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CRITERIA AND DIAGNOSTIC TOOLS FOR ASSESSING THE DEVELOPMENT OF METACOGNITIVE SKILLS (A CASE STUDY OF GRADES 10–11)

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Abstract: This article looks at how to assess the development of metacognitive skills in senior secondary school students (grades 10–11) in a digital learning environment. Metacognition is the ability to plan, monitor, regulate and evaluate one's own learning, and it matters for academic success and for lifelong learning. The article analyzes the theoretical models of metacognition proposed by J. Flavell, A. Brown and G. Schraw. On that basis it defines the structural components of metacognitive skills: metacognitive knowledge, planning, monitoring, regulation and self-evaluation. The author proposes a system of criteria (motivational, cognitive, reflective and activity-based) and three levels of development (low, medium and high). The article also describes a set of diagnostic tools: adapted versions of the Metacognitive Awareness Inventory (MAI), self-assessment questionnaires, reflective learning journals, and observation protocols. It discusses which digital tools can support this kind of assessment, such as online surveys, learning analytics in educational platforms and e-portfolios.

Keywords: metacognition, metacognitive skills, assessment criteria, diagnostic tools, self-regulated learning, reflection, senior secondary school students, interactive didactics.

Introduction:

Education is becoming digital very quickly, and this is changing what schools are expected to teach. Students now work with online platforms, interactive resources and large amounts of information. For them, knowing facts is no longer enough. They also need to know how they learn. They need to set goals, choose strategies, monitor their understanding, and judge how well their learning activity is working. These abilities are called metacognitive skills. Many researchers see them as one of the main foundations of self-regulated learning, academic achievement and lifelong learning (Flavell, 1979; Zimmerman, 2002; Veenman et al., 2006).

J. Flavell introduced the concept of metacognition in the 1970s and defined it as "knowledge and cognition about cognitive phenomena" (Flavell, 1979). A. Brown (1987) and G. Schraw and R. Dennison (1994) later developed the idea further. They described metacognition as having two parts: knowledge of cognition, and regulation of cognition, which covers planning, monitoring and evaluation. International studies show that students with well-developed metacognitive skills achieve more, transfer knowledge to new situations more easily, and cope better with complex learning tasks. Metacognitive skills are especially important in the senior grades (10–11). At this stage students prepare for higher education, choose a profession, and are expected to take more responsibility for their own learning.

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In the Republic of Uzbekistan, education policy now pays close attention to student-centered learning, digital education and the development of students' independent and critical thinking. The Concept for the Development of the Public Education System until 2030 and other state documents set a clear goal: schools should move away from reproducing knowledge and toward developing competencies. Metacognitive skills are a key part of this shift, because they help students become active, reflective and autonomous learners.

Yet assessing metacognitive skills remains one of the most debated questions in pedagogical research. Metacognitive processes are internal and only partly observable, so they are hard to measure objectively. Researchers use self-report questionnaires, think-aloud protocols, observation, interviews and performance-based tasks, and each method has strengths and limits (Veenman et al., 2006). Most of these instruments were also designed for traditional classrooms. They do not fully use what digital learning environments can offer, such as learning analytics, online self-assessment tools and e-portfolios. In the practice of Uzbek general secondary schools, there is still no clear system of criteria, indicators and diagnostic tools for measuring the metacognitive skills of senior students.

So schools face a practical problem. Teachers increasingly need to develop metacognitive skills through interactive and digital methods. However, they lack valid and practical tools for measuring how far these skills have developed and for tracking progress over time. Without reliable diagnostics, teachers cannot plan targeted didactic interventions or judge whether they work.

Materials and methods:

This study adopts a conceptual research design to develop a framework for assessing metacognitive skills among senior secondary school students in grades 10–11. The primary materials comprise Flavell's (1979) account of metacognition, Brown's (1987) discussion of metacognitive knowledge and control, and Schraw and Dennison's (1994) model of metacognitive awareness. Veenman et al. (2006) provide the methodological basis for considering how metacognitive skills can be assessed through different sources of evidence.

The study uses comparative theoretical analysis to identify common elements across the selected models. The analysis distinguishes knowledge of cognition, which concerns what learners know about their thinking and learning strategies, from regulation of cognition, which concerns how they manage their learning. This distinction informs the identification of five components for assessment: metacognitive knowledge, planning, monitoring, regulation, and self-evaluation.

The framework groups assessment indicators under four criteria. The motivational criterion addresses students' willingness to set learning goals and reflect on their progress. The cognitive criterion concerns their ability to explain which strategies they know and when and why those strategies are useful. The reflective criterion examines how students judge their understanding, identify difficulties, and evaluate the effectiveness of their strategies. The activity-based criterion focuses on how students put these strategies into practice by planning a task, monitoring their progress, and adjusting their approach when difficulties arise.

