

# Co-Learner User Manual

This manual explains what the Co-Learner agent does, how to set it up, and how to use it for codebase understanding and refactoring.

## What It Is

Co-Learner is a CLI agent that helps you: - map a repository quickly, - identify structural hotspots, - propose refactor steps, - and outline tests to reduce risk.

It uses a small set of tools (starting with `repo_scan`) and a ReAct-style loop. If you provide an LLM API key, it will draft more tailored answers and tool choices.

## Quick Start

- 1) Install dependencies

```
cd extensions/colearner  
npm install
```

- 2) Set an API key (optional but recommended)

```
export OPENAI_API_KEY="your-key"  
# or  
export ANTHROPIC_API_KEY="your-key"
```

Optional overrides: - `OPENAI_API_KEY` (optional) - `ANTHROPIC_API_KEY` (optional) - `COLEARNER_MODEL` (optional)

No keys? CoLearner still runs in heuristic mode using repo structure and docs.

Default bus mode is `kafka`. Set `COLEARNER_BUS=file` to use local FileBus instead.

Tip: copy `env.example` to `.env` and fill in keys.

- 3) Run the CLI

```
npm run dev
```

2-minute path (non-interactive):

```
npm run dev -- init  
npm run dev -- learn "ship first PR"
```

Outputs: `.colearner/learning.json` and `.colearner/plan.md`.

- 4) Ask a question

```
co-learner> map this repo
```

Evidence-backed explain:

```
colearner-ai explain "docs/overview.md docs/architecture.md"
```

Built-in command list + flow guide:

```
colearner-ai commands
```

Kafka mode (optional):

```
COLEARNER_BUS=kafka AAFW_HOME=../aafw-home npm run dev
```

Install anywhere (global):

```
npm install -g colearner-ai
colearner-ai init
colearner-ai learn "ship first PR"
```

Or run without install:

```
npx colearner-ai init
npx colearner-ai learn "ship first PR"
```

## Tutorial: First Session

Goal: get a quick map of the repo and a refactor plan.

1) Start the CLI.

2) Ask for a map:

```
co-learner> give me a structure overview and key hotspots
```

3) You will see events:

```
[thinking] Using tool: repo_scan
[tool_start] repo_scan {"depth":1}
[tool_end] repo_scan (12ms)
answer:
...

```

4) Ask for a plan:

```
co-learner> propose a phased refactor plan for the core modules
```

## Capabilities (Current)

- repo scan for high-level structure.
- tool summaries saved to .colearner/context.
- event stream for transparency.
- LLM-assisted answers (if API key is set).

## Onboarding Depth (Junior/Mid/Senior)

Choose a depth before generating a plan: - **Junior**: guided, safe tasks, heavy on docs/tests. - **Mid**: module ownership, code + tests, controlled refactors. - **Senior**: architecture decisions, system tradeoffs, process improvements.

Example:

```
colearner-ai level junior  
colearner-ai learn --scan "consumer protocol handling"
```

Then move step by step:

```
colearner-ai next --menu  
colearner-ai complete step-1  
colearner-ai next --menu
```

## Example Queries

- “Map this repo and highlight risky modules.”
- “Give me a refactor plan for the API layer.”
- “Which tests should I add before refactoring?”
- “Summarize architecture based on folder layout.”

