
GEO Practical Notes

From query collection to evidence-based revision

GEO Advanced Studies Project

English master edition · Version 1.0 · September 8, 2026

Abstract

This handbook teaches a practical workflow for generative engine optimization (GEO): define a user question, preserve an answer, investigate its sources, verify its claims, revise a useful page and measure observations transparently. Ten workshops use a single fictional campus bicycle service. Students work with local HTML pages, a spreadsheet and short text templates; coding, paid accounts and API keys are not required. Each workshop includes a worked example, exact operations, expected outputs, scoring criteria and recovery advice. The emphasis is on evidence that another person can inspect, rather than promises about ranking or visibility.

Who this is for

Learners in vocational and associate-degree programs, adult beginners and staff learning a first evidence-centered digital-content workflow. You should be able to create a folder, open a browser page, copy text and edit basic spreadsheet cells. A short spreadsheet guide is included.

Format	Time	Final product
Five cycles; ten workshops	10 × 90 minutes; 15 hours	A report and a reopenable evidence pack

A note on the case and the two editions

Songfeng Campus Cycle Service, Qinghe Vocational College and every related record are fictional. All answer samples and measurements were authored for instruction. No commercial AI system was queried to produce these outcomes. The Chinese edition is translated from this English master; IDs, prices, counts, figures and assessment rules are aligned. The case's original service-language setting is Chinese, so the English sample answers are translations rather than independent language trials.

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Before workshop 1

How the workshops fit together

The course follows five two-session cycles. Each session creates a small artifact that the next session uses. The first tasks provide substantial examples; later tasks ask you to make and explain your own choices. In the last workshop, you transfer the method to a different campus service.

Cycle	Work	Tasks	Artifact
1	Define the project; collect questions	P01-P02	Project card and frozen query set
2	Observe answers; investigate sources	P03-P04	Records and source map
3	Verify claims; revise content	P05-P06	Claim checks and FAQ V1
4	Inspect pages; measure repetitions	P07-P08	Page inspection and calculated summary
5	Review evidence; hand over the project	P09-P10	Peer review and final evidence pack

A 90-minute session



The last ten minutes are an individual exit note.

Figure 1 The repeated teaching rhythm makes the task predictable while the evidence becomes more demanding.

Work in pairs when possible. The operator works in the file; the checker asks for the relevant source and records uncertainty. Swap roles each session. A solo learner can perform a delayed self-check, but must label it self-review. A classroom handover is not described as an external audit.

Open the materials

Extract the complete student ZIP. Open START.html in a modern browser and GEO-practice-workbook.xlsx in Excel, WPS or LibreOffice. Save your own workbook copy before typing. Keep the pages and data folders together so local links continue to work. The templates folder contains ten Markdown forms; a text editor is sufficient, or you can copy the tables into a word processor.

The teaching case

A small service with enough detail to check

A standard inner-tube replacement costs CNY 33: CNY 15 labor plus CNY 18 for the tube. The station closes on Sundays and does not collect bicycles. Its typical 30-60-minute repair time is conditional. These ordinary details make it possible to practice meaningful correction without specialist domain knowledge.

GEO PRACTICE LAB · OFFLINE TEACHING MATERIAL

SONGFENG CAMPUS CYCLE SERVICE · FICTIONAL CASE

Prices and repair terms

Songfeng Campus Cycle Service · Effective 2026-09-01

Source s02 · All prices are in CNY. Record the date and the conditions together.

Service	Labor or service fee	Materials and conditions
Basic safety inspection	CNY 20 per visit	Brakes, bell and tires
Standard inner-tube replacement	CNY 15 per visit	Tube: CNY 18 each; total: CNY 33

Repair time

Standard tube replacement typically takes 30-60 minutes, depending on the queue, bicycle model and parts in stock. This range is not a guaranteed completion deadline.

Reinspection

The same repair can be reinspected free within 7 days. Free reinspection does not mean unconditional replacement and does not cover external damage.

Effective from September 1, 2026. Future price changes will be announced on this page.

Figure 2 Screenshot of the actual local teaching page s02-prices.html, captured from the supplied kit. All values are fictional. Read the labor charge and material price together.

There are six source documents but not six independent confirmations. The provider owns two pages; a promotional bulletin repeats supplied information; a reporter independently visited the location; a forum post is older; and a public-body checklist offers general advice without endorsing the service.

A research idea made practical

Why an answer and its sources belong together

The foundational GEO paper models a generative engine as a sequence involving query reformulation, search, summarization and response generation [1]. This abstraction helps identify observable evidence: a user's question, a displayed answer and its source links. It does not reveal the internal implementation of a named current product.

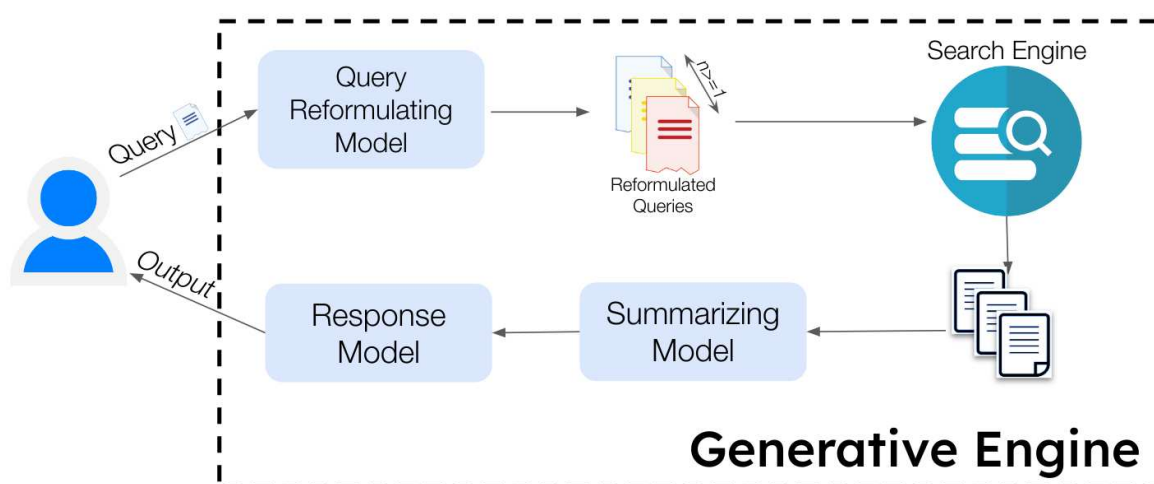


Figure 3 Aggarwal et al., GEO: Generative Engine Optimization, Figure 2, arXiv:2311.09735v3, PDF page 3 [1]. Reproduced under CC BY 4.0; cropped to figure bounds only, with original labels and topology unchanged. This is a research abstraction, not a claim about a particular live platform.

