

Learning Module 02: Fields, Variables, and Measurable Evidence

Learner: _____ Section: _____ Date started: _____

Status and Destination

- **Primary role:** Independent application
- **Task labels:** Parts A, B, and D are **Practice - not graded**. Part C is a **Graded-Outcome Component - Quantitative Foundations and Variables Application Packet** after correction. The status check before Part C is **Progress Check - feedback only**.
- **Graded outcome:** **Quantitative Foundations and Variables Application Packet**. Part C will be combined with the Foundation Application Record from Learning Module 01. It is not scored as an additional separate artifact.
- **Planned independent time:** 60 minutes in total, distributed across the first three class sessions of the current lesson
- **Use in the next class session:** The field application will be used to identify variables, indicators, respondents, possible sources, and a feasible topic direction.

Use the Included Support Materials

- **Annex A: Variable, Indicator, and Evidence Alignment Guide**

Read the relevant annex when a task or help step calls for it. The annexes are reference and recovery support within the planned 60 minutes; they are not extra worksheets or additional graded submissions. If your own study evidence is unavailable, use the clearly labeled practice case to rehearse and mark your actual-study decision pending. A practice case does not establish approval, fieldwork or findings for your study.

What You Already Learned

Quantitative research can describe groups, compare conditions, examine relationships, and support decisions. Its usefulness depends on whether the researcher measures the right information, obtains it from a suitable source, and interprets it within its limits.

RETRIEVAL	Complete this idea from Learning Module 01: Quantitative research can _____ when the researcher _____. _____
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What You Will Produce

A field-to-evidence application containing:

- a real concern and intended beneficiary;
- a decision that evidence could help inform;
- clearly identified variables and their roles;
- measurable indicators;
- a reachable respondent, record, or other data source; and
- one complete Question–Variable–Indicator–Source–Data alignment chain.

Why This Matters to Your Study

A topic is not researchable merely because it is important. You must identify what can vary, how it can be measured, and where the evidence can reasonably come from. These decisions will later control your title, research questions, instrument, and analysis.

Study This Model

MODEL	<p>Field: Education</p> <p>Concern: Some Grade 12 learners may have difficulty completing online learning tasks because their home internet access is unstable.</p> <p>Beneficiary: Grade 12 learners who need appropriate learning resources</p> <p>Possible decision: A teacher may use the evidence when preparing printed, offline, or online alternatives.</p> <p>Research question: Is reported home internet stability related to on-time completion of online learning tasks among Grade 12 learners?</p> <p>Variable 1: home internet stability — predictor or related variable</p> <p>Possible indicator: learner rating of connection stability using clearly explained response choices</p> <p>Variable 2: on-time task completion — outcome or related variable</p> <p>Possible indicator: number or proportion of assigned online tasks reported as submitted on time during a stated period</p> <p>Possible source: anonymous learner questionnaire; an approved anonymized class record may be considered only with permission</p> <p>Expected data: stability categories or ratings and task-completion counts or ranges</p> <p>Boundary: The evidence may show a pattern or relationship. It does not by itself prove that internet stability caused task completion.</p>
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Follow These Steps

1. Select a field or area that you understand.
2. Name a specific concern, beneficiary, and possible evidence-informed decision.
3. Turn the concern into a quantitative question.
4. Identify what changes, differs, is measured, or is used to form groups.
5. Decide the role of each variable from the wording of the question.
6. Give each variable an observable or measurable indicator.
7. Identify a reachable respondent, record, or source.
8. Check whether the resulting data would actually answer the question.

Begin Here: First-Step Rehearsal

TRY	Complete this row during the contact lesson using the modeled school case.
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Response Education

Field	Education
Specific concern	
Beneficiary	
Decision to be informed	
Measurable evidence needed	

Before Session 2, add one row based on your strand, interest, future work, school, or community experience.

Complete Your Work

Part A. Field–Concern–Evidence–Decision

Complete at least two learner-generated rows. Do not collect data yet.

Response 1.

Field or area	1.
Specific concern	
Intended beneficiary	
Who may make or support a decision?	
Possible decision	
Measurable evidence needed	
What the evidence should not decide by itself	

Response 2.

