Version 2 · Revised 11 November 2026 · 3/12

Questions That Improve Learning and Critical Thinking

By the end of this guide, you can

Design a learning sequence that tests understanding and transfers a concept to a fresh example.

Bring to the task

A concept you need to understand, a reliable explanation and two different application situations.

A learner can recite a rule and still apply it when a prerequisite is missing. The task in this guide separates knowing the words from checking the conditions in a new situation.

Questions help when they require the learner to do useful mental work. Ask what a concept means, why a relationship holds, when it applies, what would contradict it and how it changes a decision. Begin with adequate instruction: a question cannot reliably repair missing knowledge if the learner invents a plausible explanation and never checks it.

EXPLAIN · APPLY

Make understanding visible through questions

1. **Study**
   Use a reliable explanation.
2. **Explain**
   Connect the idea to what you know.
3. **Retrieve**
   Close the source and reconstruct it.
4. **Apply**
   Use a different situation.
5. **Check**
   Find the gap and try again.

Original Tibyan teaching aid. Illustrative example; not observed field results.

The learner must produce an answer, not only recognize an explanation. Use feedback on the actual answer before a fresh attempt.

Text explanation of the graphic
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Case, demonstration and correction

A complete learning example: prerequisites and optional work

Original fictional teaching exercise, revised 11 November 2026. This exercise provides its own rules, so accounting knowledge is not a hidden prerequisite. A *required dependency* is an input or completed action that the stated process requires before another task may proceed. Work that happens earlier is not necessarily a dependency. Independent work can proceed in parallel; optional work must not silently become a required gate.

Case A: proposal submission

The fictional submission rule requires a confirmed technical estimate and verified scope, followed by a 20-minute completeness check. The estimate is ready at 12:30 and verified scope at 13:00. An optional cover illustration is ready at 16:00. Assume the checker is available and the required records are complete. **Question:** What is the earliest justified submission time, and why?

First answer: “16:20, because every item must be finished before submission.” **Feedback:** That answer adds an unstated requirement. Which items does the rule actually require? **Corrected answer:** “13:20. The last required input is available at 13:00, then the 20-minute check can occur. The optional cover is not a submission gate.” The answer is conditional on the supplied completeness and availability assumptions.

Close the explanation and answer: **Why is sequence alone insufficient to establish a dependency?** A model retrieval answer is: “An earlier task may be unrelated or optional. I need the stated rule or a demonstrated input requirement before deciding that the later task must wait.” Compare your explanation with the rule, not with how confident it sounds.

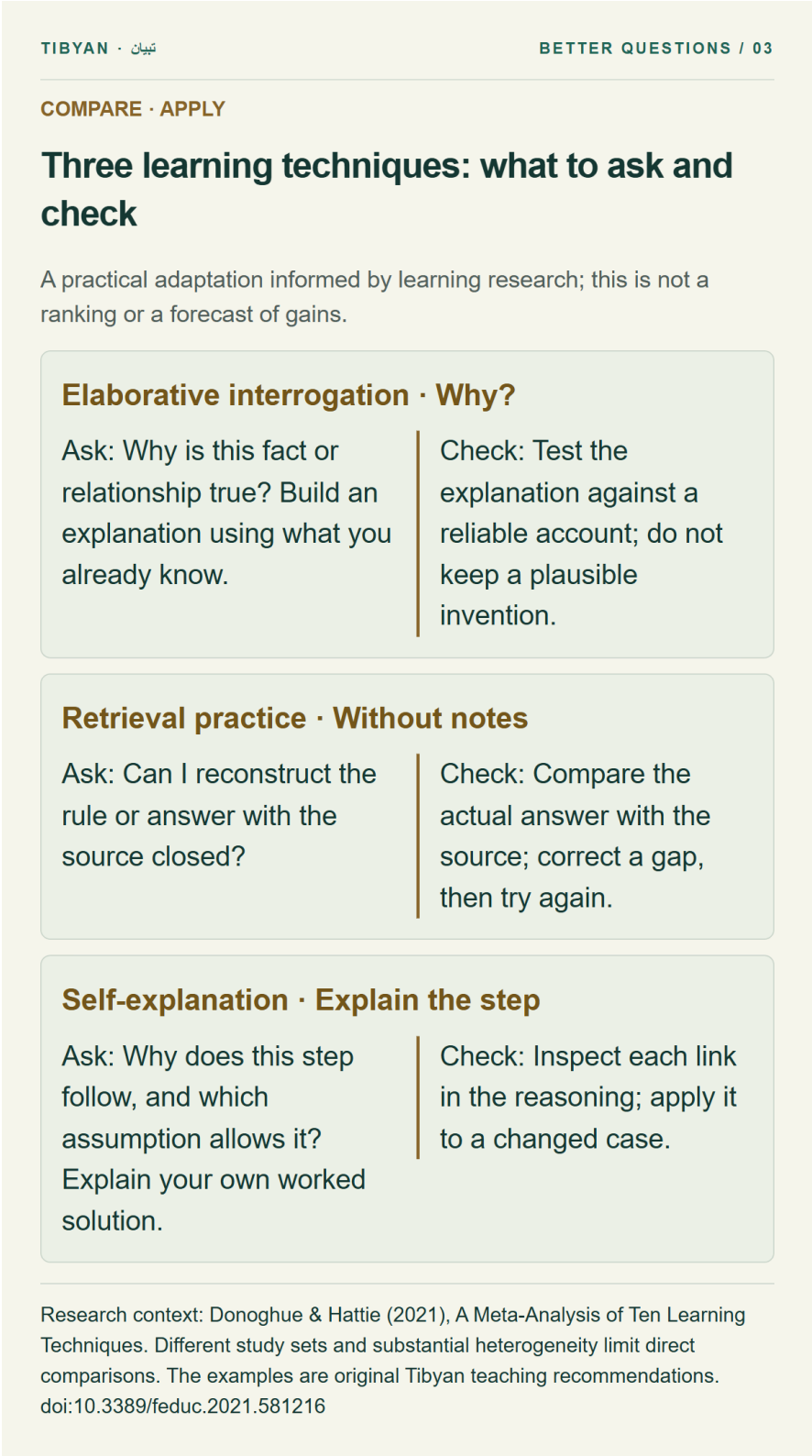
Case B: transfer to a project handoff

A different fictional team may hand work to implementation only after a signed acceptance checklist and a test report, followed by a 15-minute handoff check. The checklist is ready at 10:00; the report at 10:30; an optional demonstration video at 13:00. The checker is available. First answer without rereading Case A.