Four things you can inspect

Object	Practical question
Question	Does it describe a real decision without assuming praise?
Answer	What exact wording appeared, under what conditions?
Citation	Which document did the displayed link open?
Support	Does that document justify the particular claim?

GEO work can improve clear, factual source content and investigate observable answers. A citation is not a guarantee of support, and a clean page is not proof of retrieval. This handbook therefore gives separate tasks to capture, source assessment, claim checking and measurement.

P01 · Brief and procedure

1 Start with a project and a fact register

P01

90 minutes

After this workshop: Define a small service question, organize the files and trace each fact to a source.

Submit: A project card, eight checked facts and one folder screenshot.

A student needs a bicycle repair without an unexpected bill or a wasted trip. Your group will investigate how an answer describes Songfeng Campus Cycle Service. Start by establishing what the supplied documents actually say. A polished answer is difficult to assess when the underlying facts have never been written down.

The idea to use

A fact register stores a claim together with its scope, date and source. “CNY 15” alone is incomplete: it is the labor charge, while an inner tube costs an additional CNY 18. The same discipline applies to hours, location and the meaning of a guarantee.



Figure 4 Keep the source, the work and the conclusion in distinct places. Arrows show a workflow, not file deletion.

Inputs

Open START.html, then s01-service.html and s02-prices.html. Use the project and facts sheets in the workbook and templates/01-project-card.md. Keep the supplied files as your original materials.

Procedure

1. Extract the whole student ZIP. Create submissions-group01 beside the source folder. Inside it create originals, working, evidence and final. Copy the template and workbook into working; keep the source kit unchanged.
2. Read the two official pages from top to bottom. Copy the exact price, opening-hours and service-scope passages into your fact register. Preserve units and conditions. Do not summarize “typically” as “guaranteed.”
3. Check the eight facts F01-F08. Record the source ID and its effective date separately from the actual time you checked it. If a field cannot be established, write “not stated” in the note column.
4. Complete the project card: intended user, situation, question, scope, group members and roles. Use one decision: “Can a student replace an inner tube within a CNY 40 budget?”
5. Have a partner choose any two facts and open their source files without asking you for help. Correct missing links or missing conditions. This is a test of traceability, not memory.
6. Save project-card-v1.md and the group workbook. Capture the folder names in one screenshot. Write one sentence explaining how you would update a price without losing the previous record.

P01 · Worked example and assessment

Worked example

Item	Record	Reason
Incomplete entry	CNY 15; cheap repair	No unit, materials, scope or date.
Checked entry	F02: labor CNY 15; tube CNY 18; total CNY 33	s02; effective 2026-09-01; standard replacement.
Project question	Is CNY 40 sufficient for standard tube replacement?	A bounded user decision with a checkable answer.

Expected result

Your register has eight stable IDs. F02 gives a CNY 33 standard total; F03 states that Sundays are closed; F06 says collection and delivery are not offered. These are fictional classroom facts, not facts about a real business. Another learner can locate the exact passage supporting each entry.

Submission and scoring

A project card, eight checked facts and one folder screenshot.

Dimension	Points	Evidence required
File organization	20	Original materials preserved; four working folders identifiable.
Fact register	40	Eight entries; sources, units, dates and conditions retained.
Project scope	25	One user, one situation and one answerable question.
Peer trace	15	Two independently reopened facts and a recorded correction.

Common errors and recovery

Overwriting the source Restore the original from the ZIP and move your draft into working.

A date with no meaning Label it effective date, fixture date or actual observation time.

Inventing an unknown value Write “not stated” ; a gap is a finding rather than a reason to guess.

Independent check

A classmate writes “repairs cost CNY 15.” Which source passage would you open, and what extra words are needed before the statement is usable?

Write your answer before opening Appendix C. Explain the source or rule you used; a label without a reason is incomplete.

P02 · Brief and procedure

2 Build a query set around user decisions

P02

90 minutes

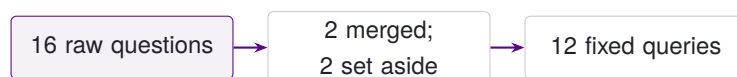
After this workshop: Clean a small question list without selecting only questions that favor the service.

Submit: Twelve frozen queries, a merge/exclusion log and a coverage check.

The supplied list contains duplicates, a question with no specific service, and a leading question that assumes praise. Your job is to create a manageable monitoring set. A useful question set includes discovery, purchase decisions, practical use and possible misinformation.

The idea to use

Keep differences that change the decision: a budget, a day of the week or a service condition. Merge wording changes that ask the same thing. A brand-free discovery question and a named-brand question can both matter, but their results answer different questions.



Preserve the raw IDs and log every decision.

Figure 5 A small query-cleaning exercise. One exploration question and one leading question leave the fixed set; their original rows remain.

Inputs

Open the queries sheet: R01-R16 are raw questions. Use templates/02-query-log.md. The source list is fictional; it is not a survey of real students and has no measured frequency.

Procedure

1. Read every raw question before editing. Assign one intent label: discovery, decision, use or risk. First identify what the user would do differently after receiving an answer.
2. Compare R01 with R02, and R05 with R06. In each pair, retain the earlier ID and log the other as a duplicate. Record the reason rather than deleting the row silently.
3. Exclude R16 because it asks for praise and already assumes the answer. Keep R04 in a separate exploration list: without context, the named provider is uncertain. These choices leave twelve fixed queries.
4. Assign Q01-Q12 to retained rows in their original order. Verify the mapping: R03 becomes Q02; R05 becomes Q03; R09 becomes Q06. Check the complete question text against the answer fixture as well as checking its ID.
5. Freeze the exact wording in a separate saved copy. Do not simplify “including materials” or “guaranteed.” Make a four-row coverage table and count how many queries belong to each intent.
6. Ask a partner to identify one user need the list misses. Write it in the exploration list rather than quietly changing v1. Save the change log and a screenshot showing IDs, wording and intent.

P02 · Worked example and assessment

Worked example

Item	Record	Reason
Merge	R01 and R02	Same location and brake-checking need; wording differs.
Keep both	R05 and R07	Sunday opening and Saturday closing are different decisions.
Exclude from fixed set	R16	Leading praise question; does not fairly test a user need.

Expected result

There are 12 retained questions, 2 merged duplicates, 1 context-poor exploration question and 1 excluded leading question. The raw 16 rows remain available. Preserve the supplied ID mapping and check the full question text when joining observations. Keep exploration questions outside the fixed test.

Submission and scoring

Twelve frozen queries, a merge/exclusion log and a coverage check.

