follows, turning quick recognition into explanation. In terms of the revised taxonomy [14], the quiz moves from remembering to analysing and evaluating.

Table 1. Digital layers of the framework for developing critical thinking in teaching philosophy

Layer	Digital tools	Philosophical task	Critical thinking skill targeted

1. Digital text annotation	Perusall, Hypothesis, Google Docs comments	Close reading of a primary text; tagging claims, reasons, assumptions and unclear terms	Interpretation, analysis
2. Argument mapping	Rationale, Argunet, MindMup, Kialo	Reconstructing a philosophical argument by Toulmin's layout, including warrants and rebuttals	Analysis, evaluation
3. Online community of inquiry	Moodle forums, Padlet	Discussing disputed points of the maps through trigger, exploration, integration and resolution	Evaluation, inference, explanation
4. Gamified formative assessment	Kahoot!, Quizizz, Mentimeter	Recognising reasoning errors, hidden premises and inference types in arguments drawn from students' own work	Evaluation, self-regulation

Table 1 shows that the layers are not interchangeable: each targets a different combination of skills, and together they cover all six Delphi skills. They also form a chain in which the product of one layer is the input of the next – annotations feed the maps, maps feed the discussions, discussions supply the quiz material. This chain constitutes the four-stage cycle "read – map – discuss – assess", the core of the framework.

Across the semester the cycle is introduced gradually. At the start students lack the skills for mapping and structured discussion, so the first block emphasises reading and annotation; the middle blocks use the full cycle; and in the final blocks students increasingly take over the teacher's functions, preparing maps and quiz items for their peers. This progressive reduction of support follows the logic of mentoring identified by Abrami and colleagues [7]. The distribution of the cycle is presented in Table 2.

Table 2. Semester sequence of the "read – map – discuss – assess" cycle by topic blocks of the philosophy course

Topic block	Leading stage	Example philosophical problem	Student product
Philosophy as a worldview; history of philosophy (incl. Farabi, Beruni, Ibn Sina)	Read	What distinguishes a philosophical question from a religious, scientific or everyday one?	Annotated text with tagged claims and reasons

Being and ontology	Read – map	Is the world fundamentally material, ideal, or neither?	First individual argument map with teacher feedback
Theory of knowledge	Map – discuss	Is knowledge grounded in reason or in experience?	Paired argument map; forum thread on disputed premises
Consciousness and the human being	Full cycle	Can a machine think? Is consciousness reducible to brain processes?	Collective Kialo debate; posts reaching the integration phase
Society, history and ethics	Full cycle with peer leadership	Is a just society one that maximises welfare or one that protects rights?	Student-designed quiz on reasoning errors; final argumentative essay

The problems in Table 2 are illustrative and can be adapted to the student group: the ethics of artificial intelligence may engage computer science students, the moral status of patients medical students. What remains constant is the progression from interpreting a given argument to analysing its structure, evaluating it in dialogue and finally producing and testing one's own arguments.

The assessment design follows the same logic: the main evidence consists of artefacts produced in the four layers rather than answers to recall questions. Four components are assessed: the quality of annotation (accuracy of tags, substance of questions); the quality of argument maps (correct identification of the main claim, completeness of reasons, explicit warrants, relevant objections); participation in the community of inquiry, judged not by the number of posts but by the phase of the inquiry cycle a student's contributions reach; and a final argumentative essay defending a position, anticipating objections and replying to them. Gamified quizzes are used exclusively formatively and are not included in the final grade, which protects students from the fear of error. Each component is accompanied by a short self-assessment, so that self-regulation is practised as well as assessed.

Implementation requires several conditions. First, teacher preparation: philosophy teachers are usually strong in content knowledge, but TPACK emphasises the integration of content with pedagogical and technological knowledge [4]. A short professional development module on argument mapping, discussion moderation and reasoning-based quiz design is needed; it also develops the competences DigCompEdu describes in digital assessment and in facilitating learners' digital competence [15]. Second, a bank of short texts and arguments in Uzbek, including fragments from the Eastern intellectual tradition, adapted for annotation and mapping. Third, a workload allowing one full cycle to occupy two seminar sessions with asynchronous work between them.

The limitations of the framework must be acknowledged. Argument mapping can encourage an overly formal view of philosophy, whereas many texts work through metaphor, dialogue or irony; the framework therefore includes annotation tasks asking students what the map cannot capture. Online discussion may reproduce unequal participation, which is mitigated by assigned roles and teacher presence. Overused quizzes can shift motivation toward winning rather than understanding, so they are limited to short episodes followed by discussion. Finally, access to devices and stable internet varies across regions; the framework favours free browser-based tools

and allows mapping to be done on paper when necessary, since the reasoning operation, not the software, is essential.

Conclusion and recommendations

The analysis allows the following conclusions. First, the general philosophy course, taught to students of all fields in Uzbek universities, is a natural and often the only place in the curriculum for the systematic development of critical thinking, and digital technologies can support this aim if they transform students' cognitive activity rather than merely deliver content.

Second, the theoretical foundations of the framework are Dewey's conception of reflective thinking, Ennis's definition of critical thinking, the six core skills of the Delphi consensus, Lipman's community of inquiry and the conclusion of Abrami and colleagues that dialogue, authentic problems and mentoring are most effective in combination.

Third, the author has developed an integrated, TPACK-based framework of four digital layers – text annotation, argument mapping, online communities of inquiry and gamified formative assessment focused on reasoning errors. Its novelty lies in the deliberate chaining of the layers, the alignment of each layer with specific philosophical tasks and Delphi skills, and the redirection of game-based quizzes from recall to the evaluation of reasoning.

Fourth, the layers are organised into the semester sequence "read – map – discuss – assess" across the topic blocks of the course, with a gradual transfer of responsibility to students, and accompanied by an assessment design based on reasoning artefacts.

It is recommended to include the cycle in working curricula of the general philosophy course; to organise professional development modules for philosophy teachers on argument mapping, discussion moderation and reasoning-based assessment; to create an open bank of texts and argument maps in Uzbek, including materials from the Eastern philosophical tradition; and to revise assessment criteria so that maps, discussion contributions and essays carry the main weight. Further research will test the framework through a pedagogical experiment and develop instruments for measuring the transfer of critical thinking skills to students' professional disciplines.

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