Model reasoning: “The earliest handoff is 10:45: both required records are ready at 10:30, then the check takes 15 minutes. The video is optional.” Now introduce a new condition: the process also requires a security approval, available only at 11:00. **Revised answer:** “11:15; the new mandatory dependency

changes the latest required-input time.” Keeping 10:45 after this change would show a failure to use the new condition, not simply a memory problem.

The critical evaluation lies in identifying the rule, testing whether a requirement is stated or invented, and revising a conclusion when a consequential condition changes. These small exercises reveal reasoning about these supplied cases; they do not establish general critical-thinking ability or workplace transfer.



Match the technique to the learning job and inspect the answer. This practical adaptation is informed by research; it is not a ranking or a forecast of learning gains.

Text explanation of the graphic
Three learning techniques: what to ask and check
A practical adaptation informed by learning research; this is not a ranking or a forecast of gains.
Elaborative interrogation · Why?
Ask: Why is this fact or relationship true? Build an explanation using what you already know.
Check: Test the explanation against a reliable account; do not keep a plausible invention.
Retrieval practice · Without notes
Ask: Can I reconstruct the rule or answer with the source closed?
Check: Compare the actual answer with the source; correct a gap, then try again.
Self-explanation · Explain the step
Ask: Why does this step follow, and which assumption allows it? Explain your own worked solution.
Check: Inspect each link in the reasoning; apply it to a changed case.
Research context: Donoghue & Hattie (2021), A Meta-Analysis of Ten Learning Techniques. Different study sets and substantial heterogeneity limit direct comparisons. The examples are original Tibyan teaching recommendations.doi:10.3389/feduc.2021.581216

Your reusable working record

1. Concept and supplied rule

State what counts as a required dependency.

2. First answer before feedback

Keep the initial reasoning visible.

3. Feedback and error diagnosis

Identify the exact reasoning gap.

4. Corrected Case A response

Give the result and its assumptions.

5. Explanation produced with the source closed

Write the explanation, not a confidence rating.

6. Unaided Case B answer

Apply the idea before seeing the model.

7. Response to the new mandatory condition

Show how a relevant change alters the conclusion.

8. Next independent attempt and criterion

Choose a fresh attempt and a visible check.

Annotated completed record

Concept and supplied rule

A required dependency is an input or action the process requires before proceeding. In Case A, confirmed estimate and verified scope are required; the cover is optional.

The concept is tied to a supplied rule rather than assumed business knowledge.

First answer before feedback

I first chose 16:20 because I treated every listed item as required.

The record preserves the error so that the correction can be examined.

Feedback and error diagnosis

The rule does not require the cover. I confused a listed item with a mandatory dependency.

The feedback targets classification of requirements, not the learner’s personality.

Corrected Case A response

13:20: scope is the last required input at 13:00; the check takes 20 minutes. This assumes the checker is available and records are complete.

Both the timing calculation and conditions are explicit.

Explanation produced with the source closed

An earlier item may be independent or optional. A later task waits only if the rule or task requires that output.

This is actual retrieved reasoning, not “Can I explain it?”

Unaided Case B answer

10:45: the checklist and test report are ready at 10:30; add the 15-minute handoff check. The optional video does not delay handoff.

The answer transfers the distinction to a different process.

Response to the new mandatory condition

With security approval required at 11:00, the earliest handoff becomes 11:15. Keeping 10:45 would ignore a mandatory input.

The new conclusion depends on the new rule, not on copying the first answer.

Next independent attempt and criterion

In a new project task, I will mark each listed item required, optional or unknown, give the earliest permitted next step, and explain one condition that would change it. A partner will check my labels against the supplied rule.

The next attempt targets the identified classification error; no improvement is claimed before it is observed.

Practice and retry

Study the supplied explanation and work Case A. Close it and explain the dependency rule in your own words. Answer Case B unaided, then respond to the security-approval change. Compare with the key, identify the reasoning gap and complete one fresh case later without the old response.

Common error and corrective feedback

Do not score a correct time as full understanding if the reason is wrong or missing. “All tasks must finish” and “the optional task never matters” both overgeneralize: an explicit rule change can make that task mandatory. Ask the learner to identify what the current rule requires and what remains unknown.

Independent-study alternative

Cover the model answers while attempting each case. Write your reason before uncovering the key. If the time is correct but the reason is not, mark the explanation as needing revision and retry with the changed condition.

Check your work

- The explanation is accurate.
- At least one answer is produced without notes.
- A changed condition is considered.
- Feedback leads to a specific revision.

Apply and review

Try another case later without the original notes. Record the gap that remains and the next practice task.

Sources and further reading

- Donoghue & Hattie (2021). A Meta-Analysis of Ten Learning Techniques
- Bastani et al. (2025). Generative AI without guardrails can harm learning: Evidence from high school mathematics

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Original evidence-informed teaching aid. Cases and example records are hypothetical; the assessment is not a validated certification.