Field or area	2.
Specific concern	
Intended beneficiary	
Who may make or support a decision?	
Possible decision	
Measurable evidence needed	
What the evidence should not decide by itself	

Response 3. Optional alternative

Field or area	3. Optional alternative
Specific concern	
Intended beneficiary	
Who may make or support a decision?	
Possible decision	
Measurable evidence needed	
What the evidence should not decide by itself	

Write a 30-second purpose statement for your strongest row:

Quantitative research matters in _____ because evidence about _____
 _____ can help _____
 decide _____.

Part B. Find and Classify the Variables

Use one field-application row to write a possible quantitative question.

Possible question: _____

First ask what varies. Then use the question to decide how each variable is being used.

Response 1.

Term from the question	1.
Does it vary in this study? How?	
Variable or not a variable?	
Numerical or categorical data?	
Role in this question	
Wording clue that supports the role	

Response 2.

Term from the question	2.
Does it vary in this study? How?	
Variable or not a variable?	
Numerical or categorical data?	
Role in this question	
Wording clue that supports the role	

Response Population term

Term from the question	Population term
Does it vary in this study? How?	
Variable or not a variable?	
Numerical or categorical data?	
Role in this question	
Wording clue that supports the role	

Response Optional profile/grouping term

Term from the question	Optional profile/grouping term
Does it vary in this study? How?	
Variable or not a variable?	
Numerical or categorical data?	
Role in this question	
Wording clue that supports the role	

Possible role labels include **main descriptive variable**, **profile variable**, **grouping variable**, **predictor or related variable**, and **outcome or related variable**.

CAUTION	Respondents are not automatically variables. In “study time among Grade 12 learners,” Grade 12 learners name the population. Grade level is a variable only if different grade levels are included and used in the question or analysis.
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Answer these checks:

1. Which variable is the main condition or result being described, compared, or related? Why?
2. If the question changes, could one variable take a different role? Show a revised question.
3. Is any term too broad to measure, such as success, effect, social media, stress, or online learning? If yes, replace it with a more specific variable.

Broad term: _____ Clearer variable: _____

Part C. Graded-Outcome Component: Build the Alignment Chain

GRADED OUTCOME	Graded-Outcome Component - Quantitative Foundations and Variables Application Packet Used in the Quantitative Foundations and Variables Application Packet: Complete one corrected Question–Variable–Indicator–Source–Data chain. This will be combined with the Foundation Application Record from Learning Module 01. Your practice rows are not additional graded submissions.
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REMEMBER	A variable is what will be studied. An indicator is the observable or measurable sign used to obtain data about that variable.
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Complete the chain for your possible question.

Research question: _____

Link	Variable 1	Variable 2, grouping variable, or second focus
Clear variable name		
What it means in this possible study		
Measurable indicator		

Link	Variable 1	Variable 2, grouping variable, or second focus
Numerical or categorical data expected		
Who or what can provide the data?		
Possible tool or record		
Is the source reachable and allowed?		
How will the data help answer the question?		

Now perform a broken-link check.

• **The weakest link in my chain is:** question / variable / indicator / source / expected data

• **Why it may not align:** _____

• **My repair:** _____

Current status: Developing / Ready for the Graded Outcome / Needs Help

Part D. Test an Unfamiliar Example

Question: Is daily social-media use related to study time among Grade 12 learners?

A proposed questionnaire asks only:

Which social-media platform do you use most often?

1. Is the response measurable? _____
2. Does it measure daily social-media use? Explain. _____
3. Does it collect study-time data? Explain. _____
4. Why would the resulting data fail to answer the research question? _____
5. Write two better items or indicators—one for each variable.
 - Social-media use: _____
 - Study time: _____

Check Your Work

CHECK	☐ My concern is connected to a real beneficiary and possible decision. ☐ The evidence I proposed is measurable and relevant to that decision. ☐ I identified what actually varies instead of labeling every title word as a variable. ☐ I used the research question to justify each variable's role. ☐ I distinguished the population from the variables. ☐ Every broad construct has a measurable indicator. ☐ My respondent, record, or data source is reasonably reachable and appropriate. ☐ The expected data can answer the stated question. ☐ I did not use relationship evidence to promise a causal conclusion.
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If You Get Stuck

HELP	<p>Use this five-question route:</p> <ol style="list-style-type: none"> 1. What is the concern? Write one condition that could differ among people, groups, times, or situations. 2. What varies? Replace broad words with something observable, countable, rateable, or classifiable. 3. What is the question doing? Is it describing, comparing, or relating? 4. What would you see in the data? Name the count, category, rating, score, frequency, or amount. 5. Who or what can provide it? Name a reachable respondent or permitted record. <p>If you still cannot begin, copy the structure of the worked model and replace only the field, concern, variables, population, and evidence with information from your chosen situation. Use Annex A: Variable, Indicator, and Evidence Alignment Guide in this module first. The separate Reference Reading is optional for fuller explanation.”</p>
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Minimum Attempt for the Next Class Session

Before Session 2:

- one learner-generated Field–Concern–Evidence–Decision row is complete.