Dimension	Points	Evidence required
Cleaning decisions	30	Correct duplicate pairs and explicit exclusion reasons.
Query wording	30	Twelve natural questions with their meaningful constraints.
Coverage	20	Four intent categories inspected; missing needs acknowledged.
Version and mapping	20	Original rows retained; v1 frozen; IDs mapped explicitly.

Common errors and recovery

Merging all price questions Keep distinct budgets or material-inclusive conditions when they change the decision.

Adding flattering assumptions Rewrite neutrally; preserve the practical need.

Changing wording mid-test Make a new version and analyze it separately.

Independent check

Should “open on Sunday?” and “close at what time on Saturday?” be merged? Explain in one sentence.

3 Capture answers without changing the record

P03

90 minutes

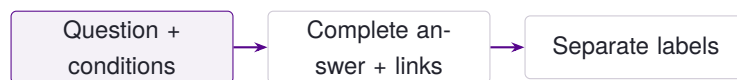
After this workshop: Save a complete answer, its conditions and its displayed citations separately from your judgments.

Submit: Six observation records, five complete answer texts and a retained failure.

The local answer page contains correct statements, errors and a failed attempt. Some answers display citations; one names the service without citing a source. Your first responsibility is to preserve what was observed. Corrections belong in a separate annotation, not in the original answer.

The idea to use

An observation is one question under one declared set of conditions, at one time and repetition. Mention and citation are different labels. A link can be present while failing to support the nearby sentence. A failed response has no observable answer outcome, so its labels remain blank.



failed: retain the row; leave outcomes blank

Figure 6 Capture first, then annotate. Citation presence and evidential support are different variables.

Inputs

Open pages/answers.html. Use the observations sheet and one copy of templates/03-observation.md per A01-A06. The English page is a translation of a fixed zh-CN fixture, not a live English test.

Procedure

1. Record the filename, fixture language, fictional sample date and your actual working time. Keep these fields separate. Write “offline authored fixture” as the data source.
2. For A01, copy the full question and the entire answer, including qualifications. Copy the displayed citation IDs in their displayed order. Open each local source link and record the target file.
3. Save the original text as A01-original.md. Take a screenshot showing the question, answer and citations together. If the answer is long, use consecutive numbered screenshots and keep the full text as well.
4. Annotate mention=1 when Songfeng is named; use 0 when a complete answer does not name it. Annotate citation=1 when a source link is displayed, regardless of whether it is correct. Record correctness later.
5. Repeat for A02-A05. For A06, keep status=failed, preserve the failure note, and leave mention and citation blank. Do not retry until the failure disappears from your sample.
6. Check every saved record against the browser. A partner should be able to reconstruct the question, full answer, source targets and labeling rule from the record alone.

P03 · Worked example and assessment

Worked example

Item	Record	Reason
A03	Mention 1; citation 0	The answer names Songfeng but has no displayed source.
A05	Mention 0; citation 1	The safety answer cites s06 without naming Songfeng.
A06	failed; both labels blank	No complete response; not a negative brand observation.

Expected result

The six records include five successful answers and one failure. Among the five successful answers, four mention Songfeng and four display at least one citation. These are two separate counts; they do not say that four answers are correct or that four independent sources support the service.

Submission and scoring

Six observation records, five complete answer texts and a retained failure.

Dimension	Points	Evidence required
Original capture	35	Five complete texts, questions and source targets retained.
Metadata	25	Fixture and actual dates distinguished; conditions recorded.
Labels	25	Mention, citation and failure encoded consistently.
Evidence files	15	Screenshots are readable and IDs match filenames.

Common errors and recovery

Correcting the original text Restore the observed wording; place your correction in the claim-check sheet.

Saving only a screenshot Add selectable full text so wording and source IDs remain searchable.

Counting a failure as zero Keep the row with blank outcome labels and report the failure count.

Independent check

A response includes a link to a page that never mentions the service. Can citation=1 and support=insufficient both be correct?

P04 · Brief and procedure

4 Investigate who is behind each source

P04

90 minutes

After this workshop: Distinguish owned information, independent reporting, republication and personal experience.

Submit: A six-source map and a short explanation of independent corroboration.

An answer can display several links that all repeat one provider announcement. Counting those links as several independent confirmations would overstate the evidence. Investigate the publisher and the origin of the information before treating a page as a witness.

The idea to use

A provider is an appropriate source for its own current price policy. An independent reporter can verify a location they visited. Neither automatically proves the service is “the best.” Source quality depends on the claim being checked; independence and factual support are separate questions.

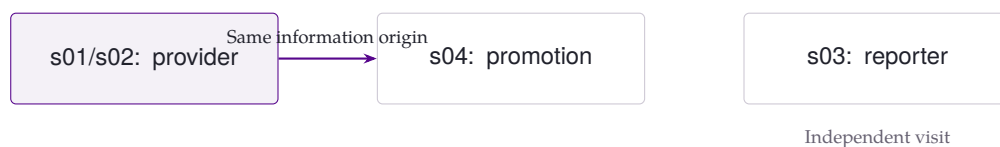


Figure 7 s04 repeats supplied information. s03 offers a separate location observation, limited to the reported visit.

Inputs

Open all six source pages from START.html, the sources worksheet and templates/04-source-map.md. Use the publisher, date and disclosure text. The document design is intentionally consistent so visual polish cannot substitute for source judgment.

Procedure

1. For each page, find the named publisher and the publication or update date. Record the exact disclosure about reporting, payment or supplied information. If no relationship is stated, record that uncertainty.
2. Classify s01 and s02 as owned information. They are two documents from one provider, not two independent organizations. Note which current service facts each can support.
3. Compare s03 and s04. The former describes an independent visit; the latter says the provider supplied the information and no independent test took place. Draw an arrow from s04 back to s01.
4. Read s05 with its date visible. It records one older personal experience. Preserve that history while treating current hours and current prices as unresolved until checked against more recent evidence.
5. Read the safety-guide body of s06, from “Three checks before riding” to the final safety paragraph. Decide whether that body recommends Songfeng. Exclude the case header and teaching notice: a name appearing there is not a recommendation.
6. Write a four-sentence source summary: the current policy source; an independent location check; a republication; an unresolved historical conflict. Attach the relevant source IDs to every sentence.

P04 · Worked example and assessment

Worked example

Item	Record	Reason
Current price policy	s02	An appropriate first-party statement of what is charged.
Location corroboration	s01 + s03	Provider statement and an independent site visit agree.
False additional witness	s01 + s04	A republication does not add independent verification.

Expected result

Six source documents are mapped. s01 and s02 share an owner; s04 traces to provider-supplied information; s03 independently reports one visit; s05 is an old personal account; s06 covers general safety. The appropriate conclusion is claim-specific, not a universal ranking of six websites.