## Didactics Commands

Use these commands in the CLI: - **init**: initialize .colearner/learning.json. - **learn <goal1, goal2>**: generate and store a learning plan. - **learn --scan <goal1, goal2>**: include docs/config/code evidence for a more specific plan. - **explain <topic>**: explain a concept at 3 levels with evidence (files or keyword scan). - **practice <topic>**: generate a safe exercise. - **assess <exercise>|<response>**: evaluate a response. - **refactor <topic>**: propose a refactor and teach the why/how. - **progress**: show learning state. - **level <junior|mid|senior>**: set onboarding depth before running **learn**. - **next**: show the next step in your learning plan. - **next --menu**: interactive menu to run suggested commands. - **complete <step-id>**: mark a step complete and advance the plan. - **comment <text>**: add a learning note to the session history. - **insight <text>**: capture an insight in the session history. - **round <name>**: start a new learning round and persist the session id. - **lifecycle <init|plan|practice|review|done>**: record a session stage. - **history**: show lifecycle history for the current session. - **history <session>**: show lifecycle history for a specific session. - **history all**: show lifecycle history across all rounds. - **history summary**: show a grouped session summary. - **close**: publish session summary/history to coach topics (Kafka). - **coach inbox**: show session start/close events from Kafka topics. - **coach inbox hints**: show stuck reports and hints. - **stuck <summary>**: publish a stuck report with branch/context and evidence pack. - **coach hint <session\_id>|<message>**: send a hint to a learner session. - **evidence <path>|<note>**: send evidence with hash +

snippet. - `request-evidence <path>|<reason>`: ask for evidence on a file or module. - `coach dashboard`: show aggregated progress for multiple students. - `student <id>`: set the student identifier for routing. - `role <coach|student>`: set the CLI role for filtering. - `sync`: poll new events for the current session. - `doctor`: run diagnostics (versions, repo size, monorepo hints, env vars, broker).

## How It Works (Short)

- 1) Co-Learner receives a query.
- 2) It chooses tools (LLM or heuristic).
- 3) Tool results are stored to disk.
- 4) It answers with a short plan and test guidance.
- 5) The learning plan ends with a first-contribution step (safe task, PR-sized exercise, definition of done).

## Safety and Limits

- Hard step limits per command (`COLEARNER_MAX_ITERATIONS`).
- Bounded reads per file and per run (`COLEARNER_MAX_FILE_BYTES`, `COLEARNER_MAX_RUN_BYTES`).
- Allowlisted file extensions (`COLEARNER_ALLOWED_EXTENSIONS`).
- Scope enforcement via `COLEARNER_SCOPE_ROOT`.
- No script execution by default.
- Branch guard for learning plans (`COLEARNER_AUTO_BRANCH=1`).

## What Co-Learner Will Not Do

- Execute project scripts or binaries.
- Read or write files outside `.colearner/` or the scope root.
- Make network calls unless LLM/Kafka mode is configured.

## Session Close (Kafka)

When `COLEARNER_BUS=kafka`: - `init/round` publishes `session_started` to `colearner.sessions.v1` - `close` publishes `session_closed` to `colearner.sessions.v1` - `colearner.history.v1` (`session_history`)

Toggles: - `COLEARNER_PUBLISH_SUMMARY=1` - `COLEARNER_PUBLISH_HISTORY=1`

## Branch Guard (Learning Plans)

When you run `learn`, Co-Learner ensures you are on a dedicated branch.  
Default behavior: auto-create `colearner/onboarding-<timestamp>` if you are on `main` or `master`.  
Disable auto-branching by setting `COLEARNER_AUTO_BRANCH=0`.

## Teacher Section: How the Didactics Work

This tool is designed to behave like a practical instructor for onboarding. The didactics are built around evidence, scaffolding, and feedback:

- 1) **Goal intake:** The agent starts by capturing learner goals and skill level.
- 2) **Learning path:** It generates a minimal path focused on “what you need to contribute.”
- 3) **Evidence grounding:** Explanations reference real files and code structure.
- 4) **Scaffolded teaching:** Concepts are explained in tiers (basic → advanced).
- 5) **Practice and feedback:** Exercises are small, safe, and reviewed with clear next steps.

As a teacher, you can use the CLI to guide onboarding sessions:

- Start with `learn <goal1, goal2>` to define objectives.
- Pick a depth with `level <junior|mid|senior>` for junior/mid/senior onboarding.
- Use `explain <topic>` to introduce concepts with concrete repo context.
- Use `practice <topic>` for hands-on tasks and `assess <exercise>|<response>` for feedback.
- Check `progress` to track milestones and confidence.

If you want to adapt the curriculum, edit `.colearn/learning.json` directly or rerun `learn` with new goals.