Before Session 3:

- two genuine variables are identified; and
- at least one variable role is justified from the wording of the question.

Before Session 4:

- one complete Question–Variable–Indicator–Source–Data chain is attempted; and
- the first broken or uncertain link is marked.

Bring This to the Next Class Session

NEXT	<p>Use this module across the linked lesson's planned stages; all stages together retain the original 60-minute independent allocation. Bring the active workspace for the class checks described above. The teacher checks one critical feature and uses it in the next research move, not another separately graded worksheet.</p> <p>After the final stage, bring the checked work to Research Title Development and Topic Lock, Session 1. Use the included example if your own attempt is incomplete; keep the exact missing decision visible. Supplied practice evidence is not permission, actual validation, or a finding from your study.</p> <p>Submit for Grading - Quantitative Foundations and Variables Application Packet: At Session 4 of Importance Across Fields, Variables, and Researchable Problems, submit Learning Module 01's Foundation Application Record together with this module's Part C. Submit one individual packet; the other practice pages are not additional graded submissions.</p>
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Bring this module to Session 4 of the current lesson. The teacher or a peer will inspect only one critical alignment chain rather than score every practice response. You will use the strongest field application and its aligned variables as the source for a feasible topic in Learning Module 03.

Annex A: Variable, Indicator, and Evidence Alignment Guide

A **variable** differs across cases. A **construct** is an idea, such as confidence, that usually needs several defensible indicators. An **indicator** is the exact observable sign used to represent the variable or construct. Phone ownership does not automatically indicate connection stability.

Role	Meaning in the question	Example and boundary
Predictor and outcome	One value is used to examine variation in another	Review minutes and task score; prediction is not causation
Grouping factor	Identifies the groups compared	Printed or digital resource; category numbers are labels
Profile	Describes relevant participant context	Strand, only if the question needs it
Control	A condition deliberately held constant or accounted for	Same test duration; explain how it is controlled
Extraneous variable	Another condition that may influence the outcome	Prior knowledge; naming it does not mean it was controlled

Data type	Recognition clue	Example
Nominal category	Names without numerical order	Resource type
Ordinal category	Ordered choices without guaranteed equal gaps	Very difficult to very easy
Discrete quantity	Whole-number count	Tasks submitted, 0-4
Continuous quantity	Can take fractional values in a unit	Measured preparation time in minutes

Complete chains across learning areas

Context/question	Variable and indicator	Source/data	Decision and limit
Education: How often were four named tasks submitted on time?	On-time submission; count 0-4	Learner report with named deadlines	Describes reported completion, not verified diligence
ABM: How long does packaging take in a classroom enterprise simulation?	Packaging duration; elapsed minutes	Authorized observation log	Identifies time variation; does not assess actual commercial profit
HUMSS: Which public information channels do participants use?	Channel use; separate yes/no per option	Anonymous structured response	Helps choose communication channels; use is not trust
STEM: How do trial conditions compare in seed emergence?	Condition; emerged seed count per tray	Controlled classroom observation	The tray is the experimental unit if treatment is applied per tray
TVL: What is the distribution of completed steps in a practice task?	Completion; rubric-defined step count	Approved anonymized demonstration record	Describes assessed steps, not employability as a whole

Worked repair: “Internet stability -> owns a smartphone -> yes/no” is broken at the indicator. Replace ownership with a defined count of named online tasks interrupted by connection loss during a stated week, or a clearly anchored stability measure. Then change the question and title to match the chosen evidence.

Use: “Question ___ requires variable ___, represented by ___, obtained from ___ as ___ values.” Stop if the source requires private records or permission you do not have. Plan access; do not collect records during this module.

Concept source: Unit 1 Reference Reading, sections 8-9 and 13. Cross-field cases are original instructional examples.