Submission and scoring

A six-source map and a short explanation of independent corroboration.

Dimension	Points	Evidence required
Publisher and date	25	All six sources recorded from visible evidence.
Independence	35	s04 traced to the provider; s01/s02 grouped correctly.
Scope	25	No school endorsement or quality ranking invented.
Source summary	15	Four sentences with source IDs and a stated uncertainty.

Common errors and recovery

Third party means true Check the evidence passage, date and reporting method.

Many URLs mean many witnesses Trace republications to their original information source.

A public institution implies endorsement Read what the source actually says about the named service.

Independent check

The same press release appears on five websites. What additional evidence would justify calling them five independent confirmations?

P05 · Brief and procedure

5 Check each claim against the source text

P05

90 minutes

After this workshop: Split an answer into checkable claims and label their support without guessing.

Submit: Eight claim checks, three factual corrections and one unresolved-evidence example.

A03 is short but contains two different promises: a deadline and collection service. They need separate checks. You will examine eight claims from the five successful answers, then explain why each is supported, contradicted or insufficiently supported.

The idea to use

Use “supported” when the evidence justifies the full claim under its stated conditions; “contradicted” when relevant evidence conflicts with it; and “insufficient” when the provided material does not settle it. A source may support one clause and contradict another in the same sentence.

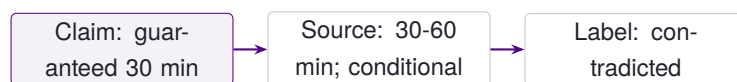


Figure 8 A claim is checked against the whole relevant proposition, including its qualifications.

Inputs

Open the claims worksheet, answers.html and s01-s06. Keep the original answer records from P03 unchanged. Use templates/05-claim-check.md for longer excerpts and corrections.

Procedure

1. Underline individual factual assertions in A01-A05. Split conjunctions when each part could have a different truth value. Use the supplied C01-C08 claims as the minimum set.
2. For each claim, open the relevant source rather than relying on the answer's citation label. Copy the smallest passage that contains both the evidence and its necessary conditions.
3. Check numbers with their units. For C01, calculate $15 + 18 = 33$. For C02, preserve “if no additional repairs are needed.” A correct number can still mislead if its condition is missing.
4. Compare dates for C03. The current official page says closed Sundays; the older forum account cannot establish current opening. Label the current claim contradicted, while retaining the historical account.
5. Check the two promises in A03 separately. C04 conflicts with “typically 30-60 minutes; not guaranteed.” C05 conflicts with “no collection or delivery.” Write a precise corrected sentence for each.
6. Add one test claim: “Songfeng is the best on campus.” Search all six sources. Label it insufficient, because no comparative evaluation is supplied. Do not turn absence of evidence into proof that the opposite is true.

P05 · Worked example and assessment

Worked example

Item	Record	Reason
C03: open Sundays	Contradicted	s01 says closed Sundays; s05 is older.
C04: guaranteed within 30 min	Contradicted	s02 gives a conditional 30-60-minute range.
Best on campus	Insufficient	No comparison or ranking method is provided.

Expected result

For the eight supplied claims, five are supported and three contradicted under the case' s current policy dates. The additional “best” claim is insufficient. This is a transparent classroom answer key, not a claim about commercial AI accuracy. A good correction narrows the wording to exactly what the evidence establishes.

Submission and scoring

Eight claim checks, three factual corrections and one unresolved-evidence example.

Dimension	Points	Evidence required
Atomic claims	20	Eight separate claims, each linked to its answer.
Evidence passages	35	Exact relevant wording and conditions retained.
Labels and corrections	30	Three contradictions corrected without adding promises.
Uncertainty	15	“Best” remains insufficient; reasoning is recorded.

Common errors and recovery

One label for a whole paragraph Split claims so mixed support can be represented.

The source is respectable, so it supports everything Match the exact sentence and its scope.

No evidence means false Use insufficient unless relevant evidence contradicts the claim.

Independent check

The source says “free reinspection within 7 days.” Does it support “free replacement of any damaged part within 7 days” ?

P06 · Brief and procedure

6 Revise one FAQ without changing the facts

P06

90 minutes

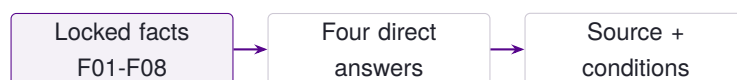
After this workshop: Write direct, useful answers whose prices, conditions and sources remain checkable.

Submit: A four-question FAQ, a fact-lock check and a before/after change log.

The old FAQ uses vague praise and incomplete prices. You will replace it with a useful page for someone planning a visit. The task is to improve the reader's access to reliable information. It does not demonstrate that any search engine will retrieve or cite the revision.

The idea to use

Good service content answers a real question early, then states the conditions and the source. Edit the wording and organization while locking the underlying facts. Independent coverage can corroborate particular facts; it should never be transformed into invented endorsements.



Wording may change; factual commitments may not.

Figure 9 The revision changes how facts are presented. It does not by itself demonstrate greater AI visibility.

Inputs

Open `faq-before.html` and the eight checked facts. Use `templates/06-faq-draft.md`. Keep `faq-after.html` closed until you have completed your own first draft, then use it as a reference for self-checking.

Procedure

1. Highlight every factual assertion and promotional claim in V0. Match each to a fact ID or mark it unsupported. “Any time,” “CNY 15 total,” “30 minutes” and “officially recommended” all need attention.
2. Select four practical questions from the frozen list: budget, Sunday visiting, location/collection, and repair time. Use the question as a heading. Put the direct answer in the first sentence.
3. Add necessary conditions immediately after the answer. State the CNY 15 labor fee and CNY 18 tube price together. Preserve queue, model and stock qualifications for the timing statement.
4. Add source IDs beside each answer and make the source links understandable. Include a maintenance role, fact-check date and update rule. Do not invent personal credentials or a named expert.
5. Use the change log to pair each removed sentence with its replacement and a fact ID. If you use an AI assistant for drafting, supply only the fictional checked facts and verify every proposed claim yourself.
6. Read your draft aloud, then compare it to the reference revision. Ask a partner to answer the four questions using only your page. Save V1 and the fact-lock check; preserve V0.

P06 · Worked example and assessment

Worked example

Item	Record	Reason
Old	“Tube replacement is only CNY 15.”	Material cost is missing.
Revised	“Labor is CNY 15 and the tube is CNY 18; standard total CNY 33.”	Source s02; no invented discount.
Old	“Officially recommended by the college.”	Remove: no source establishes endorsement.

Expected result

V1 contains four questions, four direct answers, nearby source references, a check date and a maintainer role. The facts match F01-F08. There is no invented review score, ranking, testimonial or guarantee. The reference file is one acceptable solution; different natural wording is welcome when it preserves meaning.

Submission and scoring

A four-question FAQ, a fact-lock check and a before/after change log.

Dimension	Points	Evidence required
Factual fidelity	40	Numbers, hours, scope and qualifications match the register.
Reader usefulness	25	Four questions answered directly in plain language.
Sources and maintenance	20	Nearby sources, date, role and update rule.
Change record	15	V0 preserved; each material change is explained.

Common errors and recovery

Adding impressive statistics Use only a measured, sourced statistic; otherwise remove it.

Hiding conditions in a distant footnote Place the condition next to the answer it changes.

Treating fluent AI output as checked text Reopen each source and verify facts, units and exceptions.

Independent check

What can this task establish about V1, and what would require a separate observation?

P07 · Brief and procedure

7 Inspect a page and describe the limits

P07

90 minutes

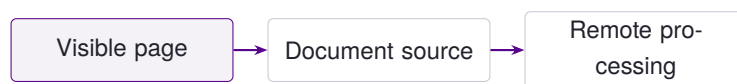
After this workshop: Find visible content and link defects, and distinguish a local check from a live crawl test.

Submit: An eight-item page inspection, a prioritized repair list and one recheck.

A page may look open in a browser while its text is wrong, its links fail or its metadata points elsewhere. The supplied broken page makes these problems visible without touching a real website. Record an observation for every item, including what you cannot determine locally.

The idea to use

Separate three questions: can a person read the page, what does the delivered document contain, and what has a remote system actually processed? A local file answers some questions about content. It cannot reveal a server's HTTP response, a crawler's visit or an engine's index.



Local checks reach the first two; live crawl and index state require other evidence.

Figure 10 Three distinct inspection levels. The right-hand stage remains untested in this offline exercise.

Inputs

Open `page-broken.html` and `templates/07-page-audit.md`. Use `faq-after.html` as the corrected content reference. The broken image and missing link are intentional teaching defects.

Procedure

1. Read the browser-tab title and the visible heading. Note that “Test page” does not describe the service question. Compare the stated CNY 15 price and daily opening against F02 and F03.
2. Try copying the core paragraph into a text editor. Record whether readable text is available. Check the missing image and the repair-terms link. Describe what happens without silently repairing the evidence.
3. Use the browser's View Page Source command. Search for title, robots and canonical. You do not need to write code: record the relevant lines as text or a readable screenshot.
4. Observe the noindex value and the example.invalid canonical target. These are document settings, not proof that a real engine has excluded this local file. The reserved invalid domain is deliberately nonoperational.
5. Rank fixes by the user problem: first wrong price/hours; then missing detail links; then descriptive title and metadata. Write a concrete fix and a verification method for each. Image quality comes after factual correctness.
6. Recheck `faq-after.html` for the visible content fixes: correct prices, conditions, source links and date. Record that server status, live crawling and indexing remain untested rather than marking the entire website “passed.”

P07 · Worked example and assessment

Worked example

Item	Record	Reason
Wrong price	“Tube replacement: CNY 15”	Add labor/material breakdown and the CNY 33 standard total.
Broken terms link	not-here.html	Point to s02-prices.html and reopen it.
Local metadata	noindex; canonical to example.invalid	Record the settings; do not infer live indexing status.

Expected result

Your inspection separates observed defects from untested server behavior. It identifies the incomplete price, incorrect daily-opening claim, broken image/link, generic title, missing update date and metadata concerns. You can verify the corrected FAQ content locally, but cannot establish a live platform’s response from these files.

Submission and scoring

An eight-item page inspection, a prioritized repair list and one recheck.

Dimension	Points	Evidence required
Visible inspection	30	Price, hours, text, image, links and date checked.
Source inspection	25	Title and metadata located with readable evidence.
Repair plan	25	Specific actions ordered by user impact.
Boundary and recheck	20	Local fixes rechecked; server/crawl/index state left untested.

Common errors and recovery

A page opens, so it is indexed Report only that the local file rendered.

A noindex tag proves a past outcome A directive is evidence of a setting, not a historical crawl event.

A screenshot of tiny source code Crop to the relevant lines or paste selectable text with the filename.

Independent check

After opening a local HTML file, can you report “HTTP 200 and indexed by AI search” ?

8 Measure repeated observations in a spreadsheet

P08

90 minutes

After this workshop: Compute transparent rates with the correct denominator and report variation without claiming causation.

Submit: A checked summary table, a two-stage comparison and a limitations paragraph.

The measurement sheet contains 36 synthetic observations: six queries, three repeats and two stages. Both stages include a failed attempt. You will reproduce the summary with filters and formulas, then describe exactly what changed in this dataset.

The idea to use

The mention rate is the number of successful answers naming the service divided by the number of successful answers. Failures are reported separately. A difference in percentage points describes this sample; it does not prove that the FAQ edit caused a change in a live platform.

Inputs

Open measurements and summary in the workbook. Use templates/08-measurement-report.md. The before/after labels are teaching groups in synthetic data, not timestamps from an actual intervention experiment.

Procedure

1. Count the rows: 18 before and 18 after. Check that each stage contains six query IDs and repeats 1-3. Filter status to failed and confirm exactly one failure in each stage.
2. For the before stage, filter status=ok and count mention=1. You should find 17 complete answers and 8 mentions. Repeat for after: 17 complete answers and 11 mentions.
3. Inspect the summary formulas. COUNTIFS selects stage and status; a second count adds mention=1. Divide the mention count by the successful-answer count. Keep the raw outcomes numeric 1/0 and failures blank.
4. Compute 8/17 and 11/17, format both as percentages with one decimal, and subtract them. Report a rise from 47.1% to 64.7%, or 17.6 percentage points using the unrounded values.
5. Repeat for citation presence: each stage has 7 cited answers out of 17 successful answers, or 41.2%. This metric does not rise even though the mention rate does. Citation presence still does not measure support.
6. Inspect each query's three repeats rather than selecting its best answer. Save the summary and write three limits: small synthetic sample, failed observations excluded from outcome denominators, and no causal or live-platform conclusion.