The proposed assessment combines an age-appropriate adaptation of the Metacognitive Awareness Inventory (MAI), task-specific self-assessment questionnaires, reflective learning journals, and structured teacher observation. The adapted MAI is intended to capture students' perceptions of their general learning habits. Brief questionnaires and journal entries focus on specific tasks and ask students to explain what they planned, what difficulties they noticed, and what they changed. The observation

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protocol records actions that teachers can identify during task completion, such as checking work against instructions or trying a different strategy after identifying an error.

Evidence is gathered at three stages of a digital learning task. Before the task, students specify a learning goal and explain their choice of strategy. During the task, brief prompts ask them to check their understanding and describe any adjustments. After the task, students evaluate their performance against their initial goal and identify one change they would make in a similar task. Online forms can collect questionnaire responses, while e-portfolios can preserve plans, drafts, revisions, and reflections. Learning platform records, such as repeated attempts or submission histories, provide supplementary evidence. Their interpretation depends on the task context and the student's explanation of why an action was taken.

The framework proposes three descriptive levels for each criterion. At the low level, students demonstrate the relevant behavior inconsistently and require explicit guidance. At the medium level, students demonstrate it in familiar tasks with occasional prompting and provide a partial explanation of their choices. At the high level, students demonstrate it independently and can explain how their decisions relate to the demands of the task. For example, when a strategy proves ineffective, a student at the high level can identify the difficulty, select an alternative, and explain why the alternative is more suitable.

The proposed procedure compares evidence from questionnaires, observations, and student work before assigning a level. Differences between sources are recorded and examined in relation to the task. Progress can be tracked by applying the same descriptors to comparable tasks at different points in the school term. The framework and its level descriptors are proposed for future piloting with students in grades 10–11.

Results and discussion:

The theoretical analysis yielded a framework for assessing metacognitive skills among students in grades 10–11 in a digital learning environment. The framework links five components of metacognition – metacognitive knowledge, planning, monitoring, regulation, and self-evaluation –to four assessment criteria. The cognitive criterion captures what students know about learning strategies. The reflective criterion concerns how students judge their understanding and evaluate the effectiveness of their decisions. The activity-based criterion captures how they plan, monitor, and adjust their work. The motivational criterion addresses their willingness to engage in goal setting and reflection.

The table presents proposed indicators for each criterion at three levels of development.

Assessment criterion	Low level	Medium level	High level
Motivational	Sets a learning goal when given explicit guidance and participates in reflection when prompted.	Sets a goal in a familiar task and reflects on progress with occasional prompting.	Independently sets a meaningful goal and returns to it to judge progress.
Cognitive	Names a familiar strategy but needs help explaining when or why to use it.	Chooses a suitable strategy for a familiar task and gives a general reason for the choice.	Compares available strategies and explains why one is appropriate for the task.

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Reflective	Gives a general judgment about performance and needs guidance to identify what caused a difficulty.	Identifies a difficulty and partly explains how it affected performance.	Uses evidence from the task to explain a difficulty, judge the strategy used, and identify a specific improvement.
Activity-based	Follows a supplied plan and changes approach after direct guidance.	Plans and checks familiar work, then adjusts the approach with occasional support.	Independently plans, checks progress, and adapts the approach after identifying a difficulty.

The criteria can reveal uneven development within the same student. A learner may explain why checking the credibility of online sources is important, for example, yet rely on a teacher's reminder to verify a claim while completing a research task. In this case, the student demonstrates stronger metacognitive knowledge than independent regulation. Reporting performance by criterion gives teachers a basis for deciding where support is needed.

A digital task can provide evidence of students' decisions at several points. For example, students comparing two online sources can record their initial plan in an online form, document a change in their approach while evaluating the sources, and use an e-portfolio entry to explain whether their final work met the original goal. The plan captures what the learner intended to do, while the revision and reflection help the teacher examine how the learner responded to a specific difficulty.

Each diagnostic instrument contributes a different kind of evidence. An adapted Metacognitive Awareness Inventory (MAI) can indicate how frequently students believe they use particular strategies. Task-specific self-assessment questionnaires and reflective journals can show how students explain those strategies in context. Structured observation and successive drafts can document actions such as checking work against task criteria or revising an answer after identifying an error. When sources differ, the discrepancy can guide further inquiry. For instance, a student who reports regularly checking their work may be asked to identify where that check occurred and what, if anything, changed as a result.