## Student Section: How to Learn With Co-Learner

Use Co-Learner as your personal onboarding tutor. A good session looks like this:

- 1) **Set goals** with `learn <goal1, goal2>` (e.g., “understand data flow, ship first PR”).
- 2) **Ask for explanations** using `explain <topic>` when you hit a concept you don’t know.
- 3) **Practice** with `practice <topic>` and try the exercise in a local branch.
- 4) **Get feedback** using `assess <exercise>|<response>` to check your understanding.
- 5) **Track progress** using `progress` to see what you’ve mastered.

Tips:

- Keep sessions focused on one objective at a time.
- Use real file paths in your questions for sharper answers.
- When you get a refactor proposal, read the “why” section first.

## Coach Section: Recurring Pattern for Guiding Progress

Use this weekly loop to keep learners moving:

- 1) **Set the objective** (10–15 min)
  - Run `learn <goal1, goal2>` and pick 1–2 next steps.
- 2) **Explain with evidence** (20–30 min)
  - Use `explain <topic>` and walk the learner through real files.

- 3) **Practice task** (30–60 min)
  - Use `practice <topic>` and assign a small change.
- 4) **Review and assess** (15–20 min)
  - Use `assess <exercise>|<response>` and give precise feedback.
- 5) **Update progress** (5–10 min)
  - Run `progress` and record confidence gains.

Repeat weekly, tightening scope as confidence grows.

## Test Drive: End-to-End Walkthrough

This walkthrough exercises the full feature set (coach + student, plan, practice, feedback).

### 1) Start two terminals

- Terminal A (Coach)
- Terminal B (Student)

### 2) Set roles and a shared session

```
co-learner> role coach
co-learner> session onboarding-01
co-learner> student s-001

co-learner> role student
co-learner> session onboarding-01
co-learner> student s-001
```

### 3) Coach creates a plan

```
co-learner> learn repo overview, dependency map, safe refactors
co-learner> lifecycle plan
```

### 4) Student syncs and checks progress

```
co-learner> sync
co-learner> progress
```

### 5) Coach assigns an exercise

```
co-learner> assign dependency graph|Create a quick module map|npm test
```

### 6) Student syncs and submits

```
co-learner> sync
co-learner> submit ex-1|I mapped modules A->B->C and noted edges.
```

### 7) Coach gives feedback

```
co-learner> feedback pass|Missing edge A->D|Add that edge|0.1
```

### 7b) Coach requests evidence (optional)

```
co-learner> request-evidence src/core/router.ts|Verify routing logic
```

### 7c) Student sends evidence (optional)

```
co-learner> evidence src/core/router.ts|Reviewed switch branches
```

### 8) Student syncs and checks progress

```
co-learner> sync  
co-learner> progress
```

### 9) Try didactics modes

```
co-learner> explain dependency graph  
co-learner> practice module boundaries  
co-learner> refactor extract interface
```

If you don't see events, ensure both terminals share the same `.colearner/` folder and run `sync`.

## Security and Scope

For production use, set `COLEARNER_SCOPE_ROOT` to restrict file access:

```
export COLEARNER_SCOPE_ROOT="/path/to/repo"
```

This scope is enforced for `file_read` and evidence snapshots.

## Testing

Use the full test plan in `docs/test-plan.md`. A quick check is: 1) learn, explain, practice, assess, progress 2) Coach/student assign, submit, feedback, sync 3) lifecycle and history 4) `request-evidence` + evidence snapshot 5) coach dashboard

## Output Shape

Responses are structured in three parts: 1) Findings 2) Learning steps (phased) 3) Risks and tests

## Troubleshooting

No LLM configured: - You will still get basic answers and tool usage. - Set OPENAI\_API\_KEY or ANTHROPIC\_API\_KEY for richer output.

Tool errors: - Check file permissions. - Ensure you are running from the repo you want to inspect.

## Next Steps

If you want deeper analysis, add tools like: - file\_read - symbol\_index - dependency\_graph - call\_graph

See `extensions/colearned/docs/agent-spec.md` for the tool contract.