P08 · Worked example and assessment

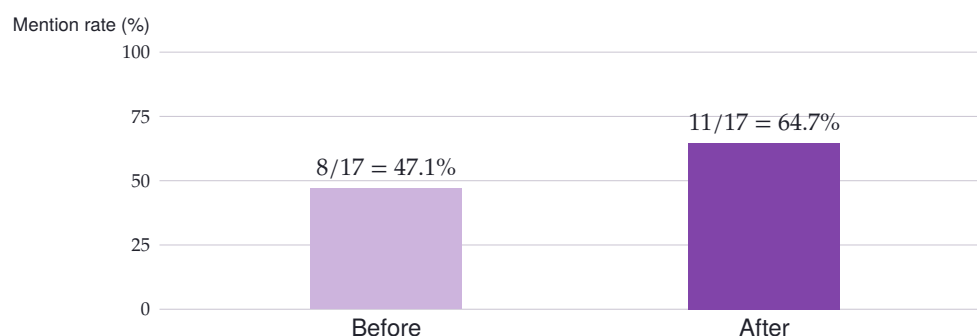


Figure 11 Synthetic classroom data. Each stage has 18 planned attempts and one failure; the outcome denominator is 17. This is not a measured effect of the FAQ revision.

Worked example

Item	Record	Reason
Before	8 / 17 = 47.1% mention rate	18 planned; 1 failure.
After	11 / 17 = 64.7% mention rate	18 planned; 1 failure.
Difference	17.6 percentage points	Citation presence stays at 7 / 17 = 41.2%.

Expected result

The workbook produces 18 planned rows, 17 successful answers and 1 failure per stage. Mention counts are 8 and 11; citation-presence counts are 7 and 7. The overall missing count is 2. You can reproduce every numerator by filtering the raw rows. The same IDs and values appear in both language editions.

Submission and scoring

A checked summary table, a two-stage comparison and a limitations paragraph.

Dimension	Points	Evidence required
Counts and missingness	30	36 rows, 2 failures, correct stage denominators.
Formulas	30	Counts depend on stage/status; rates update with inputs.
Communication	25	Counts, percentages and percentage-point difference stated.
Interpretation	15	Synthetic scope and absence of causal evidence explicit.

Common errors and recovery

Dividing by all 18 attempts Use 17 successful answers for this defined outcome; report failures separately.

Calling 17.6 points a 17.6% relative increase Name the unit. Percentage points are a subtraction of rates.

Reporting only the best repeat Keep all planned repeats and show variability.

Independent check

If one failed response is later recovered, should you overwrite the original row and silently change the denominator?

9 Review a partner's evidence and prioritize fixes

P09

90 minutes

After this workshop: Resolve labeling disagreements with source passages and turn findings into specific actions.

Submit: A peer-review record, a simple agreement count and a one-week action list.

Two people can read the same answer and reach different judgments. Discussion is most useful when both people first record independent labels. You will compare four difficult claims, resolve differences by returning to the sources, and decide which repairs should happen first.

The idea to use

Agreement measures whether annotators applied a rule similarly; it does not by itself show they were correct. Prioritize an action by the user harm it prevents and the effort needed, not by the promise of more mentions. Wrong opening hours matter because they can cause a wasted trip.



Figure 12 Save the initial judgments before discussion. Agreement after discussion must not replace the original agreement count.

Inputs

Use your P05 labels, templates/09-peer-review.md and the source pages. For a solo route, hide your original labels, reread the sources after another task, and record that the second pass is self-review rather than independent review.

Procedure

1. Choose C02, C03, C04 and C07. Send only the claims and source files to a partner, without your labels. Each person records supported, contradicted or insufficient plus one evidence passage.
2. Compare labels only after both sets are saved. Count exact matches out of four. Keep the initial labels visible even if discussion later produces agreement.
3. For each disagreement, name the decision rule at issue: time period, conditional wording, source independence or claim splitting. Reopen the original source and record the passage used to resolve it.
4. If the material still does not decide the issue, keep it unresolved and state what new evidence would help. Do not force a positive label merely to improve the agreement count.
5. Create a one-week plan with three actions. Give each an evidence ID, affected user, owner, deadline and recheck method. Put wrong price/hours and invented service promises ahead of cosmetic page changes.
6. Have the reviewer inspect one completed correction and sign the recheck field. Record the remaining limitation: a passed local review is not evidence that a platform has processed the new content.

P09 · Worked example and assessment

Worked example

Item	Record	Reason
Initial labels	3 matches out of 4	Report 75% initial agreement, before discussion.
Disagreement	“CNY 40 is enough”	Check whether “no extra repairs” is retained.
Specific action	Correct Sunday opening in the FAQ	Owner: editor; verify against F03 and s01.

Expected result

The review preserves both initial judgments and the resolved label. The 3/4 example is illustrative; report your actual count rather than copying it. The plan contains three small, checkable actions. An unresolved item is acceptable when its evidence gap is explained.

Submission and scoring

A peer-review record, a simple agreement count and a one-week action list.

Dimension	Points	Evidence required
Independent first pass	25	Labels saved before comparison, or solo route disclosed.
Resolution record	35	Disagreements tied to rules and exact passages.
Action list	25	Three evidence-linked actions with owners and checks.
Honest reporting	15	Initial agreement and unresolved items retained.

Common errors and recovery

Sharing the answer key first Repeat with hidden labels and record the new procedure.

Agreement means accuracy Check both labels against the evidence and rule.

A vague action such as “optimize GEO” Name the sentence, source, owner and observable completion condition.

Independent check

Both reviewers label an unsupported ranking “supported.” What does 100% agreement establish?

P10 · Brief and procedure

10 Deliver a project another person can reopen

P10

90 minutes

After this workshop: Present a bounded conclusion and make its supporting files easy to inspect.

Submit: A one-page report, an indexed evidence ZIP and a three-minute demonstration.

A useful final project is more than an attractive screenshot. A reviewer should be able to move from a finding to the relevant query, answer, claim and source. Your last task is to package the work so another person can check it without relying on your explanation.

The idea to use

A conclusion earns its place in the report through a traceable evidence path. Separate observed problems, completed edits and proposed next steps. The synthetic before/after data support a calculation exercise, not a success story about a real service or AI platform.



Figure 13 A reviewer should be able to follow the evidence path in either direction.

Inputs

Use all completed P01-P09 outputs and templates/10-one-page-report.md. Create a fresh final folder. Keep the full classroom source kit outside the submission; include only the source files needed to trace your findings.

Procedure

1. Write a short scope statement: fictional service, fixture version, twelve fixed queries, six supplied observation records, five complete responses, one failure, and six source documents. Identify the separate 36-row measurement exercise.
2. Choose three findings. For each, cite an answer ID, claim ID where relevant, source ID and filename. For example: “A02 says open Sundays; C03 conflicts with current s01 hours.”
3. Describe one completed content revision and one result table. Report the 8/17 and 11/17 calculation as synthetic data. State clearly that it does not show the revision caused more real-world mentions.
4. Create an evidence index and copy the necessary originals, annotations, FAQ V0/V1, workbook and report into final. Remove duplicate drafts and any accidental personal information from filenames or screenshots.
5. Give the ZIP to a partner. Ask them to reopen two findings from the report using only the index. Repair missing files and broken links. Name this test a peer handover check, not an external audit.
6. Deliver a three-minute demonstration: 30 seconds on the user question, 60 on evidence, 60 on the correction and calculation, 30 on limits and next steps. Finish with the transfer challenge below.

P10 · Worked example and assessment

Worked example

Item	Record	Reason
Finding	Sunday opening is misstated	Q03 → A02 → C03 → s01 → s01-service.html.
Completed change	FAQ now states closed Sundays	F03 → V1 → source link → local recheck.
Limit	No live platform effect tested	Synthetic counts and local page checks only.

Expected result

The final folder opens cleanly, every headline finding has an evidence path and the report distinguishes observations from plans. The demonstration uses plain language and includes one limitation. The handover check records what a partner actually reopened; do not claim independent validation beyond that action.

Submission and scoring

A one-page report, an indexed evidence ZIP and a three-minute demonstration.

Dimension	Points	Evidence required
Evidence paths	35	Three findings trace to retained records and sources.
Report and boundaries	25	Scope, counts, completed edits and limits explicit.
Package usability	25	Index, readable files and two successful peer reopens.
Demonstration	15	Within three minutes; explains one concrete user decision.

Common errors and recovery

A headline with no record ID Add its evidence path or remove the headline.

Calling synthetic data a client result Label the teaching fixture wherever a result is shown.

Submitting only the latest page Include V0, V1 and the change log so the edit can be checked.

Independent check

Transfer challenge: a campus print shop says “same-day binding.” Draft one neutral question, two facts to verify and one condition that must remain in a useful answer.

Spreadsheet quick start

A Using the practice workbook

The workbook has eight sheets. Names are deliberately stable across languages, so an instruction such as “open claims” points to the same task in either edition. Yellow cells are for your entries; the raw measurement rows remain the supplied example. Save your own copy before changing them.

Sheet	Purpose	What to do
project	Project card	Fill group, user, question and scope.
facts	Eight checked service facts	Read and trace the source and conditions.
queries	Sixteen raw questions	Label, clean and map to twelve fixed queries.
sources	Six source documents	Complete type, independence and supported claim.
observations	Six response records	Add timestamps, labels and original filenames.
claims	Eight atomic claims	Add passages, source IDs, labels and conditions.
measurements	Thirty-six synthetic repetitions	Filter and count; retain failed rows.
summary	Formula-driven stage counts	Inspect formulas and explain the rates.

Five operations you need

1. Click a cell to edit it. Use a line break only in a narrative field, not inside an identifier. Save after each task.
2. Freeze the first row so column headers stay visible while scrolling. The supplied data sheets already do this.
3. Select the header row and turn on Filter in the Data menu. Filter stage first, then status; clear all filters before checking total row counts.
4. Click a formula cell and read the formula bar. Do not replace a calculated percentage with typed text such as “47.1%.”
5. If text looks cut off, widen the relevant column or enable Wrap Text. Avoid merged cells inside the data table.

Spreadsheet formulas

Read one calculation from the inputs

In summary, row 2 is before and row 3 is after. In measurements, B is stage, E is status, F is mention and G is citation. Rows 2-37 contain the 36 observations. The formula ranges are bounded so headers and unrelated cells do not enter the count.

```
successful = COUNTIFS(stage, selected_stage, status, "ok")
```

```
mentions = COUNTIFS(stage, selected_stage, status, "ok", mention, 1)
```

```
mention_rate = mentions / successful
```

The actual E2 formula is `=IF(C2=0,"",D2/C2)`. If there are no successful answers, it leaves the rate blank rather than inventing a zero. The COUNTIFS formulas use the exact stage text from A2/A3, so the same structure works with translated stage labels.

Quantity	Before	After
Planned attempts	18	18
Successful answers	17	17
Failed attempts	1	1
Mentions	8	11
Mention rate	47.1%	64.7%
Answers with citations	7	7
Citation presence rate	41.2%	41.2%

A quick sensitivity check

In a disposable copy, change one successful before-stage mention from 0 to 1. The before mention count should become 9 and the rate $9/17 = 52.9\%$; planned and successful counts should not change. Undo the edit and confirm the original $8/17$ result returns. Never make this test in the retained original.

Two different questions

“How often did a completed answer mention the service?” uses successful answers as its denominator. “How often did a planned attempt yield a mention?” would use all attempts and is a different metric. Either can be defined, but do not switch the definition halfway through a comparison. This course uses the first and reports failed attempts separately.

Data and file contracts

B Identifiers, labels and submission files

Prefix / field	Meaning	Example
F	A checked service fact	F02: labor and material price
R / Q	Raw question / frozen question	R03 maps to Q02
A	One supplied answer observation	A02: Sunday opening
C	One checkable claim	C03: open Sundays
s	A source document	s01: current service information
status	Whether a complete answer exists	ok or failed
mention / citation	Observed binary outcomes	1 present; 0 absent; blank if failed
source date / observed_at	When a source applies / when you checked	Keep in separate fields

Frozen query mapping

Q ID	Raw ID	Decision
Q01	R01	Brake check near the east gate
Q02	R03	CNY 40 budget including materials
Q03	R05	Sunday opening
Q04	R07	Saturday closing time
Q05	R08	Location for a first visit
Q06	R09	Collection from a dormitory
Q07	R10	Appointment confirmation
Q08	R11	Guaranteed completion time
Q09	R12	Reinspection after two days
Q10	R13	Official college endorsement
Q11	R14	What the campus visit proves
Q12	R15	Pre-ride safety checks

An answer record you can reconstruct

GEO PRACTICE LAB · OFFLINE TEACHING MATERIAL

SONGFENG CAMPUS CYCLE SERVICE · FICTIONAL CASE

Six answer-observation examples

Offline sample engine · Classroom fixture

All six answers below were written by the course author. No AI service was contacted. "Offline sample engine" is not a product name. Metadata fields illustrate a recording method.

English translation of fixed zh-CN fixture · Sample session: signed out · Search: simulated · Round: demo 1 · Fixture date: 2026-09-08

Record A01 · Query Q02 · ok

Is CNY 40 enough for a new inner tube at Songfeng, including materials?

The current Songfeng price list gives CNY 15 for labor and CNY 18 for an inner tube, a total of CNY 33. A CNY 40 budget is sufficient if no additional repairs are needed. Confirm the model and stock first.

Citations: [\[s02\]](#) [\[s03\]](#)

Record A02 · Query Q03 · ok

Is Songfeng open on Sundays?

Songfeng is open on Sundays. Try visiting in the morning. A forum user reported having a repair on a Sunday.

Figure 14 Actual screenshot excerpt from answers.html. The page explicitly identifies its authored, offline status. The question, answer and displayed source links are retained as separate evidence fields.