Learning analytics can help teachers identify moments worth examining. Several quiz attempts, for example, may reflect a deliberate strategy change, repeated guessing, or recovery from a technical interruption. The teacher can interpret the sequence alongside the student's explanation and changes across attempts. Similarly, ratings under the motivational criterion should draw on evidence of students' engagement with goal setting and reflection across comparable tasks. Participation in a single activity can also be affected by task familiarity or access to digital resources.

The framework supports formative assessment by connecting each observed difficulty to a specific teaching response. A student who can identify an error but struggles to select another approach may benefit from seeing the teacher model how to compare alternative strategies. A student who completes a task successfully but gives only a general self-evaluation may need prompts to refer to particular decisions, revisions, or outcomes. Applying the same descriptors to comparable tasks over time can help teachers examine whether students begin to demonstrate these behaviors with less guidance.

The findings are conceptual. The framework, level descriptors, and proposed MAI adaptation require empirical evaluation with students in grades 10–11. A pilot study could examine whether students interpret the diagnostic items as intended, whether teachers apply the descriptors consistently,

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and whether the proposed levels capture changes across comparable tasks. In Uzbek secondary schools, piloting could also examine how the language of instruction and students' familiarity with digital platforms affect the evidence collected.

Conclusion:

This study proposes a framework for assessing metacognitive skills among students in grades 10–11 in digital learning environments. It identifies five components of metacognition—metacognitive knowledge, planning, monitoring, regulation, and self-evaluation—and translates them into observable indicators under four assessment criteria: motivational, cognitive, reflective, and activity-based. The proposed low, medium, and high levels describe how independently students apply learning strategies and how clearly they explain and evaluate their choices.

The framework combines an adapted Metacognitive Awareness Inventory with task-specific self-assessment, reflective journals, structured teacher observation, and evidence from students' digital work. Comparing these sources can help teachers identify differences between the strategies students say they use and the actions they take during a task. For example, a student may recognize when a strategy is ineffective but still need guidance in choosing an alternative. Assessing each criterion separately can help teachers identify where support is needed and track whether students demonstrate the same skills with less guidance across comparable tasks.

The framework provides a conceptual basis for formative assessment in Uzbek secondary schools. Future research should pilot the instruments with students in grades 10–11 to examine whether students understand the adapted items as intended, whether teachers apply the level descriptors consistently, and whether the framework captures changes in metacognitive skills over time.

References

1. Brown, A. L. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In F. E. Weinert & R. H. Kluwe (Eds.), Metacognition, motivation, and understanding (pp. 65–116). Lawrence Erlbaum Associates. psy.gla.ac.uk
2. Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. American Psychologist, 34(10), 906–911. https://doi.org/10.1037/0003-066X.34.10.906 doi.org
3. Abdujabborova, K. (2025). Methodology of English Language Teaching to Journalism Students: Experience of Foreign Countries. Ethiopian International Journal of Multidisciplinary Research, 12(2), 42-46.
4. Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. Contemporary Educational Psychology, 19(4), 460–475. https://doi.org/10.1006/ceps.1994.1033 pascal-francis.inist.fr
5. Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. Metacognition and Learning, 1(1), 3–14. https://doi.org/10.1007/s11409-006-6893-0 darshana-ganatra.com
6. Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. Theory Into Practice, 41(2), 64–70. https://doi.org/10.1207/S15430421TIP4102_2
7. Abdujabarova, K. X., Khanbabaeva, S. R., Xakimova, M. X., Azimova, M. A., Khojamuratova, G. S., & Maxsudbekova, N. D. (2026). INNOVATIVE METHODS OF USING READING AND LISTENING COMPREHENSION METHODOLOGY IN DEVELOPING

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ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

STUDENTS'COMMUNICATIVE COMPETENCE IN ENGLISH. Acta Innovations, 505-512. https://doi.org/10.62441/actainnovations.vi.2442
8. Norhojayeva, M. M. The Linguistic Worldview and Conceptual Thinking: A Theoretical Analysis.
9. Abdujabarova, K. (2026). O'QISH VA TINGLAB TUSHUNISH ASOSIDA BO 'LAJAK JURNALISTLARNING INGLIZ TILIDAGI NUTQIY KO'NIKMALARINI RIVOJLANTIRISH. Ijtimoiy-gumanitar sohada ilmiy-innovatsion tadqiqotlar, 3(10), 51-53.
10. Abdujabborova, K. (2026). Communicative Competence Development in English Language Education: Contemporary Directions. Best Journal of Innovation in Science, Research and Development, 5(1), 55-61.
11. Abdullayeva, M. (2025). Equity and Accessibility in Education Systems: A Global Perspective on Sdg 4 Implementation. International Journal of Formal Education, 4(12), 41-6.