Minimum final-folder contents

report.md; evidence-index.md; your workbook; query-set-v1; six observation records; eight claim checks; source-map.md; FAQ V0 and V1; page-audit.md; peer-review.md; the source pages needed by the report. Use short stable filenames such as A02-original.md and C03-check.md. The index tells the reviewer where each file is and what it supports.

Do not copy the teaching answer key into your report as if you had independently discovered it. If you used a worked example, say so and show the verification you actually performed. Keep any optional live observation in a separately named folder with its own protocol and timestamps.

Self-check answers

C Answers to the independent checks

P01

Open s02. Specify standard tube replacement, labor CNY 15, tube CNY 18 and the CNY 33 total; retain the effective date and any extra-repair condition.

P02

No. They concern different days and lead to different visiting decisions.

P03

Yes. Citation presence describes a visible link; support describes whether the source justifies the particular claim.

P04

Evidence that each outlet independently checked the relevant claim. Mere republication on different domains does not supply that evidence.

P05

No. Reinspection and replacement are different services. The unconditional replacement claim is not supported, and s02 explicitly limits the policy.

P06

It can establish factual consistency, clarity and source traceability. Discovery, indexing, citation and user outcomes require separate evidence.

P07

No. A file opened locally has not supplied a tested HTTP response, and its display does not demonstrate crawling, indexing or citation.

P08

No. Retain the original attempt and record a separately identified retry under a stated rule; revise the summary transparently.

P09

Only that their labels agree. It does not establish the ranking's truth; both may have applied the rule incorrectly.

P10

Example: "If I submit 80 pages at 16:00, can I collect a bound copy today?" Verify the cut-off time and supported binding/print size; retain stock, queue or collection-time conditions supplied by the shop.

Teaching and transfer

D Teaching choices and the next step

The organization combines seven publicly readable teaching resources [3-9], the supplied vocational training examples and the project's earlier applied-course design. Google's task-based beginner modules support a small artifact per session; Elements of AI motivates a no-programming core; Microsoft Learn provides explicit objectives and an exercise/check rhythm. Data Carpentry informs the messy inputs, explicit missingness and one-observation-per-row structure. SIFT and Cornell inform tracing, authorship and claim-specific source questions. MANTRA informs file naming, versioning and handover.

The supplied Shenzhen training exercises use 90-minute tasks, explicit inputs, screenshots and itemized scoring. This handbook adopts that practical granularity without importing its model-training prerequisites or reusing its code. Ten sessions are a reasoned design choice for this artifact sequence, not a validated optimum or a copied syllabus.

A proportionate course assessment

Component	Suggested weight	Evidence
P01-P08 task portfolio	60%	Use the task rubrics, then average the eight scores.
P09 peer review	15%	Independent labels, resolution and specific action list.
P10 handover and demonstration	25%	Traceable claims, readable package and honest limits.

A learner should be allowed to correct an unsupported claim or restore a missing source file and resubmit. A high score must not compensate for fabricated data: first repair the provenance problem, then reassess the affected work. The course does not issue institutional certification or promise business outcomes.

Optional live extension

Choose a low-risk public service page you are permitted to inspect. Use a small fixed set of neutral questions and manual observation through a legitimately accessible interface. State the platform, visible model/mode, language, region, login state, actual timestamps and planned repeats. Save complete responses and failures. Use only material you may share, and keep personal information out of the report. Costs or publishing are separate decisions, not necessary course steps. Compare the live results only within the declared protocol; do not combine them with the synthetic fixture.

Sources

E References and visual credits

- [1] Aggarwal et al.. GEO: Generative Engine Optimization. KDD 2024. arXiv:2311.09735v3. <https://arxiv.org/abs/2311.09735>.
- [2] Holderrieth and Erives. An Introduction to Flow Matching and Diffusion Models. arXiv:2506.02070v3. Typographic reference; not a source of GEO claims. <https://arxiv.org/abs/2506.02070>.
- [3] Google. Google AI Essentials. Public curriculum and activity descriptions. <https://grow.google/ai-essentials/>.
- [4] University of Helsinki and MinnaLearn. Elements of AI. Public description of the introduction and separate Building AI course. <https://www.elementsofai.com/>.
- [5] Microsoft Learn. Introduction to generative AI and agents; Exercise: Explore generative AI. <https://learn.microsoft.com/en-us/training/modules/fundamentals-generative-ai/>.
- [6] Data Carpentry. Data Organization in Spreadsheets for Ecologists. Summary/setup and Formatting problems. <https://datacarpentry.github.io/spreadsheet-ecology-lesson/>.
- [7] Mike Caulfield. SIFT (The Four Moves), June 19, 2019. <https://hapgood.us/2019/06/19/sift-the-four-moves/>.
- [8] Cornell University Library. Evaluating Web Pages: Questions to Consider. Categories, Accuracy and Authority. https://guides.library.cornell.edu/evaluating_Web_pages.
- [9] University of Edinburgh. Research Data MANTRA. Learning units and data-handling tutorials. <https://mantra.ed.ac.uk/>.

Public teaching-resource pages [3-9] were read on September 8, 2026. Catalog structures can change. These references support design choices, not a claim that one teaching format has been experimentally proven superior.

Credits and reproducibility

Visual sources

Figure 3 reproduces the original GEO paper diagram under Creative Commons Attribution 4.0. Its vector crop was taken from the project's retained arXiv v3 source and is identical to the reviewed literature asset. Original labels, arrows and colors were preserved. License: <https://creativecommons.org/licenses/by/4.0/>.

The other diagrams are original vector teaching illustrations. The bar chart is drawn from the 36-row synthetic measurement fixture. Screenshots show actual local pages included in the student kit; they are not screenshots of a commercial AI product. The visible source-document dates are fictional data fields. No photograph or diagram from the Shenzhen attachment is redistributed.

Layout and language

The page design follows the supplied academic-notes reference in its restrained rules, serif body, sans-serif headings, numbered figures, source captions and continuous scholarly reading structure. Color is limited to a purple accent. This is an independently authored course, not an arXiv submission or an institutional endorsement.

English term	Chinese term	Meaning used here
observation	观察记录	One recorded answer attempt with conditions
claim	主张	A statement that can be checked separately
evidence	证据	Material relevant to checking a claim
source	信源	The document or publisher behind information
independent corroboration	独立印证	A separate check of the same relevant fact
percentage points	百分点	The arithmetic difference between percentages

The source package contains the English master, aligned Chinese text, style file, diagram code, retained figure asset, case-generation scripts and compact quality records. Rebuild with XeLaTeX; no remote resource is required during compilation. The student ZIPs contain only learning materials, templates and